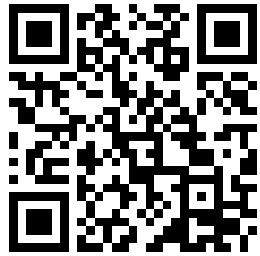

C. C. Carter

The School World

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The School World

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BY WAY OF INTRODUCTION.

A PROMINENT feature of recent educational effort is the publication of numerous works, by writers of experience and authority, upon methods of teaching the subjects usually studied in secondary schools. A large representative Committee, composed of practical teachers from all parts of the United States, has carefully considered the relative values of school subjects and the extent to which they should be studied; and their Reports[1] to the National Educational Association are full of wise suggestions and practicable recommendations which are beginning to exert an influence upon the instruction given in secondary schools in the States. Our Incorporated Association of Head Masters has, upon a more limited scale, worked in the same direction. The elaborate Reports prepared under the direction of Mr. Michael Sadler, the Director of Special Inquiries for the Education Department, have been the means of directing attention to educational methods and reforms. In addition to reports of this kind, many volumes, several of which are mentioned elsewhere, have appeared since the Royal Commission on Secondary Education reported that an improvement of methods was one of the most important steps to ensure future progress in secondary education.

Facts such as these, indicating, be it noted, the views of experienced teachers, testify to a widespread interest in the principles of teaching. Evidence has been forthcoming that, though schoolmasters and schoolmistresses may be more or less indifferent to the politics of secondary education, they are anxious about increased efficiency. Legislation will, it is hoped, eventually give our secondary schools a satisfactory place in an organic system of national education; but only those engaged in the actual work of instruction can develop sound methods of teaching and enlightened forms of school government.

It is with the object of promoting the interests of education, by publishing information upon the principles and practice of teaching applicable to secondary schools of all types, that THE SCHOOL WORLD has been founded. A co-ordination of endeavour has hitherto been too much neglected. Individual research and isolated attempts to arrive at the best way of performing the manifold duties of the schoolmaster are, we are glad to know, common enough; but it has not been sufficiently recognised that some system of recording results and exchanging observations is absolutely essential to ensure success. It is hoped that THE SCHOOL WORLD may come to be regarded as a sympathetic medium by which this end may be accomplished. But it must not be forgotten that success along these lines can only be attained by the active co-operation of those engaged in the work of education; and it is believed that these pages will eventually show that no more original and efficient methods of instruction than those followed by many teachers in secondary schools are to be found.

Practical teachers of this stamp—masters and mistresses who have spent laborious days in the class-room—have a knowledge of the realities and limitations of schoolwork altogether beyond the experience of the arm-chair educational philosopher, and it is their views which will receive the first consideration in these columns. Indiscriminate condemnation of existing methods will not be encouraged, nor vague generalisations as to how subjects should be studied. What is wanted is definite descriptions of ways and means which have been proved efficient, helpful hints which will facilitate the work of teaching, and accounts of successful plans dealing with difficulties which arise in every school. To such matters as these the pages of THE SCHOOL WORLD will always be open.

[1] Published by the American Book Company.

THE TEACHING OF ALGEBRA.

By G. B. MATHEWS, M.A., F.R.S.,

Late Professor of Mathematics in the University College of North Wales, Bangor.

I.

ALTHOUGH algebra forms such a time-honoured part of an ordinary school course, and so much has been said and written about it, there are several reasons why it is worth while to reconsider, from time to time, our aims and methods in teaching it. There is a growing conviction that the best kind of teaching is that which appeals, as far as possible, to the reasoning powers, and discourages learning by rote and the mechanical application of set rules. How far this principle can be carried out in any particular subject is an important question, and in the case of algebra is one of considerable difficulty. Again, the progress of a living science, even in its most recent and abstruse developments, necessarily reacts upon our views of its first principles, and algebra is no exception to this rule.

PROGRESS OF MATHEMATICAL ANALYSIS.

It is hardly an exaggeration to say that during the present century mathematical analysis has undergone a revolution not unlike that effected in biology by the doctrine of development; and, quite recently, the laws, hypotheses, and processes of algebra have been rigorously examined and classified as they had never been before. We now know that what is usually called "algebra," pure and simple, is only one of a whole family of algebras, each defined by its own system of formal laws; so that it is about as reasonable to allow a student to remain in ignorance of this fact as to permit a boy to leave school unaware of the existence of America. Again, the province of this "ordinary algebra," as it may be called, has been methodically explored in various directions, and its different districts, so to speak, and natural boundaries have been, to a large extent, determined. Algebra may at last fairly claim to be an organic theory, and not a mere assemblage of isolated phenomena. To encourage the notion that algebra consists of a set of "artful dodges," and that its aim and end is facility in solving "catchy" problems is as wrong as to suggest that the study of Latin and Greek consists in learning the dative plural of *dea*, the proper way of rendering "If I had had a mind, I would have given it," and other such ragged rubbish from Dryasdust's repository.

EQUIPMENT OF THE TEACHER.

I am not arguing in favour of any attempt to force upon young boys any critical discussion of the fundamental principles of algebra. Anything of this sort is sure to fail, and is sheer waste of time, if nothing worse. But I do say that a teacher ought to have a sound knowledge of the general laws of ordinary algebra, and ought to know something of the nature of other algebras, in order that he may avoid the risk of implanting erroneous ideas. I am convinced that less harm is done nowadays by teaching by rote than by those ill-advised attempts at rational instruction which are inspired by imperfect knowledge. Thus, for instance, if you state the binomial theorem for a fractional exponent, and the conditions for its validity, you do not educate your pupil, but you give him a piece of information which he can learn to apply, and which may be practically useful to him; but if you go on to make him learn one of those unsatisfactory "proofs" of the theorem which still keep their place in some of the text-books, you are doing positive mischief, and replacing harmless ignorance by a mere pretence of knowledge.

PRINCIPLES THE FIRST CONSIDERATION.

There is another consideration which demands attention when we try to balance the claims of theory and practice, and decide upon the extent and the character of the course of instruction which is best for us to adopt. The advance of physical science has created a demand for a class of workers intermediate between skilled mechanics and exceptionally qualified scientific specialists. For these men a certain working knowledge of mathematics is essential, and it is reasonable to ask that at least the foundation of this knowledge should be laid at school. Now the complaint is frequently made by eminent engineers, electricians, and physicists that, for practical purposes, the mathematics taught in schools is almost useless; and hard things are said about "academic methods," "mere mathematicians," and so forth. As a mere mathematician I do not agree with the views which some of these eloquent invectives seem to me to imply. I believe that it is the duty of a mathematical teacher to expound the principles of his subject, and not merely its applications, and that by following this course he is acting in the best interests of his pupils, whether they are to be ploughmen, or electrical engineers, or viceroys. To pick out scraps of theory, to slur over difficulties by means of unsound analysis, to rush on prematurely to the infinitesimal calculus, is an unprofitable as well as dishonest procedure. To emphasise this, and ignore that, in defiance of theoretical considerations, just because the practical engineer says that for him the one is important and the other useless, is not much better than to be ruled by the requirements of examinations.

PRACTICAL NEEDS.

At the same time there is a real ground for the outcry of the engineers, although not for the reason they too often appear to allege. It is not that too much theory is taught, but too much practice, and that practice of the wrong sort. Far too much time is spent upon elegant trifles which are as unimportant and unpractical from a

theoretical point of view as they are in the eyes of the engineer. Text-books, otherwise admirable, are disfigured by scores, nay hundreds, of fantastic examples utterly unlike anything that ever did or could arise in the course of a genuine mathematical research; and the opportunity is persistently neglected of giving examples of problems such as those which arise in actual physical investigations, and of methods (especially those of approximation) which are of great importance in all applications of mathematical theory. To understand the relation of algebraical sign to the "sense" of concrete quantities is more important than to know the factors of $a^3 + b^3 + c^3 - 3abc$. The resolution of rational fractions into the sum of elementary partial fractions surpasses, both in value and interest, nine-tenths of the "simplifications" propounded as examples on fractions; yet how often in these and similar cases is the trivial magnified at the expense of the essential!

But it is time to leave these generalities, and try to sketch out the course which seems to me to be the right one. The reader will excuse me, I am sure, for an unavoidable discursiveness; points of detail are all-important, while at the same time a detailed discussion of a whole school course is impossible.

Relation to Arithmetic.

First of all, then, the study of algebra should be based upon a sound knowledge of arithmetic. The signs of operation, the symbol of equality, the use of brackets and positive integral indices, the notation of fractions—in fact, all the ordinary apparatus of algebra, except the use of literal symbols of quantity and the convention that ab, $23c$ mean $a \times b$ and $23 \times c$, may be explained and illustrated arithmetically. Then, without any explicit mention of algebra or the use of any new technical terms, true algebraic symbolism may be slipped in unawares. As soon as a boy has really grasped a general principle of arithmetic he can appreciate the symbolical statement of it. For instance, when the pupil has once succeeded in passing intelligently from the particular case, "Three times four is equal to four times three," to the general proposition, "Any two whole numbers being taken, the product of the first by the second is equal to that of the second by the first," he will have no difficulty with the statement that "if a, b, represent any two whole numbers, $a \times b = b \times a$," and so in other cases; in fact, he will quickly relish the symbolical statement as a convenient kind of shorthand. This is, indeed, the best way of looking at algebra in the first instance.

Similarly, let the pupil be exercised in putting into the shape of a formula such things as the rules of mensuration; *e.g.*, "if a room is l feet long, w feet wide, and h feet high, what is the area of the floor? of the four walls? how many cubic feet of air will the room hold?" and such like. Give him formulæ derived from physics, such as those relating to falling bodies, to the linear expansion of solids, to the calculation of the horse-power of an engine by a friction-brake, &c., &c.; and make him work out numerical results from given data. In this manner he will learn useful facts by the way as well as acquire facility in the use of symbols; and if you tell him that, if he works, he will some day be able to prove the truth of the rules you give him, you will very likely awaken an interest which the usual "Exercises I." of an elementary "Algebra" are not calculated to inspire.

Then arithmetical problems and simple equations involving one or more variables may very profitably be taken together. Choose very simple questions first, and let them be worked out both arithmetically and algebraically; make it perfectly clear that the same reasoning and the same axioms apply to both; and let the advantage (such as it is) of the symbolical method speak for itself as the questions become more complex. At the risk of seeming very egotistical, let me confess that my interest in algebra was first aroused by the problems in Hutton's "Course of Mathematics" (there was one fascinating question, I remember, about a hare which took five leaps to a greyhound's three, and had fifty yards start, yet could not escape destruction); the result was that I could tackle pretty stiff algebraical problems long before I was officially introduced to the subject, and while I was still blissfully ignorant of half the technical terms which Science and Art candidates for Stage I. are expected to be able to define. All my experience strengthens the conviction that the solution of simple equations, and of problems leading to them, should be entered upon at the very first opportunity; that is to say, as soon as the rudiments of symbolical notation have been acquired.

(To be continued.)

The Value of Specimens in teaching Arithmetic.—Every school should have a set of the smaller weights and measures, the pound, ounce, quarter, the foot, inch, yard, the pint, quart, gallon, etc., and these should be constantly employed in teaching the tables. Children will thus see the relations between the different multiples, and acquire some definite idea of each. For lack of concrete teaching it is common enough to find young people who can repeat their tables correctly, but who yet cannot tell whether the playground is a pole or a furlong, and whether a scuttle of coal weighs a pound or a quarter. The dimensions of the room, and of its doors and windows, should be obtained by actual measurement, in which the pupils take part, and the distances to certain well known spots should be familiar, and constantly employed as standards of comparison.—David Salmon, "The Art of Teaching" (Longmans & Co.).

The Comprehension of Millions.—A person counting aloud can in a minute count from 140 to 180, depending on his power of enunciation. If we adopt an average of 150 per minute, and I assume that he will not repeat the complicated numbers, but will count up to 100 and then a second 100, and so on, 7,000 minutes will be required in which to count one million. Seven thousand minutes amount approximately to 10 days of 12 hours each. Thus, if a man could perform such a feat of endurance, he would be occupied for 12 hours a day, from the 1st of December to the 29th of January, in counting the present population of Greater London.—Sir J. Wolfe Barry.

WANTED—A CLASSIFICATION.

By H. G. WELLS.

THERE is a something called pedagogic research, irresistibly provocative to the facetious turn of mind, a something presented typically by an ambitious and imperfectly educated young lady with a notebook developing into a tabulated report. "Only 1·79 per cent. of the Boston town children had heard the word 'porpoise,' whereas the percentage in Utah was 3·012," is the sort of thing that drifts across one's memory. Such exploits fall into the hands of journalists and professional humourists and literary men like A. T. Q. C., and give them occasion for mockery. Whereby the progress of pedagogic science is retarded, and the ordinary schoolmaster comes to regard the whole business as an easy way of making himself ridiculous in the eyes of secular men. Yet a certain accumulation and systematisation of fact may be pointed out as a possible accomplishment for any energetic person with the scientific turn of mind, a research that might not only open the way to further fruitful researches, but that would be of real and immediate value to the practising teacher, and of which the very beginning is waiting to be made. And this is a natural classification of boys and girls.

There are, of course, certain empirical classifications; the boys an assistant master is in sympathy with are usually spoken of as "decent" and the residuum as "cranks," "duffers" and "little beasts," and most parents distinguish between their own offspring and ordinary children. For these latter, cater the purveyors of "individual attention." But apart from the necessities of advertisement, the work of almost all schools is arranged for the benefit of an average boy or girl and is justified, as things are at present, by a reasonable proportion of successes. Yet no one knows better than the experienced teacher, of that dispiriting minority for whom the average treatment is a misfit, who do not "catch on" with the average regimen, and who leave school at last already tainted with failure. And it is known, too, that many of these so-called failures may recover the disadvantage of that inappropriate education, and become at last more prominent, more useful or more successful than that "good-all-round" youngster who is the working teacher's ideal.

Now, it is generally believed, and the present writer believed until very recently, that this was a quite unavoidable waste, that "exceptional" boys were exceptional boys, and that the only alternative was the practically impossible one of devising an individual regimen for each exception on his separate merits. But certain recent exercises in novel writing, falling happily in with certain academic arguments with a doctor, have awakened the present writer to a possible fallacy in this view. Are we right in assuming, what I have certainly always taken for granted hitherto, that the great majority of boys resemble an average boy more or less closely, and that the remoter a boy is from that average the rarer he is? Let me represent the suggestion by two figures. If the central point of this figure represents the average boy, is the species of boy arranged around that centre as in fig. 1 or as in fig. 2? That is, is there one type of boy or many?

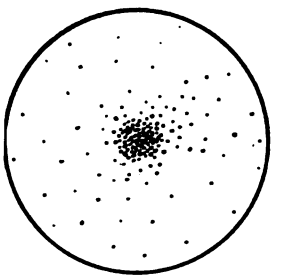

FIG. 1.

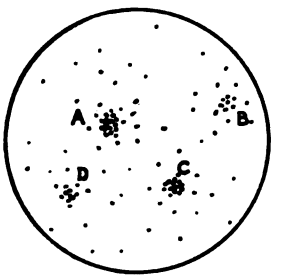

FIG. 2.

For my own part, though it might be hard to prove my position, I am convinced that whether as a result of racial intermixture or from some unknown cause, there is in this country *no central type* about which individuals vary, but that there are a number of types, each probably distinguished by a typical rate of growth, age of adolescence, mental and moral characteristics, liability to this or that disease, and that when all individuals have been referred to their types, the exceptional person will either vanish or appear in the light of a hybrid. And (another unproved opinion) I do not believe that hybrids really *mingling* characteristics are abundant, that in spite of intermarriage, types of physique and character, just as in the case of animal hybrids, refuse to average out, that offspring most generally prefers and "takes after" one or other of the apparently uniting types. And I imagine that in the more efficient schools that may come in the future, there will be an elastic educational regimen replacing the present uniformity, and that the schoolmaster will do in a regular and scientific manner what now is no doubt already largely done by teachers of genius, and that is, begin his work upon a boy with a classificatory diagnosis.

To lay down the lines of such a classification as I have proposed demands power of observation, analysis and industry to which I cannot pretend. Nor have I the perpetual opportunity for observation which is needed and which every teacher in practice possesses. But it is not improbable that such a work might profitably begin with the classification of boys or girls by the quality of their imaginations. What dreams and stories appeal most strongly to them? To some boys the passing ship, the straight, far-reaching road, the distant hills, exceed all other stimulation. There are others to whom these things have little meaning, but who are fertile of dramatic egotistical dreams. Such vary from magnificent deeds through strutting vanity to those who cherish unwholesome silences. Others again are makers, dreaming the finished work through all the disorder of its construction.

And so on. Do not these types of mind carry with them not only certain facial characters, but certain characters of physique, and a certain definite law of development?

All these things lie vague and unproven close at hand. To answer these questions with authoritative thoroughness would be of the greatest immediate and permanent value in educational work.

PHYSICAL OBSERVATION OF BRAIN CONDITIONS OF BOYS AND GIRLS IN SCHOOLS.

By FRANCIS WARNER, M.D. (Lond.), F.R.C.P.

I.

THOSE engaged in the active conduct of school education must feel an interest in the brain condition of the boys and girls who form the material upon which they expend much thought and energy. I think it will be found that definite observation of a few classes of points, such as are here described, will aid teachers greatly in forming a rapid opinion as to the brain capacity of the pupils, and also facilitate their classification for school purposes, and throw much light upon many educational problems, and afford assistance in difficulties as they arise. When we have all learnt to make observations of the brain conditions of children, and compared our results, it may become possible to found a Science of Mental Hygiene based on facts as supplemental to the School Hygiene, which has done much to improve the standard of health and prevent illness.

The make, status and present condition of the brain may be inferred by all who, looking at the individual child carefully, note his expression, balance and action in movement and response. These are direct signs of the modes of action occurring in the parts of the nerve-system (brain centres). It must be remembered that all mental action is expressed in movement and its results.[1]

The modes of motor action seen in looking at a child may conveniently be classed under the following headings, each of which will also be found characteristic of modes of mental faculty and expression:—

(1) **Spontaneity** in brain action for movement is seen when you observe in the face its changeful expression, or smiling, with movement about the mouth, spreading upwards around the eyes to the forehead. The eyes may be often turned to one side or the other, without being directed to you or any particular objects. The hands may show much spontaneity of finger movements, either as they hang by the sides or when held out straight in view of the teacher. There may also be spontaneous or uncontrolled utterances. This may be called restlessness or inattention; it should be remembered that much movement in many parts of the body represents that healthy activity of the young brain which is the basis of all successful training. This spontaneity is lost in illness, and is absent in the deficient child; it is a character of brain action present at birth, and is still very marked at seven or eight years, and then lessens—as to movement—as the years of adolescence approach. Spontaneous action may be subnormal, there being too little activity for the child's age; it is common to find children whose eyes move but little, the head being moved in looking at an object, not the eyes in the head. There may be uncontrolled repeated action such as grinning, frowning, shoulder shrugging. This usually accompanies an unoccupied mind, but may also result from over stimulation by commands in place of quiet direction.

(2) **Impressionability** is a faculty gradually developed during the first months of life; it is seen mainly in the co-ordination of spontaneity controlled through the senses, at first temporarily, while later faculty thus acquired is retained. All educable children show some impressionability; when this is deficient hearing and sight should be tested.[1] School children who are habitual mouth-breathers are apt to become deaf, and if also short-sighted they do not easily receive impressions from teaching.

(3) **Inhibition of movement.** Spontaneous movement may be arrested for a moment following the sight of something that interests the child, or a gesture, or the direction, of the teacher. This corresponds to the mental attitude of attention; but it may indicate arrest of all thoughts also. During the pause in movement you want arrangements to go on in the brain producing thoughts ready for expression. Say, you ask a question in History; the child becomes motionless; if the right answer follows you infer he was attentive and thinking while still. I shall speak later of slow response when the pause before answering is long. The mere stopping of movement in young children when not replaced by mental activity has always seemed to me a mistaken mode of training; rather a process of military discipline than cultivation of the intellect. Inhibition is seen in movements when the child is quiet while you tell him what to do, and then sets about doing it. This faculty increases with age, and becomes rapidly manifest under good training.

(4) **Control.** You may stop a child's spontaneous movements and thinking by making him sit still and do nothing; this is not controlling him. When you get response to your questions; when what you say is retained, or when inferences are made from what you show—then you control mental action. Movement is under control when physical exercises are reproduced by the pupil in imitation of the instructor; the movements should be exact in the time and degree of action in each part and each finger. Control may be better effected through the eye or the ear; sometimes the word of command causes a spreading area of

[1] See author's "The Study of Children, and their School Training," chapter v. Macmillan & Co.

[1] Op. cit., p. 30.

movement, or fidgetting, which a quiet gesture of direction controls well. If movement is well under your control, thinking will probably also become amenable to your guidance.[1]

(5) **Muscle sense.** Control of the brain is effected not only through the eye and the ear; a very important means of guidance is due to impressions coming up from the muscles to the brain. This is termed "muscular sense." Either contraction of the muscles, as in a hand and finger action or in movements of the eyes, as well as the muscle-tension resulting from holding a weight, may affect and control the brain. This is illustrated when the pupil counts the movements of his hand, when he measures two objects by use of his fingers and expresses their size; also when, with a weight in either hand, he makes mental comparisons between them, after teaching. Recognition of coins without looking at them depends mainly upon muscle-sense; primary ideas of number, dimensions, ratio, may be most readily implanted by this means of brain control. When you put points and lines on the blackboard the points may be counted and their position recognised while the length of the lines is measured by eye-movements produced by the muscles of the eye-balls.

(6) **Compound cerebration.** Interaction of parts of the brain upon one another, whether under guidance or following a simple direction and the results of former training, is exceedingly interesting, and corresponds physiologically to some of the most important brain processes in thinking. Tell the pupil to count up to ten and then add all the numbers mentioned; after a pause he replies, "fifty-five." You may say this is mental calculation following previous training and your direction: the expression so far differs from the impression of the verbal direction that interaction among the brain-centres must be inferred to have occurred in the interval. Interaction of one brain-centre upon another may be inferred from observation of movements when the expression seen differs greatly from the sensory impression which it follows, but is clearly sequential to and adapted by it. This mode of interaction among brain-centres under guidance, and retention of the established order of action, may be illustrated in movements. Look at a well co-ordinated exercise in free-hand movements; as the parts move, each hand and the separate fingers follow by imitation those of the instructor, exact in the time, order and degree of each act; when the exercise has been impressed by practice the child will repeat it without further guidance than the direction to do so. One brain-centre after another comes into motor activity as nerve-currents pass along the nerve-paths established by training, thus reproducing the series of movements taught.

(7) **Retentiveness** is shown in movement when a physical exercise is readily repeated, and in orderly habits carried out with due punctuality. The effects of a direction given may last too long; when a class has been told to hold out hands, a slow boy will keep his forward long after the others have dropped theirs. Words may be repeated in the order learned, showing memory; the child who does not turn his eyes to look at his book when he puts it away forgets where to find it; the boy who looks at his master demonstrating geometry on the blackboard does not see the figure, and can only repeat what he heard. In mental action proper, spontaneous thoughts may interfere with memory by replacing the impressions that should be recalled.

(8) **Co-ordination.** As to movement, this implies regulation of each act in the series of movements, brought about at first by control through the senses; the child sees an object, his hand is moved over it, the fingers close, and the object is grasped: in cricket, sight of the ball coming regulates the stroke with the bat, or the hands in catching the ball. Co-ordinated action may be performed only under guidance at first; but, if the same action be repeated, the nerve arrangements become established, as already explained. Hence the great value of exercises producing brain co-ordination, and skilful games where sight regulates action, quickening brain processes, which is of the greatest value for mental work. Co-ordination may be partial; the child who has much spontaneous movement may do as he is told, and fidget all the time; he may transcribe his copy, but shuffle his feet or look about the while.

(9) **Spreading area of movement.** When a child is hurt you see the angles of the mouth drawn down, then the face becomes flushed, the forehead crumpled and the eyelids are firmly closed, while the mouth is opened and he cries aloud: further, movement may spread to his limbs, the fists being closed are pressed to his eyes or the hands placed on the part hurt. The area of visible movement spreads rapidly, as in expression of other emotions; so it is in joy and passion, and in an epileptic fit and other nervous seizures. This corresponds to a spreading area of action in the brain, centre after centre becoming co-active; not one centre controlling another and then becoming quiescent, as described in compound cerebration. Such a storm of brain action accounts for the exhaustion following an explosion of emotion or passion. A uniformly repeated spreading movement is sometimes seen in tricks and habits; the tongue is protruded whenever spoken to, or the head held on one side before a reply; movement may spread in grimaces of the face or shuffling of the feet. In stammering, spasm commences on articulating certain sounds, it may be first knitting the eyebrows and then pass to the lips and the tongue. Nervousness and shyness are often shown in turning the head, twitching fingers and shifting feet. Mental confusion often accompanies spreading movement. (See examples, op. cit.)

(10) **Response delayed.** It has already been said that there may be a pause between the sensory impression and the expression resulting, with inhibition of spontaneous movements; this may

[1] Examples of children, *see* op. cit. List, p. 18.

correspond to the act of thinking. There may be no pause, but an immediate reply without thought. On the other hand, there may be delay, so long that the processes of thinking are not concluded till a further question is put; the reply may then contain an answer to the former question. Response in movement may be delayed, the child being long before doing as told; such delay may be lessened by training.

The tabulated description of a boy in school will illustrate results of physical observation of his brain action in relation to his mental work.

A Bright Healthy Boy 10 Years Old.

(1) *Spontaneity.* Playful. Expression bright, often changing; eyes much moved. No frowning. Fingers move much. Talkative.

(2) *Impressionability.* Looks at what is shown him: quiet when spoken to and looks at teacher. Generally obedient.

(3) *Inhibition.* Is quiet when called upon in class; after a short pause replies to question put, then looks at others in class. He stops to think.

(4) *Control.* When looking about is better controlled by a gesture than a word. Prompt in physical exercises. Answers something to each question.

(5) *Muscle sense.* Expresses fairly the weight of coins felt; can compare lengths at sight well and count objects. Good at games.

(6) *Compound cerebration.* Free-hand exercises performed well under guidance or without it. His thoughts are becoming orderly and systematic.

(7) *Retentiveness.* Each movement and their order exact in physical exercises. Good memory for vocabulary and poetry.

(8) *Co-ordination.* His movements are well regulated and orderly; so are his thoughts for subjects he has been taught, as rules of arithmetic.

(9) *Spreading action.* Seen in his playfulness after school; in fidgetting during lesson. He sometimes asks questions not appropriate to the lesson.

(10) *Response delayed.* Interval between question and answer becomes longer when fatigued; also when not ready in thinking out the reply.

Care of the Body.—It is much to be feared that if a truthful reply could be obtained from children in the schools of England, elementary and secondary, public and private, rich and poor, not ten per cent. could answer "Yes" to all the following questions:—(1) Is your bedroom window open at night all the year round? (2) Are your clothes easy at the neck, waist, and hips? (3) Do you take a cold or tepid bath every day, or even three times in the week? (4) Are your teeth, nose, and ears regularly and carefully cleansed? (5) Do you fully exercise the most important muscles of your arms, chest, abdomen, and legs every day of your life? (6) Do you know anything whatever of the rules that govern your physical health and well-being? And if adult England were polled, the general order of things would be found to be bad air, tight dress, no cold bath, moderate cleanliness, exercise mild and intermittent, and ignorance of all that has to do with the body. Need we wonder that angry doctors openly say before coroners that our system of teaching and training children is rotten to the core.—Alfred Barwell, "Clear Speaking and Good Reading." (Longmans, Green & Co.)

ON THE EARLY TEACHING OF FRENCH.

By PROFESSOR WALTER RIPPMANN, M.A.

I.

THE relative importance of modern languages in the curriculum of secondary schools, and the best methods of teaching them, are matters which have of late years attracted some attention. The views expressed represent every possible attitude towards the subject, from that of absolute contempt for what has been styled "purely utilitarian" to that of keen enthusiasm for what has been regarded as the panacea for commercial backslidings and international misunderstandings, and the straight road to world-wide harmony and goodwill. As for methods, I shall attempt in a subsequent paper to sketch briefly the various phases through which we have passed.

First, however, it will be best to clear the ground by defining the limits which I have set myself, and by narrowing down my audience.

It is the *early* teaching of French, and not that study as a whole, and it is particularly the teaching of French in *secondary* schools (for boys and girls) to which these remarks will apply. It is assumed:

(1) That the children (from 9 to 12 years of age) have had a certain training in their mother tongue, so that they possess a fairly large vocabulary of concrete things, and a much smaller vocabulary of abstract terms; their vocabulary may be regarded from another point of view as their "stock of ideas."

(2) That the time available is at least three periods of forty-five minutes in the week; these periods being distributed as evenly as possible, and the times being suitably chosen (*e.g.*, not in the afternoon); this is a matter of very great importance, and many school time-tables seem to be drawn up without consideration of the varying demands which different subjects make on the pupil.[1]

(3) That the study of no other language is begun at the same time. To introduce a child to two new languages in one year is to subject him to undue strain; it is much better to give more time to one language at first, and to diminish the allowance for it when the other language is taken up, one or two years afterwards.

(4) That the grave importance of good teaching in the first year is recognised, and that it is consequently entrusted to a teacher who has given serious thought to finding a suitable method.

This last assumption raises several points to which, at any rate, a brief reference must be made.

It will be easy to gather from the following papers for what reason the authorities on the theory and practice of modern language-teaching dwell so emphatically on the need for sound teaching at the very outset.

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[1] A very valuable book on this subject is H. Schiller's "Der Stundenplan," published by Reuther and Reichard, Berlin, price 1s. 6d.

The work should, therefore, not be regarded as mere drudgery, beneath the dignity of the specialist; he should be convinced that this is indeed the foundation of the building, in the construction of which he proposes to help his pupils, and that unless this foundation is firm and quite trustworthy, the building itself will be in danger, if not of crumbling to pieces altogether, yet of subsiding here and there, and thus of presenting anything but a graceful and symmetrical appearance.

To anyone who has given thought to the aspects of the child mind and to their proper development—and every teacher worthy of the name looks upon this as his chief task and the source of any satisfaction that his calling may afford him—to such a one it cannot fail to be a problem of supreme interest how best to teach a child the use of a new language, a new clothing for the mind, a new instrument of thought.

The "specialist" has been named; but I wish the term to be understood in a wide sense. It will be conceded at once that in every school, great or small, the teaching of French should be carried on according to a definite scheme, so that there is regular progress on the same lines from the lowest class to the highest. The scheme must obviously be drawn up by a teacher specially qualified for this delicate task; but it is not enough to have a scheme, it is essential that there should be one who is responsible for its execution. It may happen that the specialist who framed the scheme has left the school; but another must take his place in order that it may be carried out, either unchanged or with such modifications as seem advisable. It is undoubtedly best that he should take the beginners himself; but if that is not feasible or convenient, he will at least convince himself that the pupils have a safe guide when they are making their first steps.

Mr. Weldon, not long ago, gave as the result of his experience as a head master that the elementary teaching of foreign languages should be in the hands of a native, and the advanced work entrusted to a foreigner. As we are not now concerned with the later stages, we need not stop to dispute the second part of this statement; though it may be pointed out in passing that actual practice in France[1] and Germany does not bear it out by any means, and that in England the present state of affairs is largely due to an insufficient supply of competent native teachers. The sooner this is remedied the better it will be for the cause of foreign language study here; suitable training, such as our Universities should (and in part do) furnish, combined with a careful study of Continental methods, will supply the remedy.

The reasons why foreign teachers so often fail in dealing with elementary classes need not here be enumerated at length. We should have to consider the fact that there are salient differences between the English and the French child, differences which the foreign teacher is rarely able to appreciate, and for which he makes little or no allowance. Children are shrewd observers, and resent being misunderstood; and when they are healthy they are always ready to retaliate. Lack of sympathy is no doubt the worst charge that can be brought against the foreign teacher; next to it comes incompetence. It is not the pick of the profession who honour us by their presence, except in a few rare cases.

In favour of these I gladly make an exception to a somewhat sweeping statement; and we are all grateful for the excellent work done by many foreign teachers, men and particularly women, distinguished for their love of children and for the conscientious fulfilment of their duties. To these we owe much, and we welcome their presence in our midst; but that cannot render us more indulgent to the incompetent charlatan who thinks he can teach our children when he sees no chance of making an honest livelihood at home.

The remarks I have to make will, therefore, be addressed particularly to the younger generation of foreign-language teachers, English men and women who have not yet determined to cling firmly to some established method or book, and who are wishing to profit by the experience of other teachers here and abroad. We are sometimes inclined to pay too little attention to the methods employed and the results obtained by our fellow-teachers on the continent, and we are surprised to find that they are distinctly ahead of us. So keen is the rivalry of the leading nations nowadays, that we cannot afford to ignore their progress in any department whatever; and it behoves us as teachers of foreign languages to examine attentively what is being done elsewhere, and to see how far we can adopt or adapt the methods that have led to results which we must confess are distinctly more satisfactory than any we can claim for our own teaching.

"But French or German children have greater aptitude for learning foreign languages."

That remains to be seen. English children have hardly had a fair chance; and when they have been fortunate enough to learn their own and then a foreign language in a sound and interesting way, the result has been to show that they possessed quite as much aptitude as foreign children. A fact usually brought forward in support of the objection mentioned above is the difficulty experienced by our little ones in acquiring the pronunciation of foreign sounds; but here again it is solely the teaching that is at fault, as I shall attempt to show. Let us, then, introduce the children to the new language without handicapping ourselves with any preconceived ideas that after all, with such material, we shall not be able to do much. On the contrary, the material is good; it is far better for us to have doubts about our own powers of imparting knowledge and to do our utmost to perfect these.

(To be continued.)

[1] See the article by K. A. M. Hartmann in *Neuere Sprachen*, vi., 372 (September, 1898).

BIMANUAL TRAINING IN SCHOOLS.

By HENRY BLOOMFIELD BARE, F.R.I.B.A.

AMBIDEXTERITY has by long-continued custom been neglected and even discouraged in young children, from the disposition of parents to regard any tendency to use the left hand as a sign of awkwardness.

Only recently it has come to be recognised by advanced teachers that the systematic cultivation of the use of both hands in early years serves a very important purpose in education. From recent physiological research both in Europe and America, it seems now to be a well-established theory that the close relation of muscle, nerve and mind ensures by exercise a favourable reaction of one upon another; and correspondingly any neglect in the use of a set of muscles on one side of the body is detrimental to well-balanced brain development.

It is, of course, generally known that the nerves controlling the muscular action on the right side of the body are connected with the left half of the brain, and that the right half is connected with the muscular action of the left side of the body. It is perhaps not so generally understood that the amount of cerebral machinery apportioned to the various movements of the body is not simply in proportion to the magnitude of the movements themselves, but is more closely related to the sensitiveness of the skin which those movements bring to bear on the object. Generally speaking this sensitiveness increases towards the extremities, so that, for instance, the movements of the index finger in delicate operations (such as the reading of a blind man by the touch of raised letters),

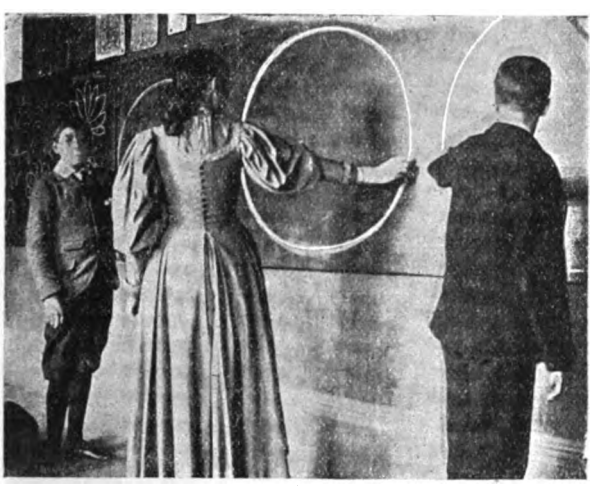

FIG. 1.

involve a much larger share of cerebral machinery than does the larger action of stooping of the whole body. But pre-eminent among the various movements of the body are the actions of the shoulder muscles on account of their extraordinary range and delicacy of control. For educational purposes it is well to remember that mental growth has to proceed in harmony with the laws of development of the body and in harmony with all phases of motor training. In early childhood the emotions and activities are dominant, and the intellect has less controlling power over the muscular movements.

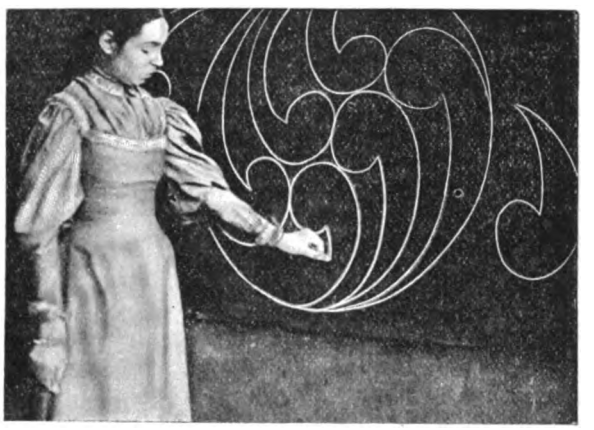

FIG. 2.

There are nervous centres controlling as well as producing movement, and efforts of the will producing action aid the development of sensorial areas of the brain. The care of the educationist is, therefore, to discipline the muscular movements and to cultivate the latent capacity for usefulness which exists for both hands alike.

In the first stages of bimanual training no more effective or more readily applied method seems to offer than a system of blackboard drawing with chalk. By actual experiment, conducted for the last fourteen years on a large scale in the schools of the Public Board of Education in Philadelphia, under the direction of Professor Tadd, the success of this method has been thoroughly established, and in the United States the use of the system is gradually spreading.

In England, so far, there appears to be only a small beginning made in Liverpool, where the writer has instituted the system during the last three years and developed its use in Parklea (private) School and in his private studio. Through this effort the system has recently attracted the attention of educationists in Germany, Austria and Italy, but it does not appear to be in actual practice in those countries at present. In any case, America is a long way ahead in the adoption of a rational system of bimanual training in public schools. Through experiments made upon a number of young children by Professor Hancock, of Clark University, Massachusetts, the value of which have been attested by further researches on the part of Professor Sherrington, of Victoria University, Liverpool, it appears to be thoroughly demonstrated that control of the arm movements develops first at the muscles of the shoulder joints, then the elbow and wrist joints, and lastly the

finger joints. For instance, the delicacy and precision required in the successful bowling of a cricket-ball emanates primarily from the joint of the shoulder, and in a decreasing ratio down to the joints of the finger tips. Where the blackboard practice allows such excellent training is in

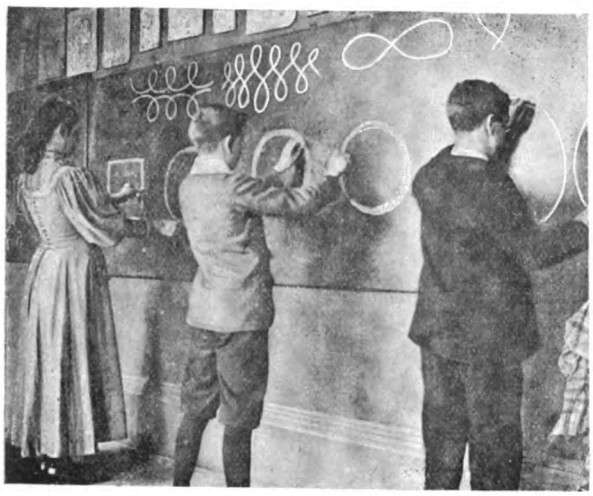

FIG. 3.

the opportunities it affords for large free movements of the whole arm, and here it is well to note that in following the natural order of control of the muscular movements of that wonderful piece of mechanism, the human arm, we should begin with movements mainly from the shoulder joint rather than with those of the elbow joint and wrist. A few illustrations photographed from the actual working of the blackboard drawing methods used in the Liverpool studio will better serve to explain the practice advised by the writer.

In Fig. 1 a circle struck with a swing of the whole arm requires that the body shall be erect and steady, the arm fully but not stiffly extended, and that the chalk shall be properly held at such an angle to the surface of the board as to prevent undue friction.

Any swaying action of the body, bending of the elbow or awkward twisting of the wrist, affects the completeness of the circle, makes it more or less of an oval and produces other irregularities of line. The pupil, in the first instance, almost invariably with these large movements misses a portion of the line, *i.e.*, until the muscles come under better control the chalk will "jump" off the board and leave a gap in the stroke.

The object of this simple exercise is to train a nicety of touch in the evenness of pressure of chalk on the board through the whole movement of the circle.

This exercise likewise trains the attention to a number of little points in the poise of the body and to the conscious control of muscular action of the arm that it is really a good drill both mental and physical, and, of course, this exercise is used for right and left arms until a good clean circular stroke can be produced with either.

Exercises such as in Fig. 2 are found to be good for large free action controlled by a definite intention as to the start and finish of the stroke, commencing at the point, taking a good swing of the arm, and returning unhesitatingly to the point. This form, practised in every direction, right, left, and upside down, can presently be produced within the space of one of the large circles (Fig. 1), the multiplied points of contact in these strokes requiring a nicety of measurement and judgment in which the hand and eye co-operate throughout the movement.

In Fig. 3 the exercises upon the smaller circles enable the hands to be practised in unison. Here a progressive set of muscular actions are brought into play, because there are at least eight varied directions in following these small circles. The fresh pupil often shows the value of the practice of this exercise by a rapid improvement in the control of muscular action; the wild and straggling first efforts are soon reduced to orderly and well-controlled movements, as shown by the regular form and more equal balance in size of the circles.

Fig. 4 gives instances of the exercises which may be practised by both hands in unison. Greek and Japanese ornamental forms suggest some of the best examples upon which to work, as they are graceful in line and in balance of form.

The eye has to be trained to discern the subtlety of a curve and to the measurement and balance of parts while the hand is following its direction, just as in playing upon a violin the ear assists in fixing the precise position of the finger on the string to produce the required interval. More complex exercises for training the eye to measurement of spaces are led up to by such examples as in Fig. 5, where the *fleur-de-lys* form having been drawn

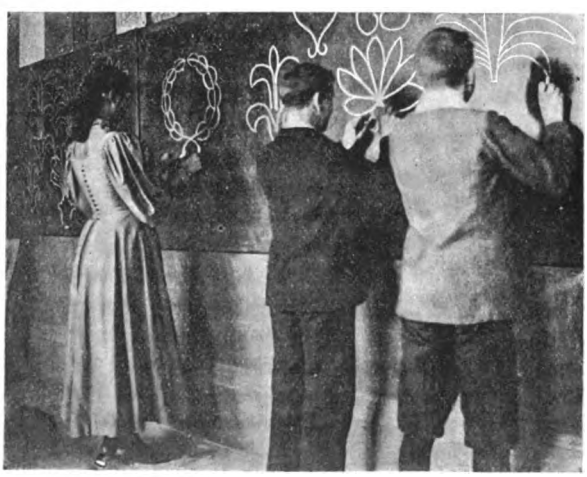

FIG. 4.

by the two hands in unison is repeated right and left and upside down, so that the four parts together make a well-balanced pattern, no other measurement but that judged by the eye being allowed. It is found that not only can the hands be trained to work evenly in unison, but that two

separate objects can be drawn at the same moment, as, for instance, a circle with one hand and a square with the other (see Fig. 3), or a double loop, like a figure of eight, may be done vertically on one side, while it is at the same time drawn horizontally on the other side, and these exercises can be interchanged.

The mind may, therefore, be trained to divided attention and the hands to separate control. It is said that Landseer could draw a deer and a dog at the same moment.

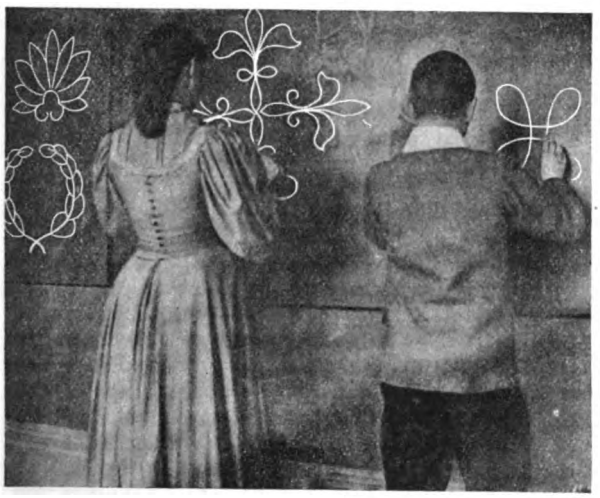

FIG. 5.

This bimanual training by means of the blackboard should be regarded as something more than a commencement for the study of drawing, though it very ably leads up to that study. It certainly gives a very helpful variety and change in the school work, one which the children seem thoroughly to appreciate. It serves as a brain rest, so that better intellectual work is afterwards attained. Manipulative skill is acquired, and the facility of hand is an excellent preparation for the many occupations of after life.

A Practical View of Devotion.—The practice of exercises as part of one's toilette is very old. Anyone conversant with the "heilgymnastik" (curative exercises) of the present day, let them belong to the systems of Ling, Schott, or Zander, cannot fail to be impressed with their resemblance to the devotional exercises of the devout Mahometan. Although doubtless the positions assumed by the worshipper are symbolical of passive submission, cringing obeisance, or subjected defiance, the point of interest to the physiologist is that, after the performance of these devotions, one experiences a distinct sense of fatigue. Thus, by incorporating in his system of devotion actual muscular exercise, the Prophet practically prescribed a system of "heilgymnastik," and forestalled the modern hygienic u·e of exercise. The devotional exercises are all performed slowly, and the change of posture is gradual. This is doubtless, from a religious standpoint, reverential, but from a physiological standpoint it prevents the occurrence of breathlessness or palpitation.—Dr. F. W. Tunnicliffe in *Nature*.

ON THE TEACHING OF HISTORY.

By A. JOHNSON EVANS, M.A.

I.

THE average citizen at forty years of age remembers but little of what he learnt at school. The simpler parts of arithmetic he has of course retained, because he has used them in his daily business. Geography he remembers just enough of to enable him to assimilate the newer information which his daily newspaper affords him *àpropos* of current events. Tags of Latin and Greek still more or less adorn his verbal memory.

But of history as he learnt it in his young days scarcely anything remains, and in the great majority of cases that little consists merely of a strong prejudice against the subject, because it consisted, so he will say, of "nothing but kings and dates." True, he retains dim memories of "Canute and his Courtiers," "Alfred and the Cakes," "Charles II. in an Oak-tree," and other such incidents, but he regards these, and rightly, as not history, but stories only slightly varying in value from fairy tales.

Yet there is no subject which can more justly claim a due place in the school curriculum than history properly taught. Specially is this the case in a country like Great Britain and Ireland, where every institution has its roots and its explanations somewhere in the past.

But I must confess that, as commonly taught, it is indeed the useless subject that the average man avers it to be. Some text-book is chosen, almost at random, by the head master, and put into the hands of his assistant, who probably has read no more of the subject than he had learnt at twelve years of age. He, in turn, thus equipped, "sets" a reign to be "got up" for each lesson, and book in hand, "hears" it more or less wearily.

I have stated the case thus bluntly, because I believe this condition of things can be remedied. Fortunately in recent times there are text-books *and* text-books, and it is possible, by methods that will suggest themselves to any thoughtful teacher, to differentiate the good and the bad.

It need not be said that the best text-book is naturally the living man. Specially in the teaching of history, the widest possible reading will improve the class lessons, and even a little study will yield a proportionate reward so long as that study is rightly directed. It is quite true, though almost universally ignored, that the history of our own country is as much worth mastering, and requires for its effective treatment as much application, as the Latin and Greek classics.

But it must be acknowledged that for the great majority of schools it is impossible to obtain men who, to the classical, mathematical or scientific attainments which are the ordinary outfit of the University-trained assistant, have added any serious study of history. For some time to come, at least until the teachers are themselves taught, the question will rather be, what is the best text-book to put into the hands of our boys? What do you,

who urge us to improve, recommend as the better way? I will therefore attempt to abbreviate the grounds for an answer to these questions.

The Subject of History is Government.—Government is an art, practised at all times by men in societies called States. It is still a disputed question whether to this art there is a corresponding science. Without attempting now to solve this doubt, I may venture to say that there are certain generalisations which we may make, and which we may illustrate from the narrative within our knowledge. Such a generalisation would be—that government succeeds in so far as it protects the least strong from those who are stronger than they, and makes itself the *only* oppressor of the community.

Now the History of England has been unique in this, that whether our kings in their private character were bad or good, whether they worked from a selfish or unselfish point of view, all who were strong enough to maintain their power made it their aim to effect this object. If this be granted, it will be seen that the ideal text-book, while still making "kings" the subject of its story, will be more insistent on this aspect of the story than on the personal details which filled the older manuals, and which quite rightly create a feeling of nausea in the average common-sense citizen.

To put the matter into technical language, **constitutional** history will be the main subject. Military and royal-family history will be the matter relegated to supplementary paragraphs.

Of course wars must not be ignored. On the contrary, their causes and due importance, the reasons which decided the locality of the campaigns, and the results of the treaties must be fully explained. But even so, this side of the story will serve but as introductory to those chapters which explain the development of the Constitution from its earliest stages to the present day.

There is another feature of our national history which needs more emphasis than has been usual. It seems to have been practically forgotten that this is a **Christian country**, and except for the conversion of the 7th century, and the reformation of the 16th, the subject is kept too much in abeyance.

And yet, certainly until the end of the 17th century, England was consciously a part of a greater whole, the Christian Church. It was affected by movements of thought and action which took place on the Continent of Europe. We should therefore give to our pupils at least some glimpses of the Kingdom of Heaven as it existed in pre-Protestant days. We can surely speak without theological prejudice of Emperor and Pope, and can explain the origin of monks and friars, of Universities and of canon law, without attributing them indiscriminately to "blind superstition."

Such subjects as these *can* be treated so as to fall within the comprehension of even the fourth form. They would make history a more interesting as well as more profitable subject of school study. Nay, we might begin to hope for a sober-minded electorate, for the fulfilment of Lord Sherbrooke's desire; we might hope "to educate our masters."

In order to illustrate and prove these remarks on the present methods of history teaching, and at the same time to help my readers to improve their own practice, I propose to treat, in successive numbers, the various periods of English history. My object will be mainly to supplement the ordinary sources of information, and to point out the characteristic features of each period, with a view to realising the relative importance of events. I begin with the Anglo-Saxon period (410-1016).

The "Anglo-Saxon" Period. (410—1016).

Consider the importance of these dates in *European* history:—

395 Division of the Imperial Administration between Arcadius and Honorius.
476 Deposition of Romulus Augustulus by Odoacer.
800 Coronation of Karl as Emperor.
962 Coronation of Otho I. as Emperor.

At the end of the fourth century the Roman Empire was being invaded by Teutonic tribes of all kinds. Especially was the west overrun by **Vandals, Goths, Franks**, &c. The Emperors who ruled in Italy came to be but puppets in the hands of "barbarian" chiefs. Great was the confusion of the "beginning of the Middle Ages." Yet throughout the whole period the Latin-speaking peoples of Gaul, Spain, and Italy, maintained their language and their Churches, and we have contemporary accounts of events. In the end the "Catholics" won over to their side those of their invaders who were "Arian," and the orthodox Franks at last made alliance with the Bishopric of Rome.

Karl, King of the Franks, and ruler over all Gaul and North Italy, besides lands in Germany, at last created an order out of the chaos. In 800 in recognition of his practical authority in Church and State, he was crowned by the Pope as Emperor, *i.e.*, ruler of the world under God.

But under his son and grandsons, divisions and confusion again triumphed, until **Otho** began to restore order in Germany in **936**, and the princes of "Western France" gave themselves a nominal head in Hugh "Capet," **987.** Italy never attained unity in the Middle Ages.

Thus, briefly stated, is the story of Christendom for some six hundred years. The **Roman Empire** disappeared in the west as a practical power only to survive as a Church and an idea. Karl attempted its revival as a whole, because he had wide domains and could control the chaos. A century and a half later Otho revived the idea, but only as a means of uniting Germany and of legitimising his claims on Italy.

Now let us turn to our own island and its history. Let us see wherein it is parallel to, wherein it is contrasted with, the history of the Continent.

In **410** the Roman province of Britain was abandoned to its own resources. In **597** S. Augustine arrived to attempt its reconquest for

Rome. What events had occupied this interval of nearly two centuries? **Rome had disappeared**, its language was no longer spoken, its Church had withdrawn into Wales. There are no contemporary chroniclers to tell us the story of the change. We are left to traditions and to fragments of history. We must piece these out by conjecture.

Almost all that we know for certain is that Roman Britain had vanished, that English, Saxons and Jutes, Teutonic and heathen, were here instead.

It is worth while to dwell for a little on the word "English." It is quite possible that a traveller in north-east Germany, about 400, might have met a man who to the question, "What be you?" would have answered, "I be English." This word was, in the pages of Latin-writing chroniclers, transliterated into "Angli," whence we have derived the word "Angles." It is best to drop this word as misleading. **English** settled in the north and east of the country, Saxons in the south and east, Jutes in Kent and the Isle of Wight. Owing to the rise of literature in the North-Humber land, the language of the whole country came to be called English, not Saxon, so that Alfred, King of the West *Saxons*, spoke of his own language as *English*, and later, Kings wanting a title called themselves Kings of the *English*, *i.e.*, of the English-speaking folk. Let us, therefore, cease to speak of *Angles* and Saxons, and use the word "Anglo-Saxon" with caution.

The English, Saxons, and Jutes settled here gradually, forming many kingdoms. The monarchical tendency was strong. Not only did kingships evolve, but, according to our latest authorities, each great landowner ruled his neighbours, and had even greater authority over the inhabitants of his vill or township. Former notions as to legal equality and community of property are now much discounted.

In the conquest of Britain, therefore, we see a parallel and a contrast with the course of events on the Continent. Teuton heathens swarm in, and erect kingdoms in the midst of the Roman provinces. Petty kingdoms are founded, and there is no central authority. The history of these years is confused and full of violent changes. In Britain, and in Britain alone, Rome and her influences practically disappear. There is a breach of continuity, such as nowhere happened on the Continent. Roman religion—the Christian—and Roman law vanished entirely, except where they survived in the British west. Then, towards the end of the 6th century, Christianity is again introduced. It comes both from Rome and from Scotland. In the course of the 7th century, the controversies between the rival Churches are settled in favour of Roman customs (**Synod** of **Streoneshalh**, **664**). Bishoprics become territorial, the parochial system is developed, and English churches are to follow the fashion of the Continent, not of Ireland.

The unity of the Church leads to the unity of the State. Of the seven or eight kingdoms into which the earlier petty ones coalesced, that of the **West Saxons** finally obtains the hegemony, partly because its kings can continually reward their followers with newly conquered lands to the south-west.

Egbert is the contemporary of Karl the Great. Some of his years of exile were spent at the Court of the Frankish King-Emperor. This island, therefore, begins to attain unity just at the same time as the countries of Western Europe are drawn together for a time under one head and feel the pressure of one strong hand.

But we have now arrived at the period of the **Danes**. Up every river of western Christendom these last wanderers of the nations push their viking ships to burn and destroy. After fifty years of gradual conquest in England, they were checked by Alfred. They were allowed by him to share the land, but only on condition of their being baptised. This is a Christian country.

The later Danish invaders of Alfred's reign were repulsed by him, but other Danes in Gaul extorted from Charles the Simple the territory named after them, Normandy. Alfred gave his country peace and good government, and restored the arts of civilisation. His son and grandson completed the work that he had begun, extended their authority over the Danes settled in the country, and the various tribes were now so closely connected that **Athelstan** could call himself "**King of the English**." Unity is attained in the State as it had previously been attained in the Church.

It is remarkable that, whereas on the Continent the great names are those pre-eminently of kings both in Germany and in France, the great statesman of England in the 10th century is **Dunstan**, Archbishop of Canterbury. His greatness is more on the political than on the ecclesiastical side. By him the Danes were checked, and the neighbouring kingdoms brought to acknowledge the suzerainty of his monarch.

Edgar the "Pacific" was contemporary with Otho I. of Germany, who was reviving with his kingship the Roman emperorship, claiming to be the successor of Karl the Great, and rival of the Greek-speaking monarch of Constantinople who also claimed to represent the Roman Empire. It is therefore worthy of note that Edgar, wanting titles to express his lordship over the British Isle, should use the words "**Basileus**" and "**Imperator**." Britain was an island independent of Roman Empire whether German or Greek. It was, as it were *another empire*, another world. Many years later, a Pope addressed Anselm as "papa alterius orbis." Henry VIII. said in 1533, "This realm of England is an empire." So ancient and so persistent is our insularity!

Here, at this height of the pre-Norman kingship, we may pause. The unity of the kingdom has been attained, the overlordship of the island has been, at least momentarily, acknowledged, titles are used which imply our independence of all foreign influence or control. The Church is Christian, but so far from acknowledging obedience to any foreign power, it has almost drifted apart from

continental influences. King and Witan are supreme in Church and State, in all matters that concern the country as a whole.

But the strength of the English constitution of the 10th century is not in its head or in its central institutions. It resides rather in the **shire-moots**, assemblies of freemen on whom the burden-privilege is laid of administering justice and defending the land. The King has only *begun* to develop a royal system of justice.

When Dunstan died, the weakness of Ethelred the Redeless led to the inroad of foreign invaders. For two centuries the country was under the rule of stranger kings.

ELEMENTARY EXPERIMENTAL SCIENCE.

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THE recent addition of a subject entitled "Elementary Experimental Science" to those branches of natural science which may be taken by junior candidates in the University Local Examinations and the alterations in the requirements for the London Matriculation have brought into prominence the opinion which has been for some time held by men of science, that no preliminary scientific instruction which neglects the experimental treatment of the subjects dealt with is of any educational value. Many science masters and mistresses throughout the country are making strenuous endeavours to bring their teaching into line with these modern views. The demands upon their time and energies are so numerous, however, that it is found impossible to give as thorough a consideration as they would like to the best methods of treatment for very young pupils. To assist them, it is here proposed to put forward a few suggestions for making the subjects enumerated in the detailed schedules published by the University authorities interesting and instructive to boys and girls in lower forms. All the experiments to be described can be done with the simplest appliances. The measurement of lengths, areas, and volumes will be dealt with in this issue.

MEASUREMENT OF LENGTHS, AREAS AND VOLUMES.

I.—LENGTHS.

Things required.—Rule divided into inches on one edge, and into decimetres, centimetres and millimetres on the other. Tape measure (or long rule) divided on one side into inches and on the other into centimetres.

Practical Work for the Class.—Notice the divisions upon the rule. Measure a few lengths, such as the width of a sheet of paper and of a table, in feet and inches. Consider how confusing it would be if inches and other standards of length had not a constant size.

Notice the fractions of an inch, and find by measurement the number of inches in $1\frac{1}{3}$ feet, $2\frac{1}{2}$ feet, $2\frac{3}{8}$ feet, 1 yard, 2 ft. 9 in., and other lengths.

Examine the metric divisions upon the rule. The smallest are called millimetres; ten of them make 1 centimetre; ten of these centimetres make 1 decimetre; and ten decimetres make 1 metre. Notice that all these go in steps of ten.

Find the number of inches which are equal to the length of 1 metre; the number of millimetres equal to an inch; and the number of centimetres equal to an inch. (Fig. 1.)

Measure distances in inches and centimetres, and from the results determine the relation between the two.

LESSON GIVEN TO THE CLASS.

Measurement of Length. — Whenever we measure a length, what we do is to compare it with another length which we call our standard or unit. Every boy knows, from his lessons in arithmetic, that British people, when they speak of a length, express it as yards, feet, inches, or one of the other measures which have been learnt in Long Measure or measures of length. *Let a boy repeat Long Measure.*—Most thoughtful boys have said to themselves at one time or another, "What are these yards, feet, and so on? How does the maker of a rule know how long a yard has to be? And how is it that if we buy a yard measure in London, Manchester, or any other town, it is always the same length?" These are all very important questions, and we must try to answer them.

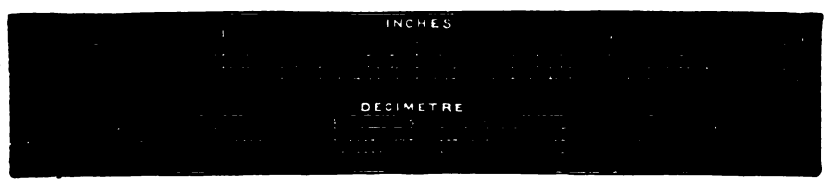


FIG. 1.—Comparison of Inches and Centimetres.

What a Yard is.—In the strong-room of the Standards Office in London there is a fireproof iron chest which contains a bar of bronze. Into this bar, near each end, are sunk two golden studs; and across each stud fine lines are drawn. The distance between these marks (when the bar is at a certain temperature, called sixty-two degrees Fahrenheit, which will be explained later) is what is called the **Imperial Standard Yard**. Several exact copies of this bar have been made, and are securely kept in different places. There is consequently very little danger of all the bars

being burnt or lost at the same time. All yard measures should be the same length as the distance between these marks. The yard is divided into three equal parts, and each of these is called a **foot.** A foot is divided into twelve equal parts, and each part is called an **inch.**

The Metre.—Lengths are not measured in yards, feet and inches in all countries. In France and some other countries the standard length is what is called a **metre.** In Paris a bar of a similar kind to that kept at our Standards Office is carefully preserved. The distance between the two marks in the golden studs is the standard known as the metre. The metre is longer than the yard. You know there are thirty-six inches in the yard, but the metre measures about thirty-nine and one-third inches, or three feet, three and one-third inches (3 feet $3\frac{1}{3}$ inches). This number is easily remembered, because it only contains the figure 3. The metre is not divided in the same way as the yard. A much better plan is adopted. First the metre is divided into ten equal parts, each of which is called a **decimetre,** so that we may write—

10 decimetres make one metre.

Next, each of these decimetres is divided into ten equal parts, each of which is a **centimetre,** and it would take one hundred of them to make a metre, consequently we may say :—

10 centimetres make one decimetre.
100 centimetres make one metre.

Then, each centimetre is divided into ten equal parts, each of which is called a **millimetre,** and it would take one thousand of them to make a metre. Thus, we see, that we may write a table for the sub-divisions of the metre which we shall have no trouble in remembering :—

10 millimetres make 1 centimetre.
10 centimetres ,, 1 decimetre.
10 decimetres ,, 1 metre.

For lengths greater than a metre the same simple plan is used. A length which contains exactly ten metres is called a **dekametre**; one which just contains one hundred metres is called a **hectometre**; and one which is exactly one thousand times as long as a metre is called a **kilometre.** These can be put together in another little table :—

10 metres make 1 dekametre.
10 dekametres ,, 1 hectometre.
10 hectometres ,, 1 kilometre.

To be Committed to Memory.

A *standard* is required before lengths can be measured. The table of long measure shows how British standards of length are related to one another.

The *standard yard* is the distance between two lines upon a bronze bar kept in the Standards Office. One-third ($\frac{1}{3}$) of a yard is one *foot*, and one-twelfth ($\frac{1}{12}$) of a foot is one *inch.*

The *metre* is the French or metric standard of length. It is divided into tenths or *decimetres*, hundredths or *centimetres*, and thousandths or *millimetres.* The length of a metre is roughly 3 feet $3\frac{1}{3}$ inches.

Exercises.

(1) What is meant by the Imperial standard yard? Name the parts into which it is divided.

(2) What is a metre? Compare its length with that of a yard.

(3) Explain how the metre is divided, and write down the names which are given to these parts.

(4) How many millimetres are there in each of the following :—Centimetre, decimetre, and metre?

(5) How many dekametres are there in a kilometre? And how many metres are there in the same length?

(6) Draw a line 2 inches long, and by its side another line 5 centimetres long.

(7) How many centimetres are there in 3 inches?

II.—Areas.

Things required.—Square foot cut out of cardboard, and having square inches marked upon it. Square inch cut out of cardboard. Square decimetre of cardboard, having square centimetres marked upon it. Square centimetre of cardboard.

Practical Work for the Class.—Compare the square inch with the square foot. Count the number of square inches in one row, marked upon the square foot; there are 12. Count the number of rows; there are 12. The total number of square inches in a square foot is therefore $12 \times 12 = 144$.

Compare the square centimetre with the square decimetre in the same way, and find the number of square centimetres there are in a square decimetre.

Find, by measurement, the number of square inches in any rectangular surface, such as the lid of your desk or a drawing-board, and also find the number of square centimetres.

By comparing the two results already obtained, determine roughly the number of square centimetres in a square inch. (*See* Fig. 2.)

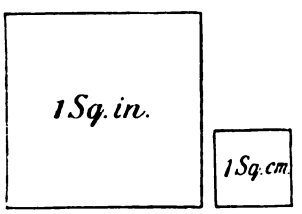


Fig. 2.

Lesson Given to the Class.

Measurement of Area. — Most of the boys or girls in the form already know the difference between lengths and areas. But to make quite certain we will take a few simple illustrations. Provided with such a rule as you have learnt to use it would be easy to measure the length of the room and its breadth or width. If we had a ladder we could, in the same way, measure its height.

Now, if we were going to have a carpet put down, we should give the upholsterer the order, and he would pay us a visit to measure the floor. You know very well it would not be enough for him to measure the length of the room only, or its width only, because both of these are measures of length. To know how much carpet he wants our workman must find out the amount of surface the floor has, or what is called its **area.** To do this he measures both the length and width of the floor, and when he multiplies them together he gets the area. If he measures the length and width in feet he gets the area of the floor in square feet by multiplying them together; if the measurement of the length and width were taken in inches the area in square inches would be obtained by multiplying them together. Whenever areas are measured in this country, square inches, square feet, square miles or some other unit from square measure is employed. "Square measure" is, as our practical work has shown, obtained from "long measure" by multiplying. The following table makes this quite clear:—

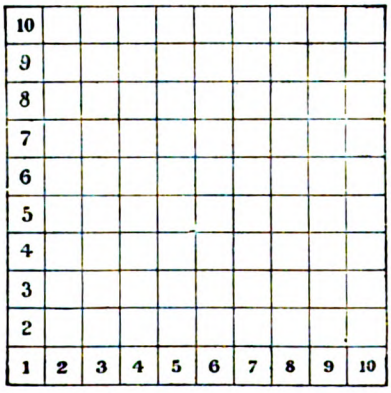


FIG. 3.—To show how areas are obtained from lengths by multiplying.

144	(=12×12)	square inches	make 1 square foot.
9	(= 3× 3)	,, feet	,, 1 ,, yard.
30¼	(=5½×5½)	,, yards	,, 1 ,, pole.

Square Metres, &c.—If instead of measuring the length and breadth of the floor in feet the workman had measured them in metres or decimetres, what would the area, obtained by multiplying, be measured in? Not in square feet, but in what is called square metres, square decimetres, &c. Square measure in the metric system is obtained from long measure in just the same way as in the case of inches. All we mean by the metric system is the plan of using metres, &c., instead of yards, &c., in measurements of all kinds. The measures of area or surface in the metric system can therefore be written as follows:—

100	(=10×10)	sq. millimetres	make 1 sq. centimetre.
100	(=10×10)	,, centimetres	,, 1 ,, decimetre.
100	(=10×10)	,, decimetres	,, 1 ,, metre.

TO BE COMMITTED TO MEMORY.

Area is found by measuring length in two directions. A foot square is a square which has each side one foot in length.

Square measure is derived from long measure by multiplying; it tells the standard which must be used in measuring areas.

As 2·54 cm.=1 inch, the number of square centimetres (sq. cm.) in 1 square inch (sq. in.) is 2·54 × 2·54=6·45.

Exercises.

(1) If you wished a glazier to put in a pane of glass you had broken, what measurements would you have to make in order to let him know the exact size of the pane?

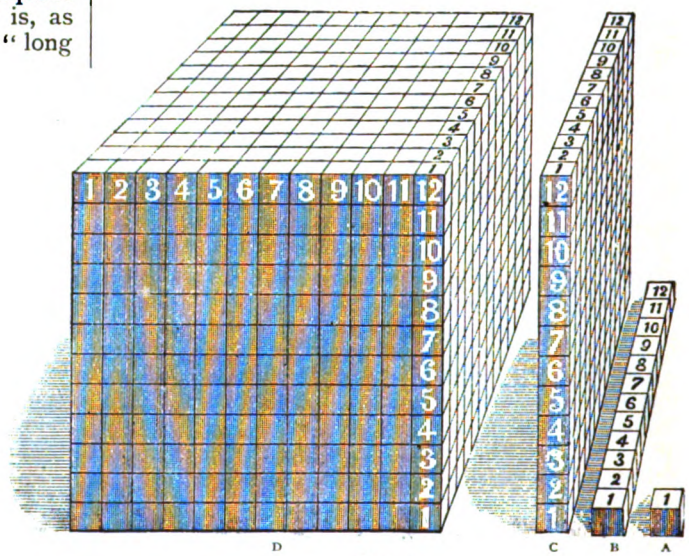


FIG. 4.

(2) How many square inches are there in a square foot, and how many in a square yard?

(3) How many square centimetres are there in a square metre, and how many in a square decimetre?

(4) Draw a square inch, and a square having each side 2·5 centimetres in length. How many square centimetres are there in the latter?

(5) Measure the area in square inches of a sheet of notepaper, or a half-sheet. Write the number of square inches upon the paper.

III.—VOLUMES.

Things Required.—A cubic inch of wood. A box or cube one cubic foot in size, and marked as in Fig. 4. A slab of wood 12×12×1 inch. Rod of wood 12×1×1 inch. Cubic centimetre of wood. Rod of wood 1×1×10 cm. Slab of wood 10×10×1 cm. Box having an internal capacity of exactly 1 cubic decimetre—that is, measuring 10 cm. in length, breadth, and width. Litre and half-litre measure; also a pint and a half-pint bottle or measure.

Practical Work for the Class.—Mark the inches along one edge of the 12 in. rod of wood. At each mark draw lines on every face perpendicular to the edges (Fig. 4 B). Each face is thus divided into squares. Satisfy yourself by using your cubic inch of wood that each square has an area of 1 sq. in. How many cubic inches does the rod contain?

Along each edge of the slab provided mark off inches. Draw lines perpendicular to the edges across the faces of the slab. The faces are now divided into squares (Fig. 4 C). Join the divisions by lines on the narrow faces. Make out with your divided rod how many such rods there are in the slab. How many cubic inches does the slab contain?

Take the cubic foot box or cube, and mark it as in Fig. 4 D. Compare it with your slab. How many slabs would be required to build up the cube? How many cubic inches does the cube contain?

Repeat these experiments for the metric system, using the other pieces of wood.

Fill the litre measure with water, and pour it into the pint bottle. How many times can you fill the bottle? Pour a half-litre of water into the pint bottle. Does it fill the bottle? Similarly measure the capacity of other large vessels.

LESSON GIVEN TO THE CLASS.

Measurement of Volume.—If we examine a drawing of a cubic foot, and bear in mind what has already been learnt, we shall easily understand that each edge of the solid is measured as a length. Each of its faces has an area, which can be obtained by multiplying together the lengths of two of the edges which meet at a corner. But the size of the solid, or the amount of room it takes up, or the space it occupies, is quite a different thing. This new measurement is what is called its **volume**. The volume of a solid body is obtained by measuring in three directions. Just as to find the area of a surface we measure its length and breadth, so to measure the volume of a solid we must find, in addition to measurements of length and breadth, another distance called the thickness. If we multiply length, breadth, and thickness together we obtain a volume or cubical content.

Returning to our cubic foot for a moment, let us find how many cubic inches it contains. Twelve cubic inches placed in a row would make a rod, as shown at B in Fig. 4. Twelve of these rods one piled upon another would make a slab as shown at C. The number of cubic inches in the slab is therefore $12 \times 12 = 144$. Twelve such slabs would make a block or cube like that at D. Consequently, in the whole cube we have $144 \times 12 = 1728$ little cubes, whose edges are one inch long and whose faces are each one square inch. Or, one cubic foot contains 1728 cubic inches. We could reason in the same way to find out how many cubic feet are required to build up a cubic yard. We may write down, therefore—

1728 ($=12 \times 12 \times 12$) cubic inches make 1 cubic foot.
27 ($=3 \times 3 \times 3$) ,, feet ,, 1 ,, yard.

Metric Measures of Volume.—We proceed in just the same way when we wish to measure volumes by the metric system. Let us suppose we take a cube whose edge measures one decimetre. How can we measure its volume? Its edge is a decimetre, the area of one face is a square decimetre, and its cubic content, or volume, is a cubic decimetre. We can easily express the same facts by using centimetres. We know there are 10 centimetres in a decimetre, and we may say the edge of our decimetre cube is 10 centimetres in length; the area of one of its faces is $10 \times 10 = 100$ square centimetres; its volume is $10 \times 10 \times 10 = 100 \times 10 = 1000$ cubic centimetres. If a hollow cube is made, 1 decimetre wide, 1 decimetre broad and 1 decimetre deep, it will hold a thousand cubic centimetres of liquid. This capacity is called a **litre**. All liquids are measured in litres in countries where the metric system is adopted. Thus, in France, wine, milk and such things are sold by litres instead of by pints. A litre is equal to about one and three-quarters English pints.

We may now write some of the measures of volume in the metric system:—

10 centi-litres	make	1 deci-litre.
10 deci-litres	,,	1 litre (1000 c.cm.).
10 litres	,,	1 deka-litre.
10 deka-litres	,,	1 hecto-litre.
10 hecto-litres	,,	1 kilo-litre or 1 cubic metre.

TO BE COMMITTED TO MEMORY.

Volume is cubical content. Length, breadth and thickness have to be measured in determining volume. Cubic Measure is derived from Long Measure.

As 2·54 cm. = 1 inch, the number of cubic centimetres in 1 cubic inch is $2{\cdot}54 \times 2{\cdot}54 \times 2{\cdot}54 = 16{\cdot}38$.

A *litre* is the volume or capacity of 1 cubic decimetre—that is, 1000 cubic centimetres.

Exercises.

(1) If you were told the number of inches in a foot, how would you calculate the number of cubic inches in a cubic foot?

(2) What is a litre? What would be the length of the side of a cube which contained 1000 litres?

(3) Which would hold more water, a pint jug or a litre bottle?

(4) There are 1728 cubic inches in a cubic foot. Explain exactly what is meant by this.

(5) The number of centimetres in the length of an inch is 2·5. How many cubic centimetres are there in a cubic inch?

(6) How many rods 1 foot long and 1 square inch across would be required to make one cubic foot?

ANNALS OF ETON.[1]

THE history of Eton College, as related in this volume by Mr. Sterry, will find many attentive readers, but to none will it prove so interesting as to those concerned with educational affairs. Authentic records of this character are of value in many ways. In the first place, they interest the public in the work carried on in our schools, and are thus the means of promoting a sympathetic regard for educational matters; and secondly, they show practical teachers how difficulties in organisation and discipline have been overcome. It is, of course, impossible within the limits of a review to do more than refer to a few points of this kind, or to give more than the briefest mention of some of the interesting incidents in the history of the College with which the present volume is concerned.

Inspired, no doubt, by the idea of William of Wykeham, founder of Winchester, Henry VI. founded Eton College by Royal Charter, dated the 11th day of October, 1440. As originally constituted by this Charter, Eton was to "consist of a provost, ten priests, four clerks, six chorister boys, twenty-five poor and indigent scholars, and twenty-five poor and infirm men." There was to be a master or "informer in grammar," who was to instruct not only the twenty-five poor scholars, but also any other English boys who came there to learn grammar, and that without payment in money or kind. A year or two later the constitution was modified, among other changes the number of poor scholars being raised to seventy. The first Head Master was William Waynflete, the founder of Magdalen College, Oxford, who, previous to his appointment by the King, had for eleven years been in a similar position at Winchester. Waynflete was in a very few years promoted to the provostship of the College, and in 1447 was appointed Bishop of Winchester.

Building operations began at Eton in 1441, and have continued, with intervals of varying lengths, almost to the present day. The main part of the block, known as the New Schools, was finished in 1863, and this has been followed by the building of science schools, chemical laboratory, and lecture room; and, more recently still, a large quadrangle of schools, lecture hall, and museum, known as the Queen's Schools and Lower Chapel. The schools were brought into use in 1889.

It appears (says Mr. Sterry) that at first, before the College buildings were ready, the boys were quartered in the town. In the Founder's Charter of June 20th, 1443, is contained a provision that all inns, houses, and mansions in Eton were to be at the disposal of the Provost for the boys and scholars resorting thither for their instruction, and all other persons in like manner resorting thither for any cause concerning the College.

The statutes of the founder clearly specify the manner of boy eligible for election as scholar. He was to be poor and needy and of good character, apt for study, able to read and sing, and acquainted with Latin grammar. No villain or bastard, and no one suffering from incurable disease or bodily defect disqualifying for holy orders, was admissible, and no one worth more than five marks a year. Each scholar received every year a gown and hood, which he might not part with for three years. The colleger of to-day is expected to make his gown last three years also, and if it is too dilapidated within that time to be wearable, he has to pay for a new one himself.

A special statute dealt with domestic arrangements. Some of these are especially interesting. In the mornings the boys had to rise at five, and

[1] "Annals of The King's College of Our Lady of Eton beside Windsor." By Wasey Sterry, M.A. (London: Methuen & Co.) 7s. 6d.

while making their beds to say the mattins of the Blessed Virgin, and to be in school before the last stroke of the bell for mattins had sounded. They retired at curfew, and kneeling beside their beds all repeated a hymn before actually getting into bed. Some of the disciplinary statutes are very amusing. For instance:

No scholar, fellow, chaplain, or other minister or servant of the College shall keep or have hunting dogs, nets for hunting, ferrets, falcons, or hawks, or practise hunting; nor shall they have or keep among themselves, or in the College, any ape, bear, fox, stag, hind, deer, badger, or any other rapacious or rare beast which shall not profit or even harm. Further, the like persons were forbidden to grow long hair or a beard, to wear peaked shoes or moulded hoods, or unless they walked in the town, to carry swords, long knives, or any arms.

Naturally from century to century the customs changed very much; but Mr. Sterry takes the reader in hand and explains the chief characteristics of each epoch in the most interesting manner. The account of the work, play, discipline and customs of the school which was drawn up in 1560 by William Malim, the head master at that time, gives a graphic picture of the sixteenth-century Etonian's life from day to day. It was a long day—from 5 a.m. to 8 p.m.,—and every hour was well filled up. The time table seems to have been something like this:

5—6 a.m.	Prayers, making beds, sweeping room, and washing.
6—7 a.m.	Arrival of Usher. Prayers. List of absentees made. Examination of hands and faces by præpostor.
7 a.m.—9.30 a.m. (about).	Arrival of Head Master. Absentees reported. Lessons.
9.30(?)—10.0.	Interval. Breakfast (?)
10.0 a.m.	Prayers.
11.0 a.m.	Dinner.
12.0—3.0 p.m.	Lessons.
3.0—4.0 p.m.	Recreation.
4.0—5 p.m.	Lessons.
5.0—6 p.m.	Supper.
6.0—8 p.m.	Lessons.
8.0 p.m.	Bed.

We can forgive Mr. Sterry his remark that "Malim's boys seem to have been like the girls at high schools, whom we are assured it is difficult to prevent overworking themselves."

From such a fund of interesting material it is a little difficult to select typical pieces, but we may point to the account of the Great Rebellion in 1768 as a good instance of the chronicler's happy style. This well-known dispute was originally between the sixth-form præpostors and the assistant masters. These præpostors exercised monitorial authority over the rest of the school, and had the power of sending back to College any boys whom they found out of bounds. In consequence they claimed to be free from any bounds themselves. On the other hand, the masters in this year claimed the right to send back to College any sixth-form boy whom they found out of bounds. The Head Master, Dr. Foster, tried in vain to smooth over the difficulty. Matters came to a crisis one afternoon with a meeting between a master and a præpostor, named Webster, in Eton Street. That same evening Webster was performing his usual duty of keeping lower boys quiet in chapel, when the master sent a message to him that he was going to complain of him to the Head Master for making a noise. The boy, suspecting that this unfounded charge was merely in revenge, proceeded, after chapel was over, to ask the meaning of the message, but was immediately seized by the master, and hauled off to Dr. Foster to be flogged.

At this juncture the præpostors entered the room in a body and threatened to resign if the flogging was carried out. The Head Master accepted their resignation, and flogged their comrade. The next day the ex-præpostors had an interview with Dr. Foster, at which they claimed that the assistants should not send them back to College if found out of bounds, unless they were in public-houses, billiard-rooms, or places of that character. Their claim was rejected; thereupon they declared they would take no part in Declamations, for that was their duty as præpostors, and not a part of the regular school work. Dr. Foster retorted that if they did not declaim at the proper time they would leave the school. This seems to have been the last straw. There was a general meeting in the playing fields, and like the plebeians at Rome, the præpostors and their sympathisers determined to secede to Maidenhead . . . .

Next morning, either they could not agree on a plan of campaign, or wiser counsels prevailed, and they marched back to Eton, where a deputation had a parley with the masters, and offered to surrender on condition that all were treated alike. Dr. Foster, however, would make no terms, and his tactics seemed to have been justified, for thereupon three of the leaders "to their eternal infamy made peace at the expense of their own honour," while of the rank and file some submitted, others fled to their homes, where, if one may judge of all from the accounts that have been preserved of the reception of some, they met with small sympathy.

As an instance of these receptions, that accorded by the Marquis of Granby is typical, perhaps. He received his two sons, Lord Roos and Robert Manners, with affected surprise, though he had already heard of their running away:

"Well, boys, what brought you here?"

"We have left Eton."

"So I perceive."

"Oh, we have all been used so ill. Dr. Foster has driven the scholars away—and we have done as the rest—and so have come home."

"Very well, very well; and you would like to go to the play this evening—hey, boys?"

"Oh, yes, you are very good, sir."

"Yes, you shall go there to-night for your own pleasure, and to-morrow shall return to Dr. Foster and be flogged for mine."

And the old disciplinarian kept his word.

Mr. Sterry admits he is under great obligations to Sir Henry Maxwell Lyte's monumental work, as well as in a smaller degree to other writers. He has produced a most readable volume, which should find a place in every school library.

Longheads and Roundheads.—Ammon finds that a natural selective process continues to work among citizens, so that the longheads gradually rise towards the higher social strata. Thus, in the higher schools the proportion of longheads is very large. It will be remembered that Dr. Venn's extensive observations showed that first-class men at Cambridge were longer-headed than second-class men, and they again than the simple pass men and the failures. Muffang, of St. Briene, finds that in schools the longheads do best on the modern side, the roundheads on the classical. And there is some other evidence for this.—Dr. J. Beddoe, F.R.S., in *Science Progress*.

PROSPECTING IN THE FIELD OF EDUCATION.[1]

THE first volume of Special Reports, published more than a year ago under the able editorship of Mr. Michael E. Sadler, showed teachers and others that the section of the Education Department directed by him was a most serviceable addition to our educational machinery. The second and third volumes, issued in the middle of December, will go far to confirm this opinion, for they are filled with information of value to all engaged in the work of teaching. In the main, the papers are concerned with statements of fact as to methods of instruction followed in certain institutions and educational systems which claim attention. They thus embody the results of noteworthy experiments in organisation and practice, and by them it becomes possible to judge of the merits and success of the systems described. In addition to this kind of information, the papers contain expressions of opinion, some of which will not be accepted as final by all teachers, although their official setting gives them exceptional importance. But every paper is worthy of careful consideration.

It will be remembered that the first volume of the series was concerned with many phases of primary education in the British Isles and some continental countries. It also dealt with several sides of an ideal school training for girls, and contained a miscellaneous series of papers on different aspects of the instruction of boys and girls in the United States, Germany, Denmark, Spain and Egypt. Speaking in very general terms, volume ii. may be said to deal somewhat exhaustively with physical education, to treat of educational museums and sundry other questions, which include, *e.g.*, the training of secondary teachers, the Heuristic method of teaching, &c. Just as broadly defined, the contents of volume iii. are—the teaching of modern languages on the continent, and a far-reaching inquiry into Secondary and Higher Instruction in many European countries.

This bare outline of the contents suffices to show that the information is broad in scope and practical in its bearings. Each volume is, in fact, so important, that the simultaneous publications of the two, occupying together 1,389 pages, is to be regretted. For the schoolmaster is not a man of unlimited leisure, and the separate issue of the two reports, at an interval of several months, would have ensured a more thorough study of the contents than will now be possible. In this connection it may be remarked that the collection of data can produce little effect if it does not reach the persons for whom it is intended. Every school of importance should receive the educational intelligence published under Mr. Sadler's supervision; and provision ought to be made for the free distribution of at least parts of the volumes to all who are teaching in secondary schools in this country.

[1] "Special Reports on Educational Subjects." Vols. II. and III. Issued by the Education Department. 1898.

The contents of these volumes would form suitable material for discussion at the meetings, which take place from time to time, of the different bodies of teachers. If only they would set themselves to an earnest consideration of the questions which are here formulated by Mr. Sadler, English teachers would really be doing their proper work in this great business of educating; certainly their efforts would be more fruitful than a deliberation on more personal questions—of professional status and so on—can ever be.

We cannot pretend this month to do justice to this collection of papers, but we can, by a few selections, convince every reader that he will, by referring to the reports, find enlightenment on many of the difficulties which present themselves in school work. Several of the subjects dealt with will receive more detailed consideration in future issues.

Volume II.

A girl who can—or can be taught to—cook a dinner, make a dress, order a household, entertain a company, and carry on the family correspondence well, ought not to be dulled by devoting her whole working time to a prolonged and well-nigh hopeless struggle with a mass of intellectual mysteries. Nor should her clever sisters, to whom these mysteries are as plain daylight truths, be restrained from their study because they are too high for some.—Mrs. Bryant, "Curriculum of a Girls' School," (p. 101.)

Perhaps the greatest difficulty in dealing with pupils in classes is the fixing of an average standard of attainment. We all know that schemes of work may be planned in theory for children of different ages; but we know, equally well, how great are the variations of mental capacity, bodily strength, and life-circumstances. Hence the immense help in the apportioning of intellectual work, of an intimate knowledge of the physical health of our pupils. How important is it that we should know that our daily demands are well within the powers of, say, a rapidly growing child (whose health may be a cause for anxiety)—and on the other hand, how equally important is it that, with the certificate of normal health to guide us, mental indolence should not be condoned.—Mrs. Woodhouse, "Physical Education," (p. 144.)

Games react well on the school work, and cause it to be done with more vigour and interest. At all events, judging by our Annual Examination results, it does not seem to me as if the games, as played by our girls, had as yet in any way interfered with their work. In fact, I do not at present find that any arguments which have been advanced against out-door games for girls are of sufficient weight to balance the undoubted advantages to be derived from their adoption.—Penelope Lawrence, "Games and Athletics in Secondary Schools for Girls," (p. 158.)

There is scarcely a town of any size which does not possess an organisation of schools for the promotion of either football or cricket . . . Each school team is placed under the care of a master, generally one of the class masters who is an enthusiast, and he very generously gives up an hour for one or two days in the week, in the dinner recess, for the training of the boys in practice games . . . The boys are not slow to perceive that this means more than a professional interest in his welfare by his teachers. He knows that his master has had many weary hours with him in school, and yet gives up his hard-earned leisure for his benefit . . . He learns to appreciate this, and tries in turn to give less trouble in the work of the school, strives more earnestly to follow his teacher's wishes, and becomes much more amenable to discipline.—George Sharples, "Voluntary Organisation of School Games," (p. 160.

The objects of teaching Physical Exercises in schools are to provide a means of recreation under discipline, and to raise the general standard of health by quickening the circulation, increasing the breathing capacity, promoting nutrition, facilitating the elimination of waste products from the system, and increasing the volume and power of the voluntary and the functional capacity of the involuntary muscles, thereby promoting all-round bodily development and growth.—Thos. Chesterton, "Physical Education under London School Board," (p. 186.)

The object of training is not to supply the student with a ready-made "system" of precepts and rules, but far more, *to cultivate a habit of mind.* (p. 344.)

The commonest fault that is charged to trained teachers is that they do their work in a mechanical spirit; they have learned a system and adhere to it under all conditions. (p. 347.)

The aim of education is fundamentally an ethical problem; it concerns and is determined by the "man in the street" as much as by the teacher. And Administration must be treated as a part of Political Science.—J. J. Findlay, "Study of Education," (p. 371.)

Teaching is the weakest side of English schools. (p. 385.)

The whole moral demeanour of a boy is often changed for better or for worse by getting into a particular form. Under one who is really a "master" his whole nature may be raised; faults slink ashamed into the background, unexpected virtues arise and grow, though no single word of direct moral teaching may be uttered. How often is it noticed that a boy will cheat one master without compunction while he will shrink with unimaginable shame from the thought of cheating another?—F. J. R. Hendy, "Training of Secondary Teachers," (p. 386.)

Nothing could be less rational—less truly preparatory for the work of life—than the system of enforced silence we enjoin; but it is a necessary outcome of didactic class teaching, extravagant indulgence in the use of books, and disregard of all tools and weapons other than the pen.

In all schools open in the afternoon, after the mid-day meal, I would only allow work to be done in the workshop or work-room—a room in which scholars can move about freely, and do all kinds of practical work—and several mornings in the week should also be spent there. In schools such as Girls' High Schools, where the practice prevails of giving lessons only in the mornings, at least two mornings should be given up to workshop exercises. It would be better in such schools to substitute attendance in the school workshop for some part of the excessive amount of home work exacted. In many schools—country schools especially—I would have little else but such work, or equivalent outdoor exercises in the experimental gardens, which will, I believe, in the future be held to be an essential feature in their equipment. Gradually I would have nearly all class-rooms converted into work-rooms or workshops.—H. E. Armstrong, "The Heuristic Method of Teaching," (p. 405.)

Volume III.

The Swiss, like all Continental nations, are quite free from the plethora of "outside examinations" which so grievously harass the even working of our English schools. Such examinations become in fact unnecessary when there is an organised scheme of public education of all grades, under which anyone can judge from the official curriculum of each school as to the results of a boy going through any particular school course.—R. L. Morant, "The Organisation of Education in Switzerland," (p. 23.)

There is a considerable body of opinion that in spite of all that has been done and is being done for the improvement of methods of modern language teaching, nothing will be found to supersede as an instrument of linguistic discipline for the sharpening of the logical faculties, the *right and skilful use of Latin.*—Michael E. Sadler, "Problems in Prussian Secondary Education for Boys," (p. 215.)

There are comparatively few private secondary schools for boys. Formerly there were more, but the number has greatly decreased. The present tendencies of collective organisation are unfavourable to them. But private schoolmasters have rendered immense services to German education. Salzmann, Basedow, Froebel, Stoy, were all private schoolmasters. There are some signs of a reaction in German educational thought in favour of private schools.—Michael E. Sadler, "Problems in Prussian Secondary Education for Boys," (p. 248.)

The punishments are as follows:—

(*a*) Separation from the rest of the class during the lesson (employed only in the four lowest classes).

(*b*) Formal reproof either before the class or before a masters' meeting. (Such punishments are noted in the terminal reports sent to parents.)

(*c*) Detention under supervision, either in the school or in a masters' house (employed chiefly in the four lowest classes.)

(*d*) "Karzerarrest." This consists in solitary confinement during free hours in the school "Karzer" (a special room provided for the purpose). The length of the confinement may vary from two hours to three days.

(*e*) Expulsion, which is of two grades: (1) Simple expulsion, which does not disqualify for admission into another school. (2) Unqualified expulsion, which precludes admission into any other school of the country.

It will be noted that corporal punishment is not resorted to; neither is there any system of school fines.—H. E. D. Hammond, "The High Schools of Baden," (p. 352.)

The Germans have at present no intention of giving up their classical schools. They have too great a faith in the humanising influence of the study of Latin and Greek. But they are fully alive to the fact that it would be fatal to bring up any section of the nation as strangers to the modern spirit, and to those influences which have produced and are still moulding neighbouring nations.—Fabian Ware, "The Teaching of Modern Languages in Frankfurt-on-Main," (p. 464.)

The only language which a boy learns in the lowest classes of the Frankfurt classical schools is French. If this is to be taught in the most natural manner possible, the first requirement is that the teacher should be able to speak French fluently. Were this enforced in English secondary schools many of those at present engaged in teaching French to the younger boys would be immediately disqualified.—Fabian Ware, "The Teaching of Modern Languages in Frankfurt-on-Main," (p. 467.)

Allowing for such variations in the prominence given to different aspects of the new teaching, its principal features may be summed up as follows: (1) Purely oral teaching at the beginning; (2) The use of the foreign tongue, as much as possible, from the first and throughout; (3) The absolute or partial exclusion of translation from the native into the foreign tongue, except in the higher classes; (4) The reduction to a minimum of translation from the foreign tongue into the mother tongue; (5) The extensive use of pictures in the younger classes, and generally as concrete a way of putting things as possible; (6) The extensive teaching of *Realien, i.e.*, the life, customs and institutions, geography, history and literature of the foreign nation; (7) Constant conversations on the reading-book either in the form of preparation, or, more frequently, by way of revisal; (8) The use of the reading-book as material for learning grammar inductively.—Mary Brebner, "The Teaching of Modern Languages in Germany," (p. 483.)

CURRENT GEOGRAPHICAL TOPICS.

By A. J. HERBERTSON, F.R.G.S.

Lecturer in Geography at the Heriot-Watt College, Edinburgh.

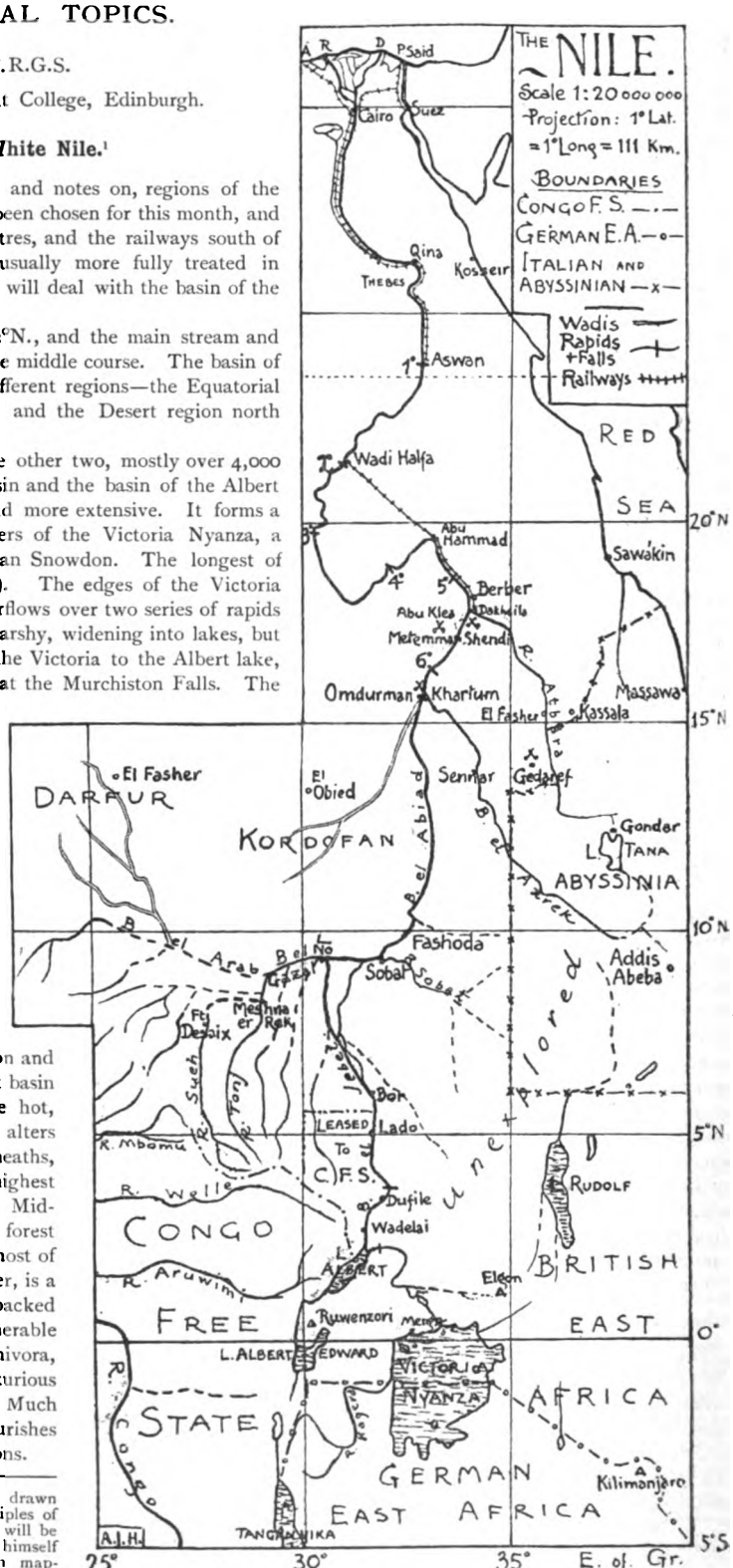
Notes on the Basin of the White Nile.[1]

ON this page it is intended to give maps of, and notes on, regions of the world of current interest. The Nile Valley has been chosen for this month, and the map shows the whole basin, with its chief centres, and the railways south of Cairo; but as the lower part of the Nile is usually more fully treated in ordinary text-books than the upper part, the notes will deal with the basin of the White Nile.

The Nile flows almost due north from 3°S. to 32°N., and the main stream and tributaries lie between 30° and 35°E., except in the middle course. The basin of the White Nile may be divided into three very different regions—the Equatorial (3°S.—4°N.); the Riverine region (4°—10°N.); and the Desert region north thereof.

The Equatorial region is much higher than the other two, mostly over 4,000 feet. It may be sub-divided into the Victoria basin and the basin of the Albert lakes. The Victoria basin is much the loftier and more extensive. It forms a shallow cup, whose bottom is filled by the waters of the Victoria Nyanza, a lake the area of Scotland, lying 300 feet higher than Snowdon. The longest of the many streams is the Kagera (about 500 miles). The edges of the Victoria basin are lowest in the north, where the lake overflows over two series of rapids near the lake. It then becomes sluggish and marshy, widening into lakes, but in the last quarter of its 250 miles journey, from the Victoria to the Albert lake, it falls most of the 1,700 feet, 150 in one bound at the Murchiston Falls. The Albert basin is only one-third that of the Victoria one, and is a trough curving round Ruwenzori, with two lakes, Albert Edward, the area of Lancashire, at the height of Skiddaw, and Albert, not much larger, but 900 feet lower, joined by the Semliki river. From the Albert Lake to Lado, 230 miles, the Nile falls 700 feet, but most of this is at the Fola rapids at 4°N., above and below which it is navigable.

The Equatorial region is a rainy one, the fall increasing from 40 inches per annum on the east of Victoria Nyanza to 60 inches at the Congo divide. The temperature is equable, and rain falls in all months, but two periods of greater rains occur which determine two crops in the year. (*See* Wilson and Felkin, "Uganda.") In the bottom of the Albert basin the dense equatorial wet jungle can grow in the hot, humid air. Up the mountain sides the vegetation alters rapidly in character; bamboo forest, then shrubby heaths, then mosses, lichens, and finally snow in the highest mountains. (*See* Scott Elliot's "Naturalist in Mid-Africa.") Hunting tribes are to be found in the few forest patches on the hills east of Victoria Nyanza, but most of the land east and south, where the rainfall is lower, is a savana, inhabited by pastoral peoples, with hump-backed oxen. This savana land is the haunt of innumerable herbivorous animals such as the antelope, and carnivora, like the lion. The rainier regions have more luxurious vegetation, and woods grow in the river valleys. Much of the land here is cultivated. The banana flourishes north and west of lake Victoria in the rainier regions.



[1] The network of longitudes and latitudes has been drawn in squares, in order to make it easily reproduced in multiples of the present scale. Four times this scale, or 1:5,000,000, will be found a useful one to employ. The teacher will save himself an infinite amount of labour by using metric units in map-making. A scale of 1:5,000,000, with longitudes and latitudes 5° apart = 111 km. per degree, is at once obtained from $5 \times \frac{111,000,000 \text{ mm.}}{5,000,000} = 111$ millimètres.

The Riverine region is so called from the number of streams that flow from all sides into the hollow of the basin, whose lowest part lies between Lado and Fashoda, 440 miles, with a fall of less than 200 feet. In the rainy season these rivers bring great volumes of water, which flood the low-lying ground. It is therefore marshy, and inhabited only by a few fishers, whose numbers are considerable only round Fashoda. Crocodiles and hippopotami live in the waters, and great reeds grow with intertwining roots. In floods masses of these plants are floated, and they accumulate to form the sudd barriers, which are the only hindrance to navigation from Khartum to Lado. Near the Congo divide the rainfall is about 40 inches per annum, but it gradually diminishes with the shortening of the rainy season towards the north, and the northern tributaries are wadis, only occasionally filled with running water. West of the river, as far north as 10°, and also in Darfur, over 20 inches of rain fall, and here savanas are found passing into the richer park lands with river woods, and clumps of trees to the south, a region of cultivation, and to poor grass lands and deserts in the north, where only pastoral arts are possible. (*See* Junker's "Travels in Africa.")

Most inhabitants are found north and west of Lake Victoria, on the Welle-Ghazal divide, and in Darfur. The savanas have scattered semi-nomadic or nomadic tribes, and the poorer grass lands support but few people. Industries are carried on among the agricultural peoples, who are often skilled iron workers, but in many cases are under the sway of the pastoral people, who despise and often pillage them.

From Fashoda to Khartum the Nile passes through an almost desert country.

ITEMS OF INTEREST.

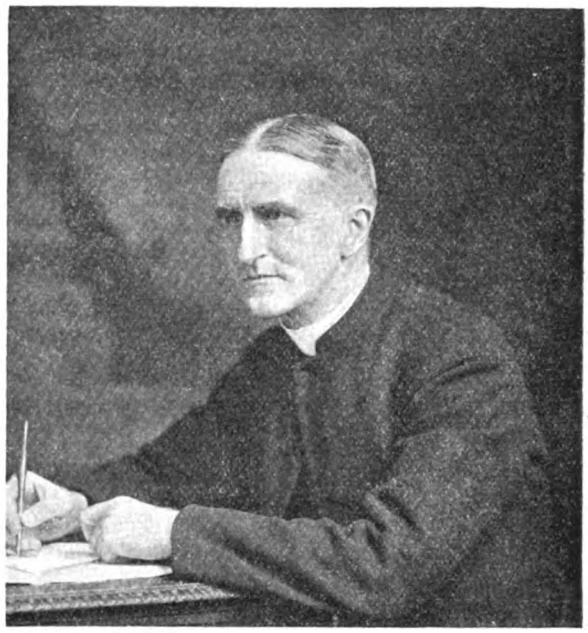
IT may not be generally known that the popular novelist, Mr. H. G. Wells, whose suggestive article will be found on another part of this issue, was for many years an assistant master in secondary schools. The reader, curious as to Mr. Wells's academic distinctions, will find the name of the author of "When the Sleeper Wakes," which is running through *The Graphic*, high up on several honours lists in the calendar of the London University.

SOME of the researches indicated in the article "Wanted—a Classification" have been somewhat exhaustively worked at by Dr. Francis Warner, who has examined the physiological characteristics of no fewer than 100,000 children. The paper from Dr. Warner's pen, "Physical Observation of Brain Conditions of Boys and Girls in School," will supply laboratory notes, as it were, for the teacher who sets about similar diagnoses.

WE shall commence next month a series of notes and test-papers for the Junior Oxford Local Examination for July, 1899. This guide, which has been specially prepared for THE SCHOOL WORLD, should prove very useful in forms preparing for this examination. The hints as to books may save much time in looking over catalogues and specimen copies, and the questions will take the place of an outside Examiner.

DR. WELLDON, the late headmaster of Harrow, has consented to allow his portrait to be painted for the Vaughan Library, but has declined any other memorial. The committee entrusted with the matter has decided to restrict the subscriptions of all Harrovians and masters to 10s., and of boys in the school to 2s. Any surplus will be handed over to some school fund.

THE REV. JOSEPH WOOD, D.D., the new Headmaster of Harrow, had a distinguished University career. From Manchester Grammar School he proceeded, in 1861, to Balliol as a classical Exhibitioner, and in 1862 took a first-class in Moderations, which he followed with a first-class in Greats in 1865. In the same year he was elected a Fereday Fellow at St. John's, and in 1875 and 1876 he was classical moderator at Oxford.



REV. JOSEPH WOOD, D.D.

For three years Dr. Wood was an assistant master at Cheltenham, leaving in 1870 to enter upon his first headmastership—that of Leamington College. Eight years ago he went to Tonbridge, where his success as a headmaster has been most marked, as evidence of which it is enough to state that the numbers have more than doubled. In fact the present buildings at Tonbridge are about as full as they can be. It is interesting to note that Dr. Welldon, whom Dr. Wood succeeds, is an old Tonbridge boy. Our illustration is from a photograph by Messrs. Elliot and Fry. The Rev. C. C. Tancock, for ten years headmaster of Rossall, succeeds Dr. Wood at Tonbridge. Mr. Tancock was educated at Sherborne School and Exeter College, Oxford. He took a first-class in Classical Moderations (1872), and a first in Greats (1874).

THE beginning of a new term is always a time of anxiety for those in charge of boarding schools. The fear that some infectious malady may be introduced into the school is, in the light of the experience of many headmasters, well grounded. The certificates usually required from each pupil have not always been the safeguard which it is only natural to suppose they would be. Such certificates ought to be considered absolutely essential; nevertheless, in some cases they are not required, and in other schools they are not of a sufficiently searching nature. It is much to be regretted that certificates of the kind drawn up in accordance with the formula proposed by the medical officers of Schools Association in their "Code of Rules"[1] are not more commonly adopted. We strongly recom-

[1] "A Code of Rules for the Prevention of Infectious and Contagious Diseases in Schools." (London: J. & A. Churchill.) 1s.

mend all who are responsible for the health of boys and girls in boarding schools to acquaint themselves with these valuable helps in the direction of the desired immunity.

BUT, however perfect the form of certificate may be, it is clear that its object will not be fulfilled without a careful and searching examination of the returning scholar by the medical man. Such a statement, in the absence of the facts which have, at the commencement of previous terms come to light, would be unnecessary. The busy family practitioner is not always sufficiently impressed with the importance of the examination he is called upon to make, and has before now, in his haste, failed to notice early symptoms which should have meant the refusal of a certificate. We hope doctors will agree with us that they cannot be too punctilious in this matter. If they will try and realise more fully the importance of safeguarding our schools from epidemics, they will treat the examination of boys and girls at the end of the holidays less as a matter of form, and we shall cease to have, term by term, cases like those with which most of our readers are familiar.

AT the final meeting of the Modern Language Association, held at Cambridge on the 23rd ult., it was resolved by a small majority that "The Association is of opinion that the London Matriculation Examination as revised will press with undue hardness upon the large majority of candidates whose tastes and future work are literary, and unduly favour the minority, who intend to study science and medicine. They are further of opinion that the effect of the new regulations will be to discourage the teaching of modern languages in schools."

THE Headmasters' Conference, at their opening meeting at Shrewsbury on December 22nd, 1898, passed numerous resolutions concerning secondary education. They heartily welcomed the Duke of Devonshire's Bill; they expressed the conviction that early legislation is needed to establish strong local authorities; they recorded the opinion that the consultative committee to be appointed should be of a permanent character. They also resolved that provision ought to be made for the adequate representation of governing bodies and teachers of secondary schools in the constitution of local authorities; that the interests of secondary schools might with advantage be adequately represented on the consultative committee; and that a large transference to the new Education Board of the powers of the Charity Commissioners, so far as they relate to education, would be welcomed.

ON the second and concluding day resolutions were carried in favour of the establishment of a Secondary Education Department distinct from that of Elementary Education; of the registration of schools as well as teachers; of a distinction being drawn in the registration of teachers between persons qualified to teach in secondary and elementary schools; of efforts to guard against the danger of mercenary competition for scholarships; of the modification of the rules of the boxing contests at public school gymnastic competitions so as to exclude the "knock-out" blow.

MISS CATHERINE DODD, of the Day Training College, in connection with Owens College, Manchester, contributes a very interesting paper, entitled "A Study of Town and Country Children," to the December number of *The National Review*. Her knowledge of, and belief in, Herbart's methods, are very apparent in her insistence upon the necessity for interest in a study if it is to really influence and educate the child. The whole paper is suggestive, and some of her conclusions are valuable. Among other equally practical remarks we select the following as typical:—"The child's sense of beauty must be stirred by a contemplation of the beautiful, the true, and the good, before he becomes capable of noble strivings, and a flower, a sunset flush, a noble action, or a line of poetry often awakens lofty emotions. The school, which aims at developing the whole nature of the child, must appeal to his sense of beauty. The interior of the building should be beautiful, the colouring harmonious, the pictures good, and the flowers carefully tended. No inharmonious details, such as untidy maps hanging on the walls, or bad and crude pictures, should be permitted to pervert the child's taste."

A PAPER on Commercial Education, read recently by Sir Albert Rollit, M.P., at a meeting of the Society of Arts, and printed in the Society's *Journal* of December 16th, contains many suggestions which should prove of value to masters in secondary schools. Speaking of the consular reports which have been published from time to time he said:—"My own experience has confirmed these consular complaints, sometimes humorously. I have heard a Yorkshire merchant ask in a foreign shop for a kilometre of polony—upwards of half a mile of it; and an experience of an Alderman, manufacturer and merchant, who spoke nothing but English, was thus told me by himself: 'I went to Paris, staying at the Hotel de Lille et d'Albion. Never having been before, I lost my way, and could not find my hotel again, because I neither spoke nor understood French. Thinking some of the people I met might understand written English, I went into a stationer's shop and bought a large card, on which I wrote, "Please tell me the way to the Hotel de Lille et d'Albion?" Again I sallied out, showing my card to several, but still to no purpose. At last a gentleman read it, and silently beckoned me to follow him, which I did as silently, for a mile or more. Then he pointed, still silently, to the sign of the hotel, and when I saw it I broke the silence by exclaiming, "Thank you." "What," he replied in amazement, "are you an Englishman? So am I, but I took you to be deaf and dumb."'"

SIR A. ROLLIT gave an instance of lamentable ignorance of general facts in the case of a boy from one of the greatest London public schools of national reputation, who brought the headmaster's leaving certificate that he had "been at the school for several years, and had made creditable progress in his studies!" This youth of nineteen managed to make two mistakes in spelling in four lines, and appeared to be like Mr. Weller, who said how to spell depended on the taste of the speller—*e.g.*, he spelt accommodate, 'accomordate,' and Piccadilly, 'Piccadilee'; he was no good at compound addition or percentages; he could not name the counties of two large county towns out of four; and he wrote that Queen Victoria was of the House of Tudor.

THE Byron-Shelley-Keats In Memoriam prizes are awarded for the best annual essays in English, written by a woman of any nation. The prize subjects for 1899 are as follows:—

Byron's "Sardanapalus."—First prize, £10; second prize, £5.

Byron's "Mazeppa."—First prize, £10; second prize, £5.

Byron's "Hebrew Melodies."—Four prizes, £5 each.

Shelley's "To a Lady, with a Guitar," and "The Keen Stars were Twinkling."—First prize, £10; second prize, £5.

Shelley's Translations from Classical and Foreign Poets.—First prize, £7; second prize, £5; third prize, £3.

Keats' "Lamia."—One prize, £5.

The essays are to be sent before June 1st, 1899, to Mrs. Crawshay, care of 12, Warwick Road, Paddington, London, W. The prizes will be awarded in August, 1899. Essays are not to exceed ten pages of twenty-one lines in length. Competitors may send in essays on all the subjects, but cannot be awarded more than one first prize.

FOREIGN NOTES.

SOME light is shed upon the educational needs and ideals of a country by a comparison between the number of pupils in the primary and secondary schools respectively. In France, where a snug place in the Civil Service is the highest aim of the vast majority, statistics show that 10 per cent. of all pupils frequent the secondary schools. The total number of pupils in the primary schools is 4½ millions, and the number is decreasing with the general population every year. The *Écoles Supérieures* provide instruction for 22,000 boys and 10,000 girls, and a further 11,000 boys and 5,000 girls frequent the evening continuation schools.

La Fronde quotes a curious announcement characteristic of the plan adopted in the sixteenth century by teachers visiting a new district. Froment went to Geneva in 1532. Soon after his arrival, posters were found on the walls of the town, worded as follows:—"A man has come to this town to give lessons in reading and writing in the French language. He will instruct adults and children, persons of male or female sex, and also those who never have frequented a school, for the space of one month. From those who cannot read and write in a month he will ask nothing for his pains. He may be found near the Molard, in the big room at Boitel's, with the device of the Golden Cross, where he also heals many diseases gratis."

MR. J. N. TATA, a Parsee mill-owner and merchant of Bombay, has offered, under certain conditions, to place at the disposal of a properly constituted body landed property which is calculated to bring an annual income of about 125,000 rupees, for the purpose of maintaining an institution for post-graduate studies. Mr. Tata has spent a long life in developing the cotton and silk industries of India. He is known to value higher education even as a preparation for industrial and commercial vocations, and he frequently selects a number of graduates to undergo training for about three years in one or other of his mills, the graduates, contrary to the usual custom, being paid during the period of their apprenticeship.

A VALUABLE addition to the facilities offered for acquiring the German language is the "Ausländerheim" at Frankfurt-am-Main, which has now existed for about a year, and has proved a great success. It is a kind of loosely organised club, which holds social meetings, at which people from all nations meet in pleasant intercourse. German is the language generally spoken, although its use is not prescribed by rigid rules. Occasionally representatives from some particular nation organise an evening for themselves, at which the Germans return, so to speak, the visit of the foreigners. The Swedish colony recently held a very agreeable gathering, and the whole tendency of the institution makes for international peace and goodwill.

IN the *Allgemeine Deutsche Lehrerzeitung*, Herr Senex reviews "German as she is wrote" in a despondent vein. He specially laments the decadence of German composition in the secondary schools. The compositions show bad orthography, faulty grammar and construction, artificiality, and total absence of style. The cause he traces to the gradual loosening of the grammatical instruction given to the pupils, and the substitution of what he considers the very doubtful alternative of "practical exercises" *à la* Ahn and Ollendorff. In reading his arguments one cannot help feeling that the decadence mentioned is hardly a matter of methods, but is connected with a general lowering of mental forces from overwork and other causes.

THE fourteenth Congress of the German Society for the Promotion of Manual Training was held in connection with the annual meeting of the Deutsche Lehrerverein at Leipzig. The chairman, Herr von Schenckendorff, declared that the society could not insist upon the compulsory introduction of manual training in all the schools until the proper conditions as to attitude of local authorities and preparation of teachers had been arrived at. Any attempt to force the matter before them would only convert the willing and even enthusiastic work of a well-prepared school into sullen acquiescence or passive resistance.

WRITING on "The Education of the Imagination," the Finnish author, Vasenius, quotes some amusing examples of the breakdown of purely formal knowledge when the imagination is left undeveloped. "If there are nine sparrows on a tree, and you shoot two, how many remain behind?" is a trap which almost invariably catches the precocious arithmetician who is quick at figures, and who promptly answers: Seven. Again: If one man can build a wall in ten days, working ten hours per day, in what time can 6000 men build the same wall? The clever boy answers: In one minute, and does not realise that the 6000 men would be very much in each other's way.

JAPAN is evincing a wholesome appreciation of modern school methods as far as hygiene is concerned. According to the new regulations, every school in the Island Empire is to be placed under the care of a school physician, who is bound to visit the school at least once a month during school hours, and report upon all matters relating to the health of the pupils and school sanitation. The whole school is to be carefully inspected and overhauled once per annum. Needless to say, the physicians will be natives, for Japan, with its modern school system and its Imperial University, is rapidly escaping from the necessity of calling in foreign experts.

A WELL-WRITTEN series of articles is appearing in the *Indian Journal of Education* on the subject of "An Oriental Faculty for Madras University," by K. Sundararama Aiyar, M.A. Lord Macaulay's Minute on Education of 1835, and Sir Charles Wood's dispatch of 1854, put down English as the language of university instruction, and as the medium through which the treasures of western knowledge should be made available for the Indian millions. The results have not quite justified the high hopes entertained for this system. The masses remain practically unaffected by it, and some steps will have to be taken to use the vernacular languages to get into close touch with those whose enlightenment is aimed at.

THERE is a movement on foot in Germany for the selection of suitable books for the young, from the rich store of general national literature. An organisation has actually been formed, composed chiefly of teachers, for the examination of books, and for their collection, exhibition and distribution if approved—in fact, a modern censorship, but without either official sanction or legal powers. There is no doubt that such an organisation can do a great deal of good, if only by the formation of a healthy public opinion. The only danger is the spice of the forbidden fruit which may be introduced by anything in the way of intolerance or want of tact in making and announcing the selections.

DR. MAURICE DE FLEURY has published the results of an interesting study concerning the number of hours daily which should be allowed young children for the reparation of their strength by sleep. A child of from five to eight years of age ought to sleep from eight o'clock in the evening to seven in the morning—that is, eleven hours; a child from eight to twelve years of age should sleep from nine in the evening to seven in the morning—or ten hours; a child of from twelve to fifteen years of age, from half-past nine in the evening to half-past six in the morning—or nine hours. Later, it will be well to accustom them to seven hours' sleep, but this should be done gradually; first dropping to eight hours, and then, in six months, to seven hours. These are general rules for children in ordinary health; there are, however, others for whom it is advisable to increase the hours of sleep. Sickly, thin, enervated, and excitable children are the better for half-an-hour or an hour's sleep after the midday meal.

THE SCHOOL PULPIT.

Notable Passages from Sermons Preached in Public Schools.

Culture and Character as a Duty of the Citizen.[1]

A great State is not an aggregate of contemptible or even mediocre individuals. Personal worth is the salt of the State. Sodom itself might have been saved by ten righteous men. A great State needs many kinds of greatness—greatness of character and rectitude, greatness of generosity and education, greatness in art, in literature, in science; in insight into the political, social, and economical problems of the day. It needs, above all things, men of strong independent individuality, who will see things with their own eyes, think for themselves, and act for themselves. "Men of character," says Emerson, "are the conscience of the society to which they belong." Observe, I am speaking not of duties as a man, but as a citizen. One of the greatest contributions a man can make, as a citizen, to the welfare of his city is that he should be something himself. There are men of all ranks, with or without much that we call education or culture, with or without much that we vaguely call religion, who do the State real service by being themselves men of sterling worth, of probity, of honour, of judgment, of that indefinable quality we call weight. They form what Walt Whitman calls, I think, "the spinal element" in a State—the backbone, the indispensable element of self-reliance and character. The State needs also students, poets, historians, astronomers, economists, teachers, preachers, newspaper-writers and editors. You will be doing your duty as a citizen if you, in any of these ways, add to its moral force, its love of righteousness, its sober sense, its knowledge; above all, if you can lift and ennoble its ideals. The greatest gift England gives to a nation is its great men—its men of ideas and ideals.

But this, you perhaps think, is for the few. We cannot all be geniuses—great men. What can we say is to all, to the average boy, the duty of a citizen in regard to personal worth?

I think what I have to say falls under two heads. One is culture, the other is character.

The word "culture" has become a little spoilt for this purpose, and yet I can find no better word, only you must understand what I mean. Do you know what it is to look at a stream of miners or factory hands, and to feel with a chilling weight of sadness that the lives of almost every one of them are wholly closed and limited in certain directions? The wider range of thought and language, the intense interests of science, of history, of literature, of poetry—these avenues of mind are for the most part to them closed. Every Athenian, in the great days of Athens, lived in the enjoyment of beauty, of art, and of literature. They so lived at the expense of their slaves. Our working classes are, apparently, by the conditions of our civilisation, for the present largely shut off from all this higher life. Not for them is all the accumulated wealth of literature, and art, and emotion, and knowledge. They will pass to their graves without entering on their great inheritance.

> For knowledge to their eyes her ample page,
> Rich with the spoils of time did ne'er unroll;
> Chill penury repressed their noble rage,
> And froze the genial current of the soul.

Yes; but is it much otherwise with you, or such as you? It is not a less sad thought that so little taste is often carried away from these higher schools for going on with study. If work is with you a mere cramming for examinations, and just so far as it is this, then its good vanishes.

I look with no less compassion on the so-called educated man who comes out into life ignorant of the splendid inheritance of his country's literature; with no desire, and no capacity, and no enjoyment in science, in history, or literature of any kind; no pride in following up any course of study and making it his own; no love of ideas. It seems to me truly pitiful that a man who has had such a chance as you have should go to his grave ignorant of all the best that his country has had to offer him.

To be in some small way a centre for higher tastes and studies is one of the duties that falls on you as educated citizens. It should be for you to import into your homes, and into your lives, when you leave this school, some resolute appreciation of this sort of culture. You should not suffer yourselves to adopt the standard of those less educated than yourself, and to make *Tit-Bits* your literature, and *Comic Cuts* your art. From you, as educated citizens, is due a higher permanent standard of culture in yourselves, and a radiating influence on all around you, which shall help to bring out the higher side of life in your towns. The world is not only a workshop; not even only an arena for public life; it is the school for developing the noblest, purest, most elevated qualities in our nature. You do this by living with the best company, and you can always choose the best company in books. I will give you some of my personal experience. At Cambridge I read both classics and mathematics, chiefly the latter, and I read as hard as most men do. But I am quite certain that my acquaintance, begun at Cambridge, with Kingsley, and Coleridge, and Carlyle, and Maurice, with Mill, and with Fichte, and Tennyson, and Emerson, and Shakspeare, and Wordsworth, was far more to me than all my mathematics. These were to me the educating friends and powers of those priceless three years. They did more for me than mathematics.

This is the sort of culture I would press on you, in addition to your school nucleus of study. No scholarships that you may win, no honours you may carry off, will compensate you for the lack of this; and, what I am now insisting on, nothing will do more to make you useful in your day and generation as educated citizens in this busy North.

I cannot tell you how earnestly I desire that you should prize and value this high standard of thought and study. Don't be discouraged if some one by your side calls it "rot," which is I suppose the generic school-boy name for anything he does not quite understand, and that seems to him only talk. Make up your mind to live with the great; to claim your national inheritance. "Son of man," said the prophet, "stand on thy feet." Dare to be your best self, and give up the dreary round of imitating one another in deadly commonplace. Then you will do honour to your school, and play your part as citizens.

Perhaps you think "this is all very well, but it is a superfluity that I can do without. My definite work, lessons now, business afterwards, demand my first, and even my exclusive thought. Time given to culture is energy subtracted from business."

This is a mistake, a great mistake, a dangerous mistake. Was Dr. Arnold less of a schoolmaster because he was writing Roman History, and corresponding and writing on all the pressing questions of politics? It was this that gave his mind that contagion of activity which infected his pupils, and made the Rugby of his days a nursery of great men. Varied activity and culture react on the direct business of life. A man's powers grow; his alertness, his intelligence, are awakened. He goes on growing year by year. He is the better citizen, of course, and the better man, of course; but he is also the better in his profession whatever he may be, if he has these great human interests, that I have summed up as culture, lying outside his profession.

I have left little time for speaking of the most important

[1] From an address on "The Duties of a Citizen," given to the boys of the Manchester Grammar School by the Ven. James M. Wilson, M.A., Vicar of Rochdale and Archdeacon of Manchester, late Head Master of Clifton College.

subject of all—character—and the influences that go to make or to mar it. Perhaps it is well that I have little time left. For on this point it would probably be inevitable that one who has written so many sermons as I have done should fall to moralising and sermonising. And this you would pronounce dull, and rightly so perhaps.

Only let me say that remarks about character, and its formative influences, are not necessarily dull. Character is surely the outcome of the noblest and best faculties we possess. Is it dull to talk of these and of all that stimulate their growth? Character, and, I will add, religion, is indispensable in a democracy; it is the only cement that holds it together. Is it necessarily dull to speak of character and religion? No indeed. *People* may be dull when they speak of character and religion; they often are deadly dull, because they say what is conventional or exaggerated; they do not know what they mean, or they say more than they mean. The accessories of religion may be dull; the discipline of it, the necessary discipline, may be dull. But religion itself is not dull. For religion is a life in which all the widest interests of men find a place; a life to which learning and science and philosophy are contributories, but which is, after all, a life, and not a learning or a science or a philosophy. The centre and staple of character and of religion lie in a helpful, active, and healing life; in scrupulous personal honour and purity; in wide feeling for other's needs; in unsparing thoroughness and earnestness in all the duties that lie before us. Such a life creates at every turn a thousand interests of the brightest and deepest kind—interests that can never become stale or wear out. Such a life is not dull. Grasp duty firmly by the hand—that grasp is character and that is religion—and you will find your life fuller and fuller of such interest and happiness as far outweigh all childish dreams of adventure and enjoyment of which self was the only centre.

LONDON MATRICULATION,

JUNE, 1899.

Guide and Monthly Test Papers.—No. I.

A SERIES of five test-papers covering the syllabuses of the compulsory subjects of the London matriculation examination, together with test papers on French, which will probably be one of the most popular optional subjects, has been specially drawn up for THE SCHOOL WORLD, and the first of the series is here published. The syllabuses have been divided into four parts, and a paper set on each of the parts. The fifth test, which will appear in the May number, includes a general revision of the whole subjects.

At the head of each test-paper in the present issue a list of books, suitable for students preparing for the examination, is given. It should be remarked that the books named are those which, in the opinion of the teachers who have prepared the test-papers, are the best for the purpose. But it must be remembered that there may be books equally good which have not come under their notice. In those cases where more than one book is mentioned, the order in which they are named may be regarded as an indication of their general fitness for the purpose. In addition, advice has been added which it is hoped will be useful as a guide to what should be read and the order in which the parts of the subject can with advantage be studied.

I.—Latin.

GRAMMAR AND COMPOSITION.

The following paper is mainly based upon Roby's "School Latin Grammar," and contains questions on the—1st and 2nd declension of nouns and adjectives. Genders of the same, Comparison of adjectives of 1st and 2nd declension. 1st and 2nd conjugation of regular and irregular verbs.

Syntax:—Parts of a simple sentence. Use of noun inflexions. Use of nominative, accusative, and dative cases.

A useful general paper on Prose and Grammar will be given next month as a test for the Junior Oxford Local.

(1) Give the accusative singular and plural, the gender and meaning of—auriga, domus, vir, virus, pelagus.

(2) Give the vocative singular of—meus, numerus, deus, Mercurius, pius; the ablative plural of—faber, līber, līber, dexter, dea, deus; and the locative case of—humus, Roma, Corinthus, Athenæ.

(3) Give the comparative and superlative of—taeter, malus, miser, benevolus, prosperus.

(4) Give the 3rd singular present subjunctive, 2nd singular present imperative, of—doceo, do, hortor, reor.

(5) Give the principal parts of—vetabat, prandere, faves, stet, ciere, sonui, torre, augere, gaudere, reor.

(6) Parse and give the meaning of—solitæ erant, amasti, cenati, comitatus, cubuere.

(7) Put into Latin:

(*a*) You are the first that has seen Marcus.
(*b*) He gave the book to his sister as she was coming up.
(*c*) Cæsar is said to have been called Emperor.
(*d*) Leisure and riches, which mortals count first of all things.
(*e*) I was an old man when I began to write.
(*f*) He died before Cicero was consul.
(*g*) Triste lupus stabulis (put into English).
(*h*) They live mainly on milk and cattle.
(*i*) After the capture of the city we surrounded the citadel with a ditch ten feet deep.
(*k*) Active old Tullius sailed to Athens when sixty-six years old.
(*l*) I was the first whom the tribune asked for his opinion.
(*m*) Life is taken from the young by force, from the old by ripe age.
(*n*) Everything had to be seen to by Cæsar at one and the same time.
(*o*) He leaves five cohorts as a guard for the camp.

(8) Translate and explain the cases of words in *italics*:

(*a*) suffusus *oculos*. (*b*) *me miserum*.
(*c*) *id* temporis. (*d*) *os humerosque* deo similis.
(*e*) In *Siciliam Syracusas* abiit. (*f*) Quid *mihi* Celsus agit?

CICERO. PRO MARCELLO.

The teacher is strongly recommended to make use of Froude's "Cæsar," a book which greatly interests both boys and girls. Extracts might be read from chapters xxi., xxii., and xxvi.—the last of which contains an abridged translation of the speech Pro Marcello, together with a comparison of Cicero's sentiments as therein expressed with those expressed in the Second Philippic.

Text-book recommended: Cicero Pro Marcello,—Pro Ligario, &c., by W. Y. Fausset, M.A. (Clarendon Press, 2s. 6d.).

I. Translate into English:

A.

Ch. I., §§ 2, 3. Dolebam enim . . . . . suspicionibus anteferre.

B.

Ch. III., § 9. Sed tamen eiusmodi res . . . . laudibus efferemus?

II. (1) Translate, and explain carefully the use of the subjunctives:

(*a*) Diuturni silentii finem hodiernus dies attulit: idemque initium, quæ vellem, quæque sentirem, meo pristino more dicendi.

(*b*) Ex quo profecto intellegis, quanta in dato beneficio sit laus, cum in accepto tanta sit gloria. Est vero fortunatus ille cuius ex salute non minor pæne ad omnes quam ad ipsum ventura sit, lætitia pervenerit.

(*c*) Nullius dicendi aut scribendi tanta vis, tanta (est) copia, quæ—enarrare res tuas gestas possit.

(*d*) Quæ quidem ego nisi ita magna esse fatear, ut ea vix cuiusquam mens aut cogitatio capere possit, amens sim.

(2) Give a brief outline of the Civil War.

(3) What attitude did Cicero take during the different stages of the struggle? How was he treated by Cæsar?

(4) State what you know of M. Marcellus.

(5) Give some of the reasons for and against the authenticity of this speech.

UNPREPARED TRANSLATION.

III. Translate:

(1) Hæ enim cogitabamus: nec mihi, coniuncto cum Pompeio, fore necesse peccare in republica aliquando, nec cum Cæsare sentienti, pugnandum esse cum Pompeio: tanta erat illorum coniunctio. Nunc impendet, ut et tu ostendis et ego video, summa inter eos contentio. Me autem uterque numerat suum, nisi forte simulat alter. Nam Pompeius non dubitat: vere enim indicat, ea, quæ de republica nunc sentiat, mihi valde probari. Utriusque autem accepi eiusmodi litteras, eodem tempore, quo tuas, ut neuter quemquam omnium pluris facere, quam me, videretur.

(2) Tunc ne levis aura retectos
auferret cineres, saxo compressit arenam:
nautaque ne bustum religato fune moveret,
inscripsit sacrum semiusto stipite nomen:
hic situs est Magnus. Placet hoc, Fortuna, sepulcrum
dicere Pompei, quo condi maluit illum
quam terra caruisse socer? temeraria dextra,
cur objicis Magno tumulum manesque vagantes
includis?

CICERO. M. CATILINAM I.

The portions of Froude's "Cæsar" which bear upon the period and Cicero's character should be read before the speech is attempted. The best editions are:—

"The Catiline Orations." By Professor A. S. Wilkins. (Macmillan.)

"The First Oration against Catiline." By G. H. Nall. (Macmillan.)

The latter gives an excellent sketch of the Catilinarian conspiracy; the notes are short and to the point, and the vocabulary is helpful.

"Speeches against Catilina." By E. A. Upcott. (Clarendon Press.)

(1) Translate:

Ch. II., § 5. Si te iam, Catilina . . . esse fateatur.

Ch. III., § 7. Num me fefellit, . . . esse dicebas?

Ch. IV., § 10. Haec ego omnia . . . . esse prædixeram.

(2) Explain the references:

(*a*) hic munitissimus habendi senatus locus.

(*b*) P. Scipio, pontifex maximus, T. Gracchum . . . . privatus interfecit.

(*c*) Decrevit quondam senatus ut L. Opimias consul videret ne quid detrimenti respublica caperet.

(*d*) Castra in Etruriæ faucibus collocata.

(3) Translate and explain the construction of the words in italics:

(*a*) quid *consilii ceperis, quem nostrum* ignorare arbitraris?

(*b*) Nihil agis, nihil moliris, nihil cogitas quod non ego non modo *audiam*, sed etiam videam planeque sentiam.

(*c*) Sunt in nostro consilio qui de nostro *omnium* interitu *cogitent*.

(*d*) Cupio *me esse clementem*.

(4) (*a*) What is the difference between "in dies" and "cotidie"?

(*b*) Explain "inter falcarios."

(*c*) ,, "de republica sententiam rogo."

II.—English.

LANGUAGE AND LITERATURE.

Books recommended.—Nesfield's "English Grammar, Past and Present" is the most suitable. (Macmillan, 4s. 6d.) It will be wise, however, to read in addition Mason on "Analysis of Sentences" in his "English Grammar." (Bell, 3s. 6d.) Stopford Brooke's "Primer of English Literature" should be studied continuously throughout the course. (Macmillan, 1s.)

The following is the scheme of Test Papers:—

I. Nesfield. Chapters xxi.—xxv.
II. ,, ,, i.—ix.
III. ,, ,, x.—xx.
IV. Stopford Brooke's Primer. Nesfield, Chaps. xxvi.—xxxii.
V. Revisional.

Subjects for Essays will also be given.

(1) Draw up a table showing the relationship of English to the other members of the Indo-Germanic group of languages. In what respects do the Teutonic differ from the other Indo-Germanic languages?

(2) From what sources are the following words derived?—Mile, Avon, thorp, mass, yacht, alligator, tandem, toil, checkmate, minster, boycott, psychological.

(3) What is Grimm's Law? How are the exceptions to this law explained?

(4) Distinguish between Cognate and Derived words. How do you account for such forms as "potion" and "poison," "hotel" and "hospital"?

(5) At what different periods has a French element been introduced into our language? Give examples of French words introduced in the several periods mentioned.

(6) State briefly what you know of the origin and history of each word in the following:—"We can scarcely doubt the extreme importance to the nation of this scientific work."

(7) Account for the italicized letters in post*h*umous, sov*ereign*, *grey*hound, *scot*free, num*b*er, brid*al*, *a*lchemy, gossip, crayfis*h*, frontispi*ece*.

(8) Tell what you know of the origin and structure of the English Alphabet.

(9) What is meant by "organs of speech"? How would you define a vowel? How a diphthong? How is it that the combination *gh* is pronounced in so many different ways in English?

(10) Write an Essay on one of the following subjects:—

(1) Patriotism.
(2) The different forms of government.
(3) The advantages of travel.

HISTORY OF ENGLAND, WITH GEOGRAPHY RELATING THERETO.

Pupils should be prepared for a slightly stiffer examination than they will probably have to meet. The questions which will be set in English History will therefore aim somewhat high. Some of them will be directed rather to emphasise points which are commonly slurred over by text-books, but which are beginning to be required in examinations. Others are intended to call the attention of teachers to matters which are not directly asked, but the knowledge of which will make the examination knowledge more intelligent, and the answers of their candidates more worthy of a first-class than a second.

The questions have been chosen after a careful perusal of past examination papers, and have been used to test the efficiency of certain widely-used text-books. These books are not judged from the standpoint of the general reader, but from that of pupils wanting plain facts and intelligent explanations thereof, such as can be of service for the best preparation for an examination.

Tested thus, it has been found that Oman's and Gardiner's books fail us least often, that Ransome's and Buckley's manuals are good so far as their space permits, that Thompson's little book is too short, except as an introduction, and that Ross is fairly good, except for the "comments" which he extracts from writers now much discounted. Collier professedly "aims at

giving a clear outline of British history, retaining those details only upon which the life and colour of the story depend." He is therefore superficial, and fails us most when exact facts are wanted.

These criticisms might be worked out in detail, but the teacher will find their application who tests them by the questions. Of course if he aims at anything higher than a bare pass, he will choose the longer and more recent books. Green's "Short History of the English People" is excellent reading, and full of suggestive chapters. But this book should be supplemented with something "drier" for purposes of examination.[1]

(55 *B.C.*—1200 *A.D.*)

Ten questions to be answered.

(1) What was the condition of Britain at the time of Cæsar's invasion? Summarise the story of his visits.

(2) Mention with dates the events of the Roman conquest. Describe the Roman province of Britain. Illustrate with a map.

(3) Give a general account of the Anglo-Saxon conquest of Britain. What different theories have been maintained as to the nature of that conquest?

(4) Tell the story of the "Conversion of England," with special reference to the Northumbrian kingdom.

(5) Mention all the kings of the house of Cerdic till 1016, with dates and a brief summary of each reign.

(6) Summarise English history, 1016—1066, so as to account for the course of the Norman Conquest.

(7) Trace carefully the changes made in the English constitution in Church and State as an immediate result of the Norman Conquest. What were William I.'s relations with the Papacy?

(8) Define the "feudal system." Discuss the question how far it was "introduced into England" by William I. and II.

(9) Make a genealogical chart of the Norman and Angevin houses. Tell the story of their wars, acquisitions and losses. Illustrate with a map.

(10) Give a general account of the Crusades, with special reference to the points at which they touch English history.

(11) What new institutions were established by Henry II.? How far had any of them been anticipated?

(12) For what legal positions did Anselm and Becket strive? How far were the questions respectively settled in their days? Summarise the Constitutions of Clarendon.

(13) Give some account of the growth of English towns and their privileges. Mention the most important of them in this period, and describe their situation and trade.

(14) Define: fyrd, wergild, sac and soc, manor, heriot, relief, gesith, folkland, Domesday, suit, homage, fealty, assize, mort d'ancestor, darrein presentment, novel disseisin, King's Bench, iusticiar. Illustrate and comment where appropriate.

III.—Mathematics.

Arithmetic and Algebra.

There are several excellent text-books which are suitable in forms studying for the Matriculation Examinations. From these we select: Pendlebury's (George Bell & Co., 4s. 6d.), Loney's (Macmillan & Co., 4s. 6d.), Lock's (Macmillan & Co., 4s. 6d.), and Hamblin Smith's (Longmans, Green & Co., 4s. 6d.).

This paper includes, in Arithmetic, Vulgar and Decimal Fractions with Practice and Proportion, and, in Algebra, Simultaneous Equations with two or more unknown quantities, and problems thereon, Easy Fractions, Square Root and Factors. Read:—

Arithmetic:—Pendlebury, to end of chap. xxv. Loney, chaps. i.—x. and xii., xiii. Lock, chaps. i.—viii. and x. Hamblin Smith, chaps. i.—xi., xiv.—xx.

Algebra:—Hall and Knight, chaps. i.—xvii. Hamblin Smith, chaps. i.—vii., xii., xiii., xv.—xvii., and easy parts of viii.—x. C. Smith, chaps. i.—ix. Todhunter & Loney, chaps. i.—xi. and xix.—xx.

(1) Prove that $\frac{5}{6} \times \frac{3}{4} = \frac{5}{8}$.

What fraction of 3 perches 5 sq. ft. 3 sq. in. is 2 sq. yds. 7 sq. ft. 75 sq. in.?

A tube is suspended vertically in a vessel containing four liquids of different densities; if two-sevenths of it be immersed in the first, two-thirteenths in the second, a third in the third and a sixth in the fourth, how much of the tube remains uncovered?

(2) Find, to the nearest unit, the number of metres there are in the circumference of the earth, having given that the earth's radius is 4,000 miles and that a metre equals 39·371 inches. [Ratio of the circumference of a circle to its diameter is equal to 3·1416.]

(3) Find the value of 3 tons 2 cwt. 2 qrs. 19 lbs. 15 oz. of material at £84 3s. 6d. a cwt.

(4) Fifty yards of carpet, 30 inches wide, are required to carpet a room; how many yards will be required to carpet another room twice as long and half as wide again as the former, with carpet 36 inches wide?

(5) Prove that $a(bc) = (ab)c = a \times b \times c$.

Multiply $\frac{1}{5}x^3 - \frac{2}{3}x^2 + x - \frac{1}{4}$ by $5x^2 - 3x + \frac{1}{4}$ and verify your result by putting x equal to 1 throughout.

(6) What conditions must attach to n that $x^n - y^n$ may be divisible by both $x-y$ and $x+y$?

Obtain the quotient as far as *four* terms of $x^{12} - a^{12}$ divided by $x^2 + ax + a^2$.

(7) Solve the equations:—

(i.) $\frac{x}{3}(2 - \frac{7}{x}) + \frac{3}{8}(3 - \frac{4x}{3}) = \frac{1}{12}(3 - \frac{x}{2})$

(ii.) $2x + 3y - z = 3$
$5x - 7y + 2z = 22$
$4x - y + z = 13$

(8) A grocer has two kinds of tea at different prices; if he mix them in the proportion of 3 of the former to 1 of the latter, he can sell the mixture at 1s. 9d. a lb. without profit; but if he mix 1 lb. of the former with 3 lbs. of the latter and sell at the price of the second, he can gain 1d. a lb. What are the prices of the teas?

(9) Factorise the expressions:—

(i.) $3x^2 + 11xy - 4y^2$
(ii.) $a^2 + 2ab - c^2 + 2bc$.
(iii.) $(a+b)^2 - (a-b)^2$

(10) Find the fourth root of

$$x^4 + \frac{a^4}{x^4} + 4a\left(x^2 + \frac{a^2}{x^2}\right) + 6a^2.$$

Answers.

1. $\frac{5}{161}$; $\frac{11}{182}$ 2. 40,446,374 3. £5,275 18s. $5\frac{2}{11}\frac{7}{8}d.$

4. 125 yards. 5. $x^5 - \frac{59}{15}x^4 + \frac{141}{20}x^3 - \frac{53}{12}x^2 + x - \frac{1}{16}$

6. $x^{10} - ax^9 + a^3x^7 - a^4x^6$. 7. (i.) 7. (ii.) $x=3, y=-1, z=0$. 8. 1s. 8d.; 2s. 9. (i.) $(3x-y)(x+4y)$; (ii.) $(a+c)(a+2b-c)$; (iii.) $2b(3a^2+b^2)$ 10. $x + \frac{a}{x}$

Geometry.

The editions of Euclid's Elements recommended are those of Hall and Stevens (Macmillan & Co.), Deighton (Geo. Bell & Co.), Layng (Blackie & Co.) and Deakin (W. B. Clive). Test I. includes the whole of Book I., with riders.

(1) Define a superficies, a perpendicular, a segment of a circle, parallel straight lines and a square.

(2) Prove, by superposition or otherwise, that the angles at the base of an isosceles triangle are equal to one another.

(3) The greater angle of every triangle has the greater side opposite to it.

The straight line CD bisects the straight line AB at right angles; if any point P be taken outside CD, show that the sides PA, PB of the triangle PAB cannot be equal.

[1] "History of England." By Chas. Oman. (Edwin Arnold.)
"Student's History of England." By S. R. Gardiner. (Longmans.) (3 vols.)
"A Short History of England." By Cyril Ransome. (Longmans.)
"History of England for Beginners." By Arabella Buckley. (Macmillan.)
"History of England." By Edith Thompson. (Macmillan.)
"Manual of English History." By Robt. Ross. (Simpkin, Marshall.)
"History of the British Empire." By W. F. Collier. (Nelson.)
"History of the British Empire." (Senior Class Book.) (Nelson.)

(4) Two polygons are described on the same base and on the same side of it, one lying wholly inside the other; show that the perimeter of the outer polygon is greater than the perimeter of the inner.

(5) If a straight line fall across two parallel straight lines, it makes the alternate angles equal, and also the two interior angles on the same side of the line together equal to two right angles.

(6) The medians of a triangle are concurrent.

(7) Triangles on the same base and on the same side of it are equal in area.

ABCD is a parallelogram, and E, F are the middle points of the sides BC, CD; show that the triangle AEF equals in area three times the triangle CEF.

(8) Construct a rectangle equal to four times the area of a given triangle.

(9) In a right-angled triangle the square on the hypotenuse is equal to the sum of the squares on the sides containing the right angle

(10) ABC and DEF are two triangles having the angles at B and E right angles; show that, if AC equals DF and AB equals DE, the triangles are identically equal.

IV.—General Elementary Science.

With reference to this subject, it must be remembered that the examiners expect candidates to have performed or witnessed simple experiments in illustration of the scientific principles included in it. Probably few candidates will be able to qualify in the subject between now and next June if they have not previously studied elementary physics and chemistry; for they would scarcely be able to devote the necessary time to the experimental work. The scheme of study which begins this month and will end in May would, therefore, not be found practicable in schools with crowded time-tables; and it should be regarded rather as a revision course than as a course for pupils to whom experimental science is entirely new.

The book to use for this subject is "Elementary General Science," by A. T. Simmons and Lionel M. Jones (Macmillan, 3s. 6d.). The chapters to study, in preparation for the test paper below, by reading and experiment, are chaps. i.-iv. and chaps. xiv., xv. Particular attention should be paid to the following points:

Chap. I.—The distinctive characters of solids, liquids and gases. Experiments 5-7 showing that a substance can occupy the three states in succession, and Experiments 20-22, showing that no change of weight accompanies change of state, should be carefully performed.

Chap. II.—The methods of determining areas and volumes; the calculation of volumes of cubes in British measure when the length of an edge is given in metric measure, or the converse case; the conversion of one set of measures into the other; the following table should be committed to memory, as it contains the designations of all the metric measures of length, volume, and mass:

Value.	Measures of Length.	Measures of Volume.	Measures of Mass.
$\frac{1}{1000}$	Milli- metre.	Milli- litre.	Milli- gram.
$\frac{1}{100}$	Centi- metre.	Centi- litre.	Centi- gram.
$\frac{1}{10}$	Deci- metre.	Deci- litre.	Deci- gram.
1	METRE.	LITRE.	GRAM.
10	Deka- metre.	Deka- litre.	Deka- gram.
100	Hecto-metre.	Hecto-litre.	Hecto-gram.
1000	Kilo- metre.	Kilo- litre.	Kilo- gram.

It is important to remember that a litre is a capacity of 1,000 cubic centimetres.

Chap. III.—The unit of time is the length of the mean solar second, or the 86,400th part of a mean solar day. A pendulum swinging in the latitude of London beats seconds when it is slightly over 39 inches long. Read carefully pp. 34-36. Definition of velocity (v) is space (s) traversed in unit time (t), and when velocity is uniform, $v = \frac{s}{t}$. Definition of Acceleration is rate of change of velocity, and the unit of acceleration is increase of unit velocity in unit time.

Chap. IV.—Mass is quantity of matter. Notice the distinction between mass and weight (pp. 46-48); equality of masses tested by equality of weight (pp. 48-52); units of mass in the British (pound avoirdupois) and metric (kilogram) systems (pp. 44-45).

Chap. XIV.—Simple chemical operations: Solution (p. 16 and p. 209); evaporation (pp. 209-210); distillation (pp. 16, 210); crystallisation and precipitation (p. 212); separation of a soluble solid from an insoluble one by solution and filtration (p. 212); recovery of dissolved substances by evaporation (p. 7); mixtures and chemical compounds (pp. 213, 214).

Chap. XV.—Quantitative character of chemical action (pp. 214, 223-225, 227-8); chemical properties of the atmosphere (pp. 217, 218, 225-6); chemical properties of the principal substances contained in the atmosphere (pp. 218-222, 225); combustion (pp. 228-9); flames (p. 229); incandescence (p. 230). Notice the means of distinguishing nitrogen from carbon dioxide (p. 225).

(1) Enumerate the properties of a liquid which distinguishes it from other forms of matter. Describe in detail two experiments in support of the assertion that liquids communicate pressure equally in all directions.

(2) You are provided with a solid heavier than water in the form of a rectangular prism. Describe clearly how you would find its volume in cubic centimetres: (*a*) by measurement; (*b*) by displacement of water.

(3) What is the common unit of time? How is it related to the sidereal second? Describe briefly the principle on which some common mechanism for measuring time depends.

(4) Distinguish between velocity and acceleration. A cyclist travels uniformly round a circular track at the rate of twelve miles an hour; if he passes the same point five times in ten minutes, what is the length of the track?

(5) What is the difference between the mass of a body and its weight? Describe and account for any changes which would be observed in the weight of a body suspended from a spring-balance, as it was carried from south polar regions to Central Africa.

(6) What relation exists between the metric units of mass and volume? Multiply 20·8 square centimetres by 31 decimetres, and state the result in cubic centimetres and in litres. What would be the mass of such a volume of water at 4° C.?

(7) A mixture of sugar and sand is given to you. Explain fully how you would proceed: (*a*) to obtain the two constituents in a pure state; (*b*) to find the quantity of each in one pound of the mixture. Could you separate sugar and soda in the same way?

(8) If you were required to prove experimentally that rusting and burning are essentially similar operations, how would you go to work?

(9) Describe fully how you would demonstrate that when sulphur is burnt in the air the product of combustion weighs more than the sulphur consumed. Give a sketch of the apparatus.

V.—French.

Great changes have been recently introduced into the syllabus of the London Matriculation Examination. In French the change is very considerable. Formerly pieces of translation from French, a few easy sentences to be translated into French and a knowledge of accidence were all that was required. Under the new regulations the paper is to contain: (1) Passages for translation from French, (2) a piece of easy translation into French, (3) questions in grammar limited to accidence and elementary syntax.

(1) In the translation from French it is essential that modern French authors should have been read. A piece from a classic may possibly be set, but the tendency is the reverse. The extracts in Lazare's "Half-hours with Modern French Authors" (Hachette, 2s. with vocabulary; 1s. 6d. without vocabulary) are very well chosen, and are typical of the pieces usually set in the London Matriculation paper. For reading practice it cannot easily be bettered.

(2) For translation into French Bertenshaw and Janau's "French Composition" (Longmans, 3s. 6d.) will be found a complete and trustworthy manual, erring on the side of fulness, perhaps, for this particular examination, but otherwise most suitable. The same may be said of the "Oxford and Cambridge French Grammar" Part II. (Hachette, 2s. 6d.). The practical rules for translating into French are most clearly put, and the opportunity which is afforded of obtaining a knowledge of the syntax concurrently with proficiency in idiomatic French is unique.

(3) The best grammar for Matriculation students is the "Wellington College French Grammar" (D. Nutt, 4s.). The syntax is somewhat too full for our purpose, but still it must be remembered that it is unwise to send a student up for examination with a bare knowledge of the prescribed work; it is the additional knowledge which makes the difference between a pass and honours.

Teachers will find Belfond's "Students' Handbook to French Examinations" (Hachette, 1s. 6d.) very useful. It contains an exhaustive list of those peculiarities and irregularities of the language that it is the delight of the examiner to spring upon the unsuspecting examinee.

There will be five test-papers in this series. They will be graduated in principle and modelled on the most recent examination papers. The first test presumes a fair acquaintance with the accidence and the most elementary rules of syntax.

Translate:

(*a*) Quand il faut que la chronique de chaque jour choisisse entre ce qui flotte, pour ainsi dire, à la surface de l'histoire, et ce qui se cache dans ses profondeurs, son choix est fait d'avance. L attention des observateurs paresseux et celle du monde des oisifs est plus aisément attirée par les accidents de la vie extérieure des peuples que par les péripéties de leur vie intime. Un ministère qui s'en va, un ministère qui vient, un tournoi parlementaire, une cabale de cour, cela suffit à la curiosité de quiconque ne cherche dans l'histoire qu'un spectacle. Et pourtant, que de faits propres non seulement à intéresser l'esprit, mais à émouvoir le cœur, dans ces régions de la pensée que, trop souvent, la chronique dédaigne! Il est tel livre, même parmi ceux qui tombent, inaperçus d'abord, dans le grand courant des choses humaines, et y roulent quelque temps comme submergés, qui porte en lui la destinée de plusieurs millions d'hommes et contient un de ces drames où les acteurs sont des peuples.

(*b*) La vue dont on jouit en marchant le long de l'Eurotas est bien différente de celle que l'on découvre du sommet de la citadelle. Le fleuve suit un lit tortueux et se cache, comme je l'ai dit, parmi des roseaux et des lauriers, roses aussi grands que des arbres; sur la rive gauche, les monts Ménélaïons, d'un aspect aride et rougeâtre, forment contraste avec la fraîcheur et la verdure du cours de l'Eurotas. Sur la rive droite, le Taygète déploie son magnifique rideau, et tout l'espace compris entre ce rideau et le fleuve est occupé par les collines et les ruines de Sparte; ces collines et ces ruines ne paraissent point desolées, comme lorsqu'on les voit de près: elles semblent au contraire teintes de pourpre, de violet, d'or pâle. Ce ne sont pas les prairies et les feuilles d'un vert cru et froid qui font les admirables paysages, ce sont les effets de la lumière.

Translate into French:

Frederick the Great once saw a crowd staring at something on a wall. He rode up, and found that the object of curiosity was a placard (affiche) making fun of himself. The placard had been posted so high that it was not easy to read it. Frederick ordered one of his attendants to take it down and put it lower.

"My people and I," he said, "have come to an agreement which satisfies both parties. They are to say what they please and I am to do what I please."

(1) What are the primitive tenses of a French verb? What tenses are derived from each? Illustrate by the verb "agir."

(2) Give the 2nd singular conditional, 2nd plural pres. indic., 1st plural preterite and the present participle of contredire, faire, aller, voir, vivre, vouloir.

(3) Give the plural and meanings of chou, bail, sou, vitrail, œil, monsieur, and the feminine and meaning of gros, leger, vieux, blanc, paroissien, frais.

(4) Give the rule for forming adverbs from adjectives. What adverbs correspond to bon, mauvais, gentil, commode, affreux?

(5) Illustrate the use of the partitive article by translating the following sentences:—

(α) If he had any spirit he would not allow it.

(β) I have read no English newspapers for a week.

(γ) He sent her some beautiful pale blue flowers.

(6) Translate: (1) George III. died in 1820. (2) August 1st, 1898, was the centenary of the Battle of the Nile. (3) He is taller than he was last year by two inches. (4) Ten eights are eighty.

(7) Give a list of the disjunctive pronouns. Say when they are used, and construct six sentences to illustrate.

TEACHERS IN COUNCIL.[1]

"IN the multitude of counsellors there is safety," but when the counsellors are schoolmasters, the precepts laid down and the opinions expressed are likely to be so diverse and in many cases so contradictory that much trouble may be experienced in arriving at a conclusion which may be fairly taken to represent the algebraic total of the terms of the whole expression. The volumes before us are evidence enough, if any were needed, of the widespread desire to displace the old empirical methods of teaching by a carefully tested system founded upon a thorough grasp of the conditions which obtain in schools and a scientific acquaintance with psychology. Until recently the attitude of mind which has characterised the masters of our secondary schools has been a distrust of any formally expressed science of pedagogics. The very name has been distasteful. A confident assurance that "teachers are born, not made," has met every protest from the outsider that a preliminary course of training is as necessary for the schoolmaster as for any other professional man.

The publication of such books as "Essays on Secondary Education" and "Work and Play in Girls' Schools" shows that times are changing. Here we find men and women, occupying a deservedly high place in their profession and in the estimation of their compeers, putting on record the results of their experience, and there is little doubt that the influence such books will have on young teachers will be as great as it is beneficial. The book which Mr. Cookson has very ably edited is, for several reasons, likely to take a place of greater authority than most of the others. The chief among these is, perhaps, the recognition of the limitation of any one man's powers. It is unreasonable to suppose that most schoolmasters and schoolmistresses can, in view of the demands upon their time and energies, be specialists in a variety of subjects. Keeping this in mind, Mr. Cookson has secured the co-operation of well-known teachers of the various subjects which constitute a public-school education, with the result that each essay will serve as a guide indicating how the best results may be obtained in the limited time of school life. There are other important questions which the teacher must have studied besides the mere teaching of subjects. He must have clear views on discipline, the proper function of examinations, the place of athletics, and numerous other problems, on all of which points the teacher will find guidance in the essays of Mr. Cookson and his contributors.

Miss Beale, the talented Principal of the Ladies' College, Cheltenham, not only edits "Work and Play," but is also the largest contributor. She is more directly concerned with Intellectual Education, to the consideration of which 373 pp. out of a total of 423 are given. The moral side of education is dealt with by Miss Soulsby, and the Cultivation of the Body by Miss J. F. Dove. In the treatment of many of the subjects, Miss Beale has secured the assistance of past and present members of her staff, but she personally writes upon English subjects, Modern Languages, Philosophy and Religion, Mathematics, the Order in which Science should be studied, Art, and the relation of School to Home. We confidently recommend

[1] "Essays on Secondary Education." By various contributors. Edited by Christopher Cookson, M.A. (Oxford: The Clarendon Press. 1898.)
"Work and Play in Girls' Schools." By three Head Mistresses. (London: Longmans & Co. 1898.) 7s. 6d.
"Psychology in the Schoolroom." By T. F. Dexter, B.A., B.Sc., and A. H. Garlick, B.A. (London: Longmans & Co. 1898.) 4s. 6d.
"Introduction to the Herbartian Principles of Teaching." By Catherine Dodd. (London: Swan Sonnenschein & Co. 1898.) 4s. 6d
"The Art of Teaching." By David Salmon. (London: Longmans & Co., 1898.) 3s. 6d.
"A Dialogue on Moral Education." By F. H. Matthews, M.A. (London: Swan Sonnenschein & Co. 1898.) 4s. 6d.
"The Teaching of Christ on Life and Conduct." By Sophie Bryant, D.Sc. (London: Swan Sonnenschein & Co. 1898.) 2s. 6d.

this volume to mistresses in High Schools who will, in any case, find much subject for thought, even if, as we think most probable, they are unable to agree with all the views put forward.

"Psychology in the Schoolroom" is written by two well-known teachers whose particular sphere is the training of pupil teachers in elementary schools. Their wide experience especially fits them to write of their subject in a simple, interesting manner, and their book should prove very useful. The elementary schoolmaster is more likely to suffer from too much than too little training. The books published to meet his particular wants, moreover, afford evidence of a growing danger. It is in the highest degree important that the originality of a teacher should be developed, and anything which will add to what we may call his *resourcefulness* should be encouraged. But it is more than doubtful if the extent to which formal and stereotyped methods of doing everything are encouraged *do* serve any useful purpose. Rather we are inclined to the opinion that the elaborate summaries, the exhaustive notes on lessons, the minute and sometimes trivial rules, all tend in the opposite direction; they weaken those powers which, if developed, are most useful in the actual practice of teaching. We do not want all our teachers shaped in a mould of exactly the same pattern. We want them thoroughly equipped in all necessary respects, it is true, but yet capable of applying their knowledge in their own way and not only according to the plans of their teacher of method.

This leads us to refer to the "Herbartian Principles of Teaching" and to "The Art of Teaching." In the former Miss Dodd writes on almost every phase of the teacher's work in something under 200 pp., concluding with nearly 50 pp. of "Lessons worked out." It is here one would expect to find something really helpful. On p. 133 a lesson on the Principle of the Inclined Plane is described. We are told that it was prepared and given to a class of boys by one of the students of the Manchester Training College. The limitations of space forbid its reproduction here, but in our opinion it is in several respects very bad, though since it is presented as illustrative of a development of Herbart's "five formal steps," we imagine it is given as a model. Under "Presentation" a single boy is required to measure the height of an inclined plane, and the whole class to enter this in their note books. But this is surely a sorry substitute for the practical teaching of science. Or, again, a second boy makes a weighing with an ordinary balance, and all enter the result in a column in their books entitled "Force." This is most misleading. A weighing is made and the *mass* of a body determined. But it is first wrongly called a weight, and this mass is then recorded as "Force," a term of which no explanation is given. Again, on p. 161, in another model lesson, the "Recapitulation" given is "simple wave-motion is an up and down motion," which is a very incomplete and unsatisfactory result. Nor can we approve of many of the other parts of the book. The literature chart which faces p. 70 is misleading, and not within the intelligent comprehension of children. The vertical scale in the chart representing the relative importance of the writers of different ages is mysterious and open to considerable discussion.

Mr. Salmon's book is evidently intended chiefly for elementary school teachers. In addition to general principles, and a consideration of order, attention and discipline, it is chiefly taken up with the best methods of teaching the subjects taught in primary schools. Reading is exhaustively dealt with in 50 pp., writing in 20 pp., arithmetic in 32 pp. The careless reader, even, will after reading these chapters understand the reason for the excellent teaching in these subjects which is generally a prominent feature of an elementary school. When teachers are thus carefully prepared it is only natural that they should be masters of the art of imparting these subjects to the children in their classes. We especially commend such training as that of Mr. Salmon, in which he insists on the need of specimens (p. 160). In the section dealing with the education of infants, much is said of the methods of Frœbel, and an account is given of Kindergarten practices. The educational value of some of the rhymes which occur in this connection may be doubted. Thus in teaching the properties of the cube to infants, the following doggerel is used, and to our mind it can only be the means of impressing upon the child unnecessary details in an uninteresting fashion:

> Eight corners, and twelve edges, see,
> And faces six, belong to me;
> One face behind, and one before,
> One top, one bottom, that makes four,
> One at the right, at left side one,
> And that comes six, if rightly done.

"A Dialogue on Moral Education" and "The Teaching of Christ" remind us of another important part of the schoolmaster's duty. The pupil has a moral as well as an intellectual nature, and the training in morals is as much a part of school work as the development of the intellect. Mr. Matthews's book is a series of conversations between a schoolmaster, a clergyman, and a doctor, whose respective wives occasionally take part. The schoolmaster is a man of very pronounced opinions; here is one, "I believe that even still, with all the reforms of Arnold, and Percival, and Thring, the system is essentially bad, and introduces boys early to the knowledge of vices of which it would be well if they could remain ignorant all their lives; and that even where it does not bring such knowledge, it crushes all the gentler aspects of a boy's nature, producing a blighted, overbearing disposition for which the cultivation of other characteristics, such as manliness—which would always find sufficient development for itself—can never atone. But you should know I am a bit prejudiced even still about public schools." The book is a little difficult to read, and the argument somewhat obscure. However, the persevering reader will be well repaid.

Mrs. Bryant shows in a simple manner the idea of morality, or life in practice, as taught by Christ. The little book is founded upon lessons given to one of the senior classes of the North London Collegiate School.

The Question of Home Work.—It is necessary that some one master should be responsible for the incidence of the home-work in different subjects in each of the forms into which the school is divided, in order to ensure that on no single night is there an unreasonable amount. This can best be done by careful inquiry by the form-master at the beginning of each term. An average should be taken, and allowance made for the slow or backward. For this purpose it is well occasionally to give opportunity in the class-room for the preparation of work, in order that the master may realise the amount of time which each lesson requires. For the benefit of the parents the school-rules should state the average time required for the home-work in different parts of the school, and where the time spent by the boy exceeds or fall short of this amount, the parent should complain. Where these conditions are fulfilled, the difficulties of home-work should be removed. But as boys, masters, and parents are all human, the difficulties are not always removed. Ambitious boys do more than they ought, and are not checked by their parents; idle boys are to be found in all schools, and masters are not always sufficiently considerate.—J. E. King, M.A., High Master of Manchester Grammar School. "Essays on Secondary Education," edited by C. Cookson, M.A. (The Clarendon Press).

RECENT SCHOOL BOOKS.

Modern Languages.

The Method of Teaching Modern Languages in Germany. By Mary Brebner, M.A. Pp. viii+75. 1s. 6d. (C. J. Clay & Sons, 1898.)—This slim volume should be read by every modern language teacher; it is a most valuable supplement to the able article contributed by Professor Spencer to "Aims and Practice of Teaching." Miss Brebner has made excellent use of the exceptional advantages she enjoyed; and she has given us the result of her observations as Gilchrist Travelling Scholar in a simple and convincing manner. It should do much to hasten the inevitable reform of modern language teaching.

Dent's First French Book. By S. Alge and Walter Rippmann. Pp. ix+205. 1s. 6d. net. (J. M. Dent & Co., 1898.)—The first English book on the lines of the continental reform movement. The lessons are based on the Hölzel pictures of the Seasons, and reproductions of these are given as a help for home work. The book is in French throughout. There are 101 lessons; a grammar, with exercises; a novel vocabulary, which can also be utilised for conversational practice; and "for those who prefer to start in this way" the first 36 lessons are also given in the transcription of the "Association Phonétique Internationale." The book is very well got up.

Elementary Object Lessons in French (Book I.) By Alec Cran. Pp. 191. 1s. 6d. (T. Nelson & Sons, 1898.)—Mr. Cran has done his work conscientiously, and produced a book which should prove serviceable in the hands of a good master. Unfortunately the author's suggestions to the teacher are scattered among what is intended for the pupil. Allusion is made to wall sheets; they are certainly necessary, and if they are as numerous as the illustrations in the book, they will be an appreciable item of expense. The publishers say nothing about them. The remarks about pronunciation are insufficient and untrustworthy.

French Conversations. By Mlle. Dehors de St. Mandé. Book I., pp. 43; 1s. Book II., pp. 32; 1s. (Swan Sonnenschein & Co., 1898.)—An amusing book, only suitable for high-class girls' schools; absolutely useless for boys. It is an adaptation of the Gouin system, with series descriptive of common incidents of a young girl's life; no less than 21 lessons out of the 31 which make up the second book tell us about going to bed and getting up, with full details as to the process of dressing. The verbs are all in thick type, after the manner of Gouin; it is notable, because the writer considers the substantive more important. According to the Preface, "the publication of these books is not undertaken for profit." Then why charge two shillings for a paltry 75 pages? There are some sensible remarks in the introduction, but they have been made before. The book is well (but not quite accurately) printed on unpleasant paper; the binding is poor.

The Age of Richelieu, as described by French Contemporaries and French Historians. Edited by A. Jameson Smith, M.A.; with a Preface by Clovis Bévenot, M.A. Pp. xxv+181. 2s. net. (A. & C. Black, 1898.)—An excellent idea well carried out. The historical introduction supplies all the information that is essential; the passages are very ably selected; and there are 20 pages of useful notes. The exercises based on the text (sentences for translation into French) may prove useful in the case of the fairly advanced students for whom this book is intended. Paper and printing are very good; the red print on the green cover is a mistake.

French Commercial Correspondence and Reader. By L. Soleil. Pp. xvi+174. 3s. 6d. (Kegan Paul, Trench, Trübner & Co., 1898.)—There are several good books on this subject, and this one is quite up to the average. M. Soleil has had considerable experience, and has done his work conscientiously. There are two ill-disguised advertisements at the end of the book, which is otherwise respectably got up.

Lower German. Reading, Supplementary Grammar, with Exercises, and Material for Composition. By Louis Lubovius. Pp. ix+217. 2s. 6d. (W. Blackwood & Sons, 1898.)—A book "intended to supplement the elementary grammar." It contains a large number of passages likely to interest children; but the German is here and there defective, and the editor should have altered the text a little more. In the very first line we find "sich einander," which is anything but good. There are also ten songs in Sol-fa notation. They are fairly well selected, though several are too sombre in tone. There is an epitome of the accidence, with some of which we cannot agree: much, however, is well expressed and very lucid. Further, there are materials for composition and a vocabulary.

Classics.

Cicero, In Catilinam I. J. H. Flather. 81 pp. *Vergil, Aeneid I.* A. Sidgwick. xx. and 104 pp. 1s. 6d. each. (Pitt Press.)—Two volumes of the new Cambridge Series for Schools and Training Colleges, of attractive appearance, with simple and useful introductions, &c. Mr. Sidgwick's notes are well known. The former contains a good table of syntactical usages.

Cicero, Letters to Atticus. Book II. A. Pretor. 147 pp. (Pitt Press.)—The notes make quite clear what the editor means, whether he is discussing a reading or explaining a difficulty. We object to the word *Indices* and *U* (capital) for *V*, and there is a *J* on page 78.

Lives from Nepos. J. B. Allen. 109 pp. (Clarendon Press.)—The first three chapters are simplified for beginners. There are introduction, maps, notes, vocabulary and exercises. The use of *quum* and the letter *j* are antiquated, and a defect is that instead of explanations a bare reference only in the notes to sections in the author's grammar is given.

Passages for Unseen Translation. Cox and Marchant. 271 pp. 3s. 6d. (Methuen.)—A collection of 200 pieces each of Latin and Greek, prose and verse, ranging from Plautus to Bentley, and from Homer to Stobaeus. Reference is given with each passage, but not in the index. Why Virgil?

Latin Verse Unseens. G. Middleton. 114 pp. *Greek Verse Unseens.* T. R. Mills. 143 pp. (1s. 6d. each.) *Higher Latin Unseens.* xxvii. and 142 pp. *Higher Greek Unseens.* xxvii. and 136 pp. *Higher Latin Prose.* 141 pp. H. W. Auden. 2s. 6d. each. (Blackwood.)—These five volumes of neat exterior and excellent print are Blackwood's "Leaving Certificate Handbooks." The last three contain valuable hints on translation and composition.

Tutorial Latin Grammar. Hayes and Masom. (Clive.) 304 pp. 3s. 6d.—In this, the third edition, the chief changes are in the treatment of commands and prohibitions (following Professor Elmer), and apodotic dependent questions. The view that *tanti*, &c., are genitives (of quality) is adopted.

Discernenda. F. Ritchie. 32 pp. 9d. (Longmans.)—Groups of Latin words which are liable to be confused.

The Conquest of Italy. E. G. Wilkinson. 146 pp. 2s. (Black.)—The first volume of "Historical Latin Readers," consisting of text adapted from Livy, with outlines of sections, illustrations, historical parallels, notes and vocabulary. Altogether a good departure.

Grammar and Composition.

English Grammar for Beginners. By Alfred S. West, M.A. 118 pp. 1s. (Pitt Press.) And an extended study of the same subject, *English Grammar.* 298 pp. 2s. 6d. By the same author.—The smaller of these two works ought to be extensively used for the teaching of junior forms. Its matter is arranged with the greatest care, its explanations are full and easily adapted to juvenile intelligences. The chapter on Word-building is not long, but is marked by a complete treatment of all the important elements in English speech. In the section on Syntax the sentences for correction ought to guard even young minds from many easy but ridiculous errors. Altogether the book is worthy of high commendation. The larger work shows a master hand. It is adapted to the higher forms, and its historical survey contains just what is wanted for examination purposes. In 68 pp. the introductory parts of the study are fully indicated, with a degree of compression and clearness which escapes anything like "cram work." When discussing the Parts of Speech Mr. West really expands what he has already said in his smaller book. And the two taken in succession will present a tolerably complete idea of the English language up to the standard of a third or fourth-form intelligence. Both books deserve a large sale.

Grammar and Composition. 156 pp. 1s. 6d. (Longmans.) —We have here an extension of the works published by the same firm, "Junior School Grammar" and "Junior School Composition." The chief merit of this new version of these well-known works lies in the multitude of examples and exercises which are contained in it. Indeed, it may be described as a collection of definitions, with full examples calculated to save much time, and to give a pupil so much practice that the difficulties of English grammar can be easily mastered, and considerable progress in composition assured. The examples of false concords given for correction are very full. The section on Punctuation is scarcely full enough.

Edited Books.

The most recent issue in "Black's School Shakespeare" is *King Lear*, by P. Sheavyn, M.A. (A. and C. Black. 138 pp. 1s. net.)—The whole of the introductory matter is well done, the last three sections especially being well adapted to the requirements of a school edition. The notes only deal with Elizabethan usages of language, thus saving both time and space.

Macaulay's Essays on William Pitt, Earl of Chatham. By R. F. Winch, M.A. (Macmillan & Co. 225 pp. 2s. 6d.)—Is a very carefully edited school-book. The notes range over the history of the whole Georgian period, and are full without tediousness or puerility. A chronological table and a plan of Old Palace Yard add to the utility of this little volume.

From the Cambridge University Press come the following editions:—(1) *Macaulay's Essay on John Bunyan*, by Arthur D. Innes, M.A. (62 pp. 1s.)—A little book with a masterly introduction. (2) *Milton's Comus and Lycidas*, by A. W. Verity, M.A. (200 pp. 2s. 6d.)—This, like all Mr. Verity's productions is extremely well done. An appendix on "The English Masque" and critical opinions add to its value in furthering a knowledge of general English literature. (3) *A Selection of Lamb's "Tales from Shakespeare,"* by J. H. Flather, M.A. (154 pp. 1s. 6d.)—Will be found especially serviceable in forming a taste for Shakespeare among younger scholars in secondary schools. (4) *The Merchant of Venice*, by A. W. Verity, M.A. (207 pp. 1s. 6d.) is another volume in the Pitt Press Shakespeare for Schools. The glossary and appendix will be found as useful as the introduction and the notes. Every page shows careful scholarship and a ripe literary judgment. It would be difficult to praise this work (or this series) too highly. From the same publishing house come *Gray's Ode to the Spring* and *The Bard*, by D. C. Tovey, M.A. (52 pp. 1s.) and a larger sumptuously bound edition of *Gray's English Poems*, by the same editor (290 pp. 5s.)—The smaller work is simply adapted for Queen's scholarship and certificate examinations. The larger is a monument of careful and yet condensed research. Nothing better in the way of criticism on Gray has yet been published than Mr. Tovey's introduction, which is far from being a mere bald biography. The notes are a perfect mine of information, historical and literary, and this elegant volume ought to further the study of Gray among all lovers of Classical English.

History.

The Young Citizen, or Lessons in our Laws. By H. F. Lester, B.A. 2s. 6d. (Cassell & Co., 1898.)—This is an attempt, on the whole successful, to put into simple language the most obvious machinery of modern government in England. The constitutional theory is popular, orthodox and optimistic in tone. Mr. Lester has thought fit to cover his powder with a certain amount of jam. Whether the young reader will find it sufficient to hide the taste of what must necessarily be to him dry facts, we take leave to doubt.

The English People in the Nineteenth Century. By H. de B. Gibbins, D.Litt., M.A. (A. and C. Black.)—Dr. Gibbins has here given a good, clear account of the chief events in the social and political development of the British Empire during the present century. He seems to have had some difficulty in getting under way, and his later chapters suffer from the inevitable lack of perspective. But the main part of the book is excellently written, marred but slightly by an apparent prejudice against the United States and "Home Rule." The maps are excellent, and in themselves tell a most interesting tale.

A First Sketch of English History. Part I., 449-1307. By E. J. Mathew, M.A. (Macmillan & Co., 1898. 2s.)—The history of the early stages in the development of the English constitution is as yet an exceedingly difficult subject. Whether it is possible to make it clear in a small compass is very doubtful, and we do not think Mr. Mathew has succeeded in the task. He seems to settle categorically many questions which are still undecided, and the book suffers as an elementary sketch from lack of arrangement, and from a certain amount of carelessness such as leads to such statements as that on p. 92, where Henry I.'s grandsons are described as having grown to man's estate in his lifetime.

Geography.

A School Geography. By Charles Bird, B.A., F.G.S., 294 pp. 2s. 6d. (Whittaker & Co.)—A commendable attempt to make the study of geography of greater educational value than it is at present, and to give interest to a subject often presented in disconnected parts and bald outlines. The volume is an advance upon the usual text-book, and will assist the reform movement, if teachers can only be induced to follow its methods instead of the traditional system of geographical teaching. The book is intended for pupils of about twelve or thirteen years of age, who have previously been taught the rudiments of the subject.

Philip's Popular Terrestrial and Celestial Globes. 5s. each. (George Philip & Son.)—The two best globes, at the price, in the market. The diameter of each is six inches, and the

globes are held in a half-meridian of brass supported upon a polished walnut pedestal stand. The terrestrial globe shows ocean currents and commercial highways as well as political boundaries. The celestial globe exhibits the stars as brilliant asterisms upon a dark blue background; the stars are represented in the configurations in which they are actually seen, and not in the reversed style adopted in celestial globes as a rule. The globes should be on many study tables, both for service and ornament.

A Practical Method of Teaching Geography (England and Wales). By J. H. Overton. (Cassell.)—A series of outline maps of England and Wales, arranged to illustrate various geographical features. Each map has a sheet of tracing paper over it; and succeeding the maps having particular features marked upon them are others for pupils to fill in the features from memory. The maps provide an easy means of acquiring a fair knowledge of the geography of our country. In a future edition a map in which the highlands and the rivers are shown together should be added, so that pupils can see the relation between them.

Philip's New Popular Atlas. Edited by George Philip, junr., F.R.G.S. 48 coloured plates, containing 76 maps and diagrams, with a complete index. Size $13\frac{3}{4} \times 10\frac{1}{2}$ inches. 3s. 6d. (George Philip & Son.)—A remarkably cheap and efficient atlas of astronomical, physical, political and classical geography. Too full of details and too large to be used as a school atlas, but a serviceable addition to the library table. The picture of the moon's annual path on Plate II. ought to be suppressed.

Mathematics.

Arithmetic. A. E. Layng, M.A. Pp. viii. 272, lvi. 4s. 6d. (Blackie & Son.)—A very good and comprehensive treatise. The explanations are clear, the worked-out examples properly arranged, and the more commercial part of a really practical nature. The variety of methods employed to suit different circumstances ought to prove very instructive. The book is very pleasant to read, and (a point of considerable importance) it is well printed.

Primer of Geometry. By J. Sutherland, M.A. Pp. iv., 118. 2s. 6d. (Longmans, Green & Co.)—A well-meaning, but silly and inaccurate book. Some of the mistakes are amusing; thus in using a sextant the observer "fastens the pointer, reads the place on the divided circle, *doubles it*," &c.; the author seems to imagine that a ship's compass is mounted like a toy compass for the pocket, and that the card has to be turned round (by the steersman?) in order to take the reading; and we should be glad to know by what process he makes the circumference of the earth's orbit about 800 million miles, assuming the mean radius of 92 millions. Perhaps Mr. Sutherland has discovered a new value of π?

Introduction to Algebra. By G. Chrystal, M.A., LL.D. Pp. xviii. 412, *xxvi.* 5s. (A. and C. Black.)—It is to be hoped that the preliminary index of technical words and phrases will not deter teachers from making a trial of this book. Written as it is by one fully conversant with the present state of analysis, it is free from those irritating misstatements which occur in many text-books; the chapters on graphical methods are extremely valuable, and the worked-out examples are models of their kind. It is not a book for beginners; but it is really an elementary text-book, which Prof. Chrystal's larger treatise can hardly be said to be. We would suggest to schoolmasters the plan of trying it with their highest classes, and working it down as far as it will go. All teachers will find profit in reading the preface, with which we heartily agree.

Differential and Integral Calculus for Technical Schools and Colleges. By P. A. Lambert, M.A. Pp. x., 246. 7s. 6d. (Macmillan & Co.)—This attractive book appears to be very well suited for its purpose. The illustrations given are of a practical kind; the bookwork is well chosen; and, while subtleties are avoided, the analysis, so far as it goes, is sound. The last forty pages give a concise but useful discussion of differential equations. Perhaps a few examples of solution by series might have been added with advantage.

Science and Technology.

An Introduction to Practical Physics. By D. Rintoul, M.A. 166 pp., 2s. 6d. (London: Macmillan & Co.)—This carefully arranged course in elementary practical physics follows the syllabus of no particular examination. It represents the experience gained during many years in instructing boys at Clifton College. It is, unfortunately, only concerned with mensuration, hydrostatics, heat and dynamics, and is consequently unsuitable for classes in Organised Schools of Science. It should, however, prove useful in the physical laboratories of the larger public schools.

Elementary Physiography. By A. Morgan, M.A., D.Sc. 320 pp., 2s. 6d. (London: Longmans & Co.)—Dr. Morgan has added another to the many books on this popular Science and Art Department subject. We have discovered no novel features which would place his book in front of previously published volumes. The treatment is clear and experimental, the type good, and the illustrations numerous and instructive.

Practical Mechanics. By Sidney H. Wells. 220 pp., 3s. 6d. (London: Methuen & Co.)—An excellent laboratory manual for technical schools dealing with mechanics. It contains every part of the subject dealt with in the Elementary Science syllabus of the Headmasters' Association and all that is necessary for the mechanics of the London Matriculation Examination, but a very great improvement in the equipment of most secondary schools will have to take place before the experiments described by Mr. Wells can be performed in them. We unhesitatingly recommend this book to such teachers as have the means of following its helpful guidance.

Practical Plant Physiology. By Dr. W. Detmer. Translated by S. A. Moor, M.A. 555 pp., 12s. (London: Swan Sonnenschein & Co.)—We should like to be able to think that Dr. Detmer's well known treatise would be placed among the reference books in those schools where Botany is taught. The value of encouraging pupils to consult the best authorities on the subject they are learning cannot be over-estimated. Many of the experiments described in this very satisfactory translation could easily be performed by intelligent girls, and there can be no two opinions as to the desirability of experimental work in botany. The book is well illustrated, and the detailed instruction given for the practical work will make it a very helpful volume for teachers of the subject.

Miscellaneous.

Cambridge Bible for Schools and Colleges—Isaiah xl.—lxvi. By Rev. J. Skinner, D.D. 251 pp. (Cambridge: University Press.)—This volume, with its sixty pages of introduction, and its elaborate and scholarly notes, will maintain the high reputation of the series of books to which it belongs.

Class Book of Dictation Passages. Selected by W. Williamson, B.A. 127 pp., 1s. 6d. (London: Methuen & Co.)—A well-selected series of pieces for dictation from standard works.

Cassell's Classical Readers. Vols. I. and II.—These appear to be well suited for Junior forms. The second volume is too large for a child to hold long without fatigue.

ARRESTED DEVELOPMENT.[1]

By DOROTHEA BEALE,

Principal of the Ladies' College, Cheltenham.

THERE is a beautiful and practical address by Lord Dufferin, as Lord Rector of St. Andrews, in which he dwells specially on the value of time. He reckons up the approximate 18,000 days which an average life may yield, and advises his hearers to get clearly into their heads the thought that life is a "succinct, definite, circumscribed period."

DEVELOPMENT CONTINUOUS.

Time is the only thing quite irrecoverable; yet there is perhaps nothing about which we are practically so careless for ourselves, so forgetful of our responsibility for others. We use the proverb, "We must make up for lost time." Can we ever recover lost time? Take the parables of nature—see the continuous development there: "First the grain, then the ear, then the full corn in the ear." What if some grain had slept through the springtime, and lifted its head on Midsummer-day to make up for lost time? We know it would have been shrivelled up, its undeveloped life could not have borne the heat and light from the zenith

The plant has to observe times and seasons, its growth must be continuous. When once the living principle which slept in the seed has been awakened, the process of growth must go on without ceasing, or disease and death soon follow. There are also periods of repose and energetic activity, as day alternates with night and the plant sleeps, or in the winter hibernates, almost ceasing to breathe.

The plant has many analogies with the animal life. The normal child should "grow up as a tender plant" in the sheltered home, taking in from its environment food for body, mind and soul—gradually, constantly developing, with no breach of continuity, ever higher forms of life. The process of development must be continuous and the instruction adapted to age and capacity; we must therefore adopt not the logical order of instruction fit for the mature mind, but the psychological—there be continuous instruction with periods for rest.

To-day I would insist on these two things—The need to study (1) The psychological order in education, the times and seasons for each growth; (2) The need for continuity.

THE TRANSIENT NATURE OF EMPIRICAL KNOWLEDGE.

The psychological order is, (1) the senses, (2) the understanding, (3) the reason; (1) the discovery of objective facts, (2) of underlying laws, (3) of necessary truth; (1) empirical, (2) scientific, (3) philosophical.

First the child learns empirically. How wonderful is the power of acquisition of the little child! See the multitude of objects that he comes to recognise during the first three years of life—the immense variety of wave-lengths and shapes that he distinguishes in articulate speech, the new words he picks up. But this empirical knowledge is not lasting, unless it is taken up into the thought world; if there is to be stability, the Chaos must become a Kosmos. It is a matter of common observation that little children who have spoken and understood Hindustani, *e.g.*, lose the language entirely after a year in England, because the sound is unassociated with sight and unassociated with thought. So, too, the language of illiterate tribes is in a constant state of flux; after a while the power of receiving empirically diminishes, almost ceases. Thus it would seem next to impossible for a grown person to learn a language merely by ear—germination must, so to speak, take place. It is a great mistake, therefore, to teach elder children as one would teach an infant. The mature and cultured scholar who knows the laws of language is able to learn perhaps a dozen foreign tongues, because he associates them by their etymology and gets hold of the root meanings. The so-called methods which keep the learner at the childish stage instead of leading him on, or which teach the adult as if he were an infant, may seem to be successful, but they are not so in the long run. For the young beginner they are right; continued to the neglect of etymology and grammar, and the development of the thinking power—wrong. The acquisition of foreign languages may thus according to the method of study tend to develop, or to starve the higher faculties. The sending girls and boys abroad to pick up a language, usually before they have a sufficient grammatical basis, results in their failing to acquire the language, and in arresting their mental development. There is a stage at which foreign travel is beneficial, but it is when the reflective power, the judgment and the character have taken definite shape.

The psychological order requires that we should take the facts of language as given empirically, and submit them to the processes of transformation, or mental digestion; then we get permanent, structural, formative thought—and the higher the mental and moral aims of the teacher, the more will she do to develop through language teaching the thinking power and the character. As Herbart especially insists, each new acquisition must take its place as an integral part of the already existing mental content.

MISDIRECTED TRAINING.

Dr. Harris, Commissioner of Education, U.S.A., has especially dwelt upon the danger of arresting the proper development of the child by a misdirected training. He remarks, "Is it not evident that if the child at any epoch of his long period of helplessness is inured into any habit or fixed form of activity belonging to a lower stage of development, the tendency will be to arrest growth at that standpoint, and make it difficult or next to impossible to continue the growth of the child into higher and more civilised forms of soul activity? A severe drill in mechanical habits of memorising or calculating, any over cultivation of sense-perception in tender years, may arrest the development of the soul at a mechanical method of thinking, and prevent the further growth into spiritual insight.

"Especially on the second plane of thought, that which follows sense perception and the mechanical stage of thinking, namely, the stage of noticing mere relations, and of classifying by mere likeness or difference, or even the search for causal relations, there is most danger of this arrested development. The absorption of the gaze upon adjustments within the machine prevents us from seeing the machine as a whole. The attention to details of colouring and drawing may prevent one from seeing the significance of a great work of art.

"The habit of parsing every sentence that one sees may prevent one from enjoying a sonnet of Wordsworth. Too much counting and calculating may at a tender age set the mind in the mechanical habit of looking for mere numerical relations in whatever it sees. Certainly, the young savage who is taught to see in nature only the traces that mark the passage of a wild animal, or perhaps of a warrior foe, has stopped his growth of observation at a point not very much above that of the hound that hunts by scent. And yet all these mechanical studies are necessary in the course. They cannot be replaced except by others equally objectionable in the same aspect. The question is, then, where to stop and change to other and higher branches in time to preserve the full momentum of progress that the child has made.

[1] Abridged from a paper read before the Child Study Society at Cheltenham.

"Professor Woodward has pointed out that the educational effect of manual training is destroyed by having the pupils work for the market. The first machine made is an education to its maker; the second and subsequent machines made are only a matter of habit. To keep the intellect out of the abyss of habit, and to make the ethical behaviour more and more a matter of unquestioning habit seems to be the desideratum.

"Child study will perhaps find its most profitable field of investigation in this matter of arrested development. If it can tell the teacher how far to push thoroughness to the borders of mechanical perfection, and where to stop just before induration and arrest set in, it will reform all our methods of teaching."

I might illustrate, too, from our experience in England. Those of us who remember the old Schools of Art, in which the pupils were kept to the mere mechanical copying and shading for an indefinite time, know how the really artistic were wearied with the monotonous thought-destroying process, and some of us have seen how a musical soul may be provoked by the attention being fixed on the technique, when the time has come for the execution to follow, not precede, the thought.

THREE PERIODS OF THOUGHT.

Dr. Harris distinguishes three periods of thought—First, the frankly empirical of mere sense-perception, which he calls atomic. The second, which we may call the scientific, which sees all things in relation to the environment. The third "which arrives at the insight that true being exists as intellect and will, that all else is phenomenal being"—these he classifies as a-theistic, pan-theistic, theistic. He writes, "the true end of intellectual education is to take the pupil through the world theory of the first and second stages up to the insight into the personal nature of the absolute."

WAYS IN WHICH DEVELOPMENT IS ARRESTED.

There are three principal ways in which we may arrest development. (1) We may give to the young child the teaching for which it is not ready, which it cannot assimilate; try to make it conceive and reason, when its perceptive powers and imagination should be in the ascendant. We all know how inconveniently active is the observing faculty in young children, how "meddlesome and mischievous" they are considered by ignorant people. Later the conceiving power as evidenced by language gains the ascendant; then mere perception which sees the object as it presents itself to the senses here and now becomes conception, which sees the object as a process—sees, *e.g.*, the identity of the oak in all stages of its development, and spite of its different appearances gives one name to the sapling and the forest tree. It is the want of a knowledge of mental science which leads so many to press upon the teachers of infants that they should give instruction inappropriate to their stage of development.

(2) On the other hand, we may feed on a poor and insufficiently stimulating diet those who need not milk but meat; by giving food ready prepared may arrest the development of the digestive power. Work should be difficult enough to call forth the powers, but not beyond them; though not so difficult as to tempt teachers and pupils to substitute the show for the reality.

As the child develops, the object lesson which cultivates the observing power gives place to the really scientific teaching which tells of processes and causes; every new fact is associated with what is already known, and the power of acquiring words (*e.g.*, proper names, in which relation cannot be traced) decreases, while the power of learning words through association increases. Thus, later, one may easily learn by a knowledge of etymology, 200 forms of the Greek verb, which the child could not have acquired.

(3) There is danger, too, of giving too many subjects: *e.g.*, one hears of a child beginning three languages at once. It is a matter of common experience that in education, as in the nurture of the body, whilst a limited amount of food is strengthening and stimulating to the digestive powers, too much or too mixed a dietary is weakening; too much reading, which is mental over-eating, is destructive of mental power, by arresting reflection and negating action. We see sometimes in learned men this arrested development, and I venture to think that the amount of reading prescribed by our Universities is sometimes a real hindrance. If a student is compelled, in order to finish his set books, to read some hundreds of pages daily, he may get into the habit of merely acquiring instead of digesting; accepting instead of questioning and reflecting; receiving instead of forming opinions—and opinions which have no root soon perish; and we find the unstable ever changing their mode of action, of thought, of religion, because these are not the outgrowth of principle.

As there may be arrest of development by feeding with improper food, so there may be through an exclusive mental dietary. Dogs have been starved on an exclusive dietary of white bread. I have seen unhappy tadpoles, who could never grow legs—they had not the complete dietary needed for the development of the frog—and I have known some girls and boys whose mental and moral life was atrophied through the same cause. We have all heard of Darwin's lament over his loss of power to care for music and poetry. With girls the one subject is apt to be music; the young girl is required to practise an excessive number of hours, or sent abroad away from all the home influences which should build up her character, with the result that she can never become the best type even of musician. I commend Mr. Barnett's remarks in "Work and Play in Girls' Schools" to my readers. I have known some whose exclusive study, say of mathematics or classics before the age at which specialising is allowable, become what Germans call "einseitig." I think of the wise father of clever sons, who refused to let them neglect that wide culture which would make them able men, for the narrow teaching which would have saved his pocket at the University—I think he must now look down joyfully from a higher world to which he has passed.

HIGHER AIMS.

We hear much in these days of scientific and technical education, of laborious investigation and exact measurements, much of objective study; there is doubtless a wholesome reaction against mere book work, but there is danger lest, while we perfect sight we lose insight, and become in the worst sense of the word "einseitig." We all know, I suppose, Plato's myth of the cave-dwellers, who could look only to one side; they were chained so that they could not turn their heads or move towards the light, but could see only on the cavern wall the shadows of the real[1] objects which were passing behind them along the entrance to the cavern—they believed only in what they saw, and they derided one who had escaped into the daylight when he told them of real objects.

Let me quote Professor Jowett's translation: "The prison-house is the world of sighs: the journey upwards the ascent of the soul into the intellectual world, and in the world of knowledge the idea of good appears last of all and is seen only with an effort, and when seen is also inferred to be the author of all things beautiful and right, parent and lord of light in this visible world, the source of reason and truth in the intellectual. This is the power to which he must turn who would do right, and those who attain to the beatific vision are hastening to the higher world in which they desire to dwell." The study of phenomena, the shadows of the true, leads the wise man to seek the noumena.

[1] Rep., p. 214, bk. vii.

GRAMMAR AND HIGHER GRADE SCHOOLS.

IN his recent Presidential Address, delivered at the annual meeting of the Association of Headmasters of Higher Grade Schools, Mr. R. L. Taylor, of Manchester, touched upon the question of the alleged competition between their schools and endowed Grammar Schools. In the course of his remarks he said—"Coming, as I do, from a city where exists one of the very best of the old-established Grammar Schools, and where also exist more Higher Grade Schools than in any other city in the kingdom, I have, times without number, had to reply to criticisms upon the effect of our schools upon the old Foundations. We have been accused of underselling, and thus attracting by lower fees boys who would otherwise have found their way to the Grammar Schools. We have been told that we teach subjects which are beyond our province, and, in short, that we have caused unnecessary and excessive over-lapping.

"To criticism such as this, I have replied that there is practically *no* antagonism between our schools and the Grammar Schools—where the Grammar Schools are efficient. We are, as I have already said, working an entirely different stratum, and I am convinced that if there had been no Higher Grade Schools in Manchester or the neighbourhood, not 5 per cent. of those who are now in them would have found their way to the Grammar School. Of course, facts are better than mere opinions, and here are some facts. Higher Grade Schools have been established in Manchester for about fifteen years. At the present time, within five miles of the centre of Manchester, there are more than 1,000 boys (besides about half that number of girls) in the Schools of Science, which form the upper parts of the Higher Grade Schools; that is, those boys are all receiving a higher education than is given in the ordinary elementary school. Yet at the same time the Grammar School is probably in as flourishing a condition as it ever was. At the beginning of the present term, I understand that the number of new boys admitted, in excess of the number who left at the end of the previous term, was exceptionally large. I may also point out that since the first Higher Grade School was started another Grammar School has also been established in one of the suburbs of the city."

Continuing, Mr. Taylor said—"There is practically little or no antagonism between the Higher Grade School and the real, efficient, high-class Grammar School. And even if some of these schools *have* slightly suffered (and I am not willing to admit that they have to more than an insignificant extent), surely we may trust that the masters of those schools are sufficiently broad-minded to be willing to set off, against that slight loss, the enormous gain to the vastly greater number of boys who have had the advantages which our schools afford them. I think we may assume that those masters are incapable of the petty jealousy which would resent the imaginary injury they have received to the extent of endeavouring to seriously cripple our schools."

Cambridge Local Examinations.—The number of candidates entered for the various Local Examinations in connection with the Cambridge University, held in December last, was 16,233. This is a marked increase on the entries for any previous year. The number in 1897 was 15,118, and in 1896 only 15,055. The increase in 1898 is greatest in the case of Preliminary Candidates. The numbers for the various divisions of the Examination were:—Preliminary, 5,256; Junior, 8,470; Senior, 2,215; Higher, 292. Of these candidates 9,502 were boys and 6,731 girls.

PUBLIC SCHOOL ENTRANCE EXAMINATION PAPERS.

BY the courtesy of the headmasters of Harrow, Rugby, Charterhouse, and Cheltenham, we shall be able to publish selections from the papers set at recent examinations for entrance into these schools. The questions published this month should prove of service in indicating the minimum amount of knowledge which is expected of boys admitted to Harrow School.

Harrow.

CLASSICAL SIDE.

[All Candidates for admission on the Classical Side are required to pass in Latin Translation, Arithmetic, and English Subjects; they are also examined in French, which affects their place in the School. A knowledge of Greek is not indispensable for admission on the Classical Side; but a boy who does not offer Greek is expected to acquit himself satisfactorily in Latin and French, and to pass in Arithmetic and English Subjects.]

I. Translate into English (*with Dictionary*):

Partito exercitu Labienum cum legionibus tribus ad Oceanum proficisci iubet, Trebonium cum pari legionum numero ad fines depopulandos mittit, ipse cum reliquis ad flumen extremasque silvæ partes ire constituit, quo cum paucis equitibus profectum Ambiorigem audiebat. Discedens post septimum diem se reversurum confirmat.

II. Translate into Latin Prose (*with Dictionary*):

(*a*) He came to Rome and stayed there seven days.
(*b*) Do not leave the town.
(*c*) He was so happy that he died.
(*d*) Do you not think this is true?
(*e*) All of us were saved by the valour of Cæsar.

III. Translate into English (*with Lexicon*):

ἐπεὶ δὲ ὄρθρος ἦν, ἔρχεται πρὸς τὸν Χειρίσοφον καὶ λέγει ὅτι ἐλπίδας ἔχει τὰ πράγματα καλῶς ἔσεσθαι· καὶ διηγεῖται αὐτῷ τὸ ὄναρ. ὁ δὲ ἥδετό τε καὶ ὡς τάχιστα ἐθύοντο πάντες παρόντες οἱ στρατηγοί· καὶ τὰ ἱερὰ καλὰ ἦν εὐθὺς ἀπὸ τοῦ πρώτου. καὶ ἀπιόντες ἀπὸ τῶν ἱερῶν οἱ στρατηγοὶ καὶ οἱ λοχαγοὶ παρήγγελλον τῷ στρατιῷ ἀριστοποιεῖσθαι.

IV. ENGLISH SUBJECTS.

Divinity.

(1) Write two or three lines about (*a*) Jael, (*b*) Josiah, (*c*) Cornelius.

(2) Where is (*a*) Jaffa, (*b*) Damascus, (*c*) Jericho? Name one event connected with each.

Grammar.

Seeing that my boots wanted *cleaning*, I gave them to the boy *that* looks after the pony, and asked *if* he could get them done *before* dinner.

(1) Write down the italicised words, and say what part of speech each one is.

(2) Write down an indirect statement, an indirect question, and an adjectival clause from the above sentence.

(3) Write down the subject of *looks*, and the object of *asked*.

History and Geography.

(1) Write two or three lines about Thomas Becket, Thomas Cromwell, Warren Hastings, and Titus Oates.

(2) Where is (*a*) Crécy, (*b*) Blenheim, (*c*) Plassy, (*d*) Waterloo? Name an event connected with each.

(3) Describe the course of the Thames and name the chief places on its banks.

V. ARITHMETIC.

(1) In a party of ten men four are blind and seven are deaf. How many of them must of necessity be both blind *and* dea ?

(2) Multiply £713 14s. 6¾d. by 29.

(3) Divide 36,588,976 by 4,019.

(4) An eldest son receives ⅔ of his father's property, and finds that it amounts to £4,000. What was the amount of the property?

(5) Add together $4\frac{1}{3\frac{1}{8}}$ and $5\frac{3}{5\frac{1}{7}}$. Subtract $\frac{9}{10}$ from $10\frac{4}{5}$.

(6) Find the value of 7,034 things at £4 17s. 3½d. each.

(7) Add ·03 to ·033. How many times is ·34179 contained in 341·79? What is the value of £·725?

(8) Find the simple interest upon £417 13s. 6d. for $2\frac{3}{4}$ years at $2\frac{1}{2}$ per cent.

VI. FRENCH.

Translate into French (*with Dictionary*):

(1) Are your books dearer than mine?

(2) Shut all the windows and open the door.

(3) She would be happy—He receives them—He will call her—Twenty-one fine horses—A French book.

(4) Un loup passait près d'une étable. Un âne, l'ayant aperçu par le trou de la porte, se mit à braire de toutes ses forces et à l'insulter. "Ah! te voilà," dit-il, "mangeur de brebis et d'agneaux, fléau des troupeaux, animal cruel et sanguinaire, viens ici: je me moque de ta force et de ta cruauté." "Faquin," dit le loup, "si tu étais hors de ton étable, je te ferais tenir un langage plus poli; mais tu n'es qu'un âne et un poltron."

[*Boys who do not offer Greek are expected to do the French without Dictionary.*]

MODERN SIDE.

[The subjects of examination for admission to the Modern Side are Latin, Mathematics (comprising Arithmetic, the earlier parts of Algebra, and Geometry) and French, and Candidates are required to pass in all three; but failure in either Algebra or Geometry may be compensated by proficiency in the other mathematical subjects. Questions in German or History are given to Candidates who are able to do them, and the answers are taken into account in determining their places.]

I.—III. LATIN AND ARITHMETIC.

[The questions in these subjects were the same as those set for boys on the Classical Side.]

IV. ALGEBRA.

(1) Find the numerical value of (1) a^2-b^2, and (2) of

$$\frac{a^3+b^3}{a^2-ab+b^2}+\frac{a^3-b^3}{a^2+ab+b^2}$$

when $a=\frac{1}{2}$ and $b=-2$.

(2) Multiply $x^2+2ax+a^2$ by $x^2-2ax+a^2$, and divide $4x^4-9a^2x^2+6a^3x-a^4$ by $2x^2-3ax+a^2$.

(3) Factorise the expressions

$$a^2x+ax^2,\ x^2-7x+12,\ 4a^2b^2-(a^2+b^2-c^2)^2.$$

(4) Simplify $\frac{x}{1+2x}-\frac{x}{1-2x}+\frac{4x^2}{1+4x^2}$

(5) Solve the equations

$$5(5x-4)-4(4x-3)+3(3x-2)-2(2x-1)=2;$$

$$\frac{\frac{1}{2}(x-3)}{3-\frac{2}{x}}=\frac{x}{3x-2};\qquad 6x^2-13x+6=0.$$

(6) After A has received £10 from B he finds that he has £6 more than B; they have £40 between them; what sum had each at first?

V. GEOMETRY.

[If you cannot prove the propositions set, say so, and others will be given you.]

(1) What parts of two triangles must we know to be equal, each to each, before we can say that the two triangles are equal in all respects?

(2) Draw a straight line perpendicular to a given straight line of unlimited length, from a given point without it.

(3) Describe a square upon a given straight line.

(4) If a straight line be divided into any two parts, the square on the whole line is equal to the squares on the two parts, together with twice the rectangle contained by the parts.

(5) The angles in the same segment of a circle are equal to one another.

VI. FRENCH.

Translate into French (*without Dictionary*):

(1) All these histories which I have learnt are false.

(2) After having walked to London, we shall go to France.

(3) They have become quite happy, though they are poor.

(4) She is much older than she seems.

(5) I do not want your horses, but his.

(6) Why has the general not gone where he was told?

(7) He was born on the 27th of July.

(8) I asked them if she had killed herself.

(9) Has he obeyed them in all that he has written?

(10) He will run; they came; we learnt; she saw; he died; we shall know; we ate.

OUR CHESS COLUMN.

A FEW words as to the *raison d'être* of this feature of THE SCHOOL WORLD are necessary.

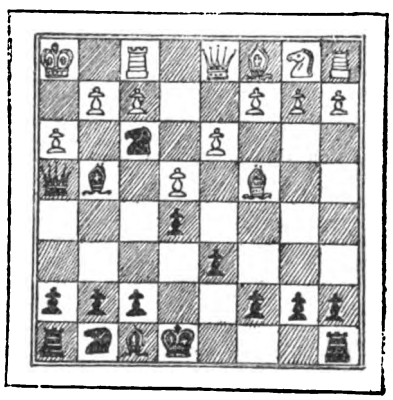
Hitherto chess has, surely without reason, been held to be a game essentially for adults. The primary aim of this column is to spread the popularity of the game in schools. The teacher is the only channel through which this can be done, and I confidently appeal to teachers to do all that lies in their power to awaken or develop an interest in chess in their pupils.

Experience has proved that this is easily possible, and none will grudge the hour or so voluntarily given up every week for two terms of the school year to the organisation and superintendence of the Chess Club. The game is, perhaps, not one for the summer months; but two correspondence games were enthusiastically contested during the summer term of the present year by two well-known schools, which we will call Black and White. We publish one of the games below; it is well worth playing over. This, as far as I know, was a new departure in inter-school relationships, and it is not too much to say that the members of the staff of each school were as "keen" on the play as the actual participants.

GAME NO. I.

	WHITE.		BLACK.
1.	P to K4	1.	P to K4
2.	Kt to KB3	2.	Kt to QB3
3.	B to B4	3.	P to Q3
4.	Castles	4.	B to Kt5
5.	P to Q3	5.	Kt to Q5
6.	P to KR3	6.	Kt takes Kt(ch)
7.	K to Rsq	7.	Q to R5

White.



Black. C. W. K

8.	Kt to Q2	8.	Kt to KR7
9.	P to KB3	9.	Kt takes R
10.	P takes B	10.	Kt to Kt6(ch)
11.	K to Ktsq	11.	P to KR4
12.	Kt to KB3	12.	Q to K2
13.	KtP takes P	13.	Kt takes KRP
14.	P to KKt4	14.	Kt to B5
15.	Q to Bsq	15.	Kt takes P(ch)
16.	K to Kt2	16.	Kt to B5(ch)
17.	B takes Kt	17.	P takes B
18.	Q to QKtsq	18.	Castles
19.	Kt to Q4	19.	Q to R5

White resigns.

I want secretaries to let me know of the existence of their clubs and their willingness to take part in an inter-school competition. If a sufficient number of schools enter, I shall feel justified in offering a valuable set of Staunton chess-men and a board to the winning team. Of course the games would be

played by correspondence; details, however, must be held over for the present. I hope to be able to announce a good entry in the next number. Will correspondents kindly let me have their views by the 28th inst.?

There are, possibly, many schools where chess is known to one or two only, and I hope to provide something for individuals as well as clubs. This month, therefore, I offer a prize of a Five-shilling Book, to be chosen from the catalogue of Messrs. Macmillan & Co., Ltd., to the boy or girl who points out the quickest way for Black to win the subjoined unfinished game. In the event of more than one correct answer, the prize will go to the sender of the first postcard examined after the 28th inst. Due mention will be made of the remaining solvers. This is an easy competition, and there is the same chance for everybody.

RULES.

I.—Write on postcards.
II.—Give name, school address, and date.
III.—Address all communications to

The Chess Editor,
THE SCHOOL WORLD,
St. Martin's Street,
London, W. C.

The game is as follows:

	WHITE.	BLACK.
1.	P to K4	P to K4
2.	Kt to KB3	Kt to QB3
3.	P to Q4	P takes P
4.	Kt takes P	Q to R5
5.	Kt to QKt5	B to QB4
6.	Q to KB3	Kt to KB3
7.	Kt takes BP(ch)	K to Qsq
8.	Kt takes R	R to Ksq
9.	B to Q3	Kt takes KP
10.	Castles	Kt takes KBP
11.	R takes Kt	R to K8(ch)
12.	B to KBsq	Kt to Q5
13.	B to Kt5(ch)	Q takes B
14.	Q takes KBP	

PRIZE COMPETITION.

The Most Popular Books in School Libraries.

FOUR prizes of books, each of the published value of half-a-guinea, to be chosen from the catalogue of Messrs. Macmillan & Co., Ltd., will be awarded for lists of the twelve most popular books in School Libraries. Two of these prizes will be given for lists of books most popular with boys, and two for lists of books most popular with girls.

For the purpose of this competition, those books will be judged the most popular which are most frequently named in the replies received.

The list of books must be accompanied by the coupon printed on p. iv., and must reach the Editors of THE SCHOOL WORLD, St. Martin's Street, London, W.C., on or before Monday, January 30th, 1899.

The competition is open to all. The result will be announced in the February number, when the successful lists will be published.

CALENDAR.

[*Items for the February number Calendar should be sent in by January 31st.*]

January, 1899.

Monday, 16th.—Examination for Foundation Scholarships, St. Paul's School. Examination for Scholarships, Whitgift Grammar School, Croydon.
Wednesday, 18th.—Mason University College, Birmingham. Entrance Examination.
Thursday, 19th.—Examination for Theological Scholarships at Durham University.
Monday, 23rd.—Oxford. Full Term begins.
Wednesday, 25th.—Trinity College, Dublin. Entrance Examination.
Tuesday, 31st.—Associated Boards of R.A.M. and R.C.M. Preliminary Local Examinations. Return Forms.
Girton College, Cambridge. Return Entrance and Scholarship Examination Forms for March Examinations.

February.

Wednesday, 1st.—Newnham College, Cambridge. Send in names for Scholarships in Classics.
Apply for papers in Elementary Examinations of Society of Arts.
Thursday, 2nd.—Cambridge University. Congregation, 2 p.m.
Friday, 3rd.—Mr. Balfour distributes prizes at Battersea Polytechnic.
Monday, 6th.—Law Society's Preliminary Exams.
Tuesday, 7th.—Return Forms Professional Preliminary Examination of College of Preceptors. Apply under Reg. 17 for Oxford and Cambridge School Examination for Higher Certificates, and under Reg. 19 for Lower Certificates.
Tuesday, 14th.—Return Forms. Durham College Medical Preliminary Examination in Arts (M.B.)
Wednesday, 15th.—Last day for applying for Centre Superintendentships for Interm. Educational Board, Ireland.

During January, on dates which can be ascertained on application, the following Examinations also take place:—(1) Civil Service Examination for Assistant Surveyorships of Taxes, (2) Law Society's Examinations, (3) Royal College of Organists, (4) Surveyors' Institution Preliminary Examination.

The School World.

A Monthly Magazine for Use in Secondary Schools.

EDITORIAL AND PUBLISHING OFFICES:

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Business Letters and Advertisements should be addressed to the Publishers.

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The Editors will be glad to consider suitable articles, which, if not accepted, will be returned when the postage is prepaid.

All contributions must be accompanied by the name and address of the author, though not necessarily for publication.

The School World

A Monthly Magazine of Educational Work and Progress.

NO. 2. FEBRUARY, 1899. SIXPENCE.

EXPERIMENTAL NATURAL HISTORY.

By L. C. MIALL, F.R.S.,
Professor of Biology, Yorkshire College, Leeds.

THE CHOICE OF AN OBJECT.

IF we had to teach the elements of natural history to a class of untrained or almost untrained boys or girls, and if we wished, not so much to give interesting information, as to develop the scientific habit of thought, how should we go to work? We should look out for some simple natural object which can be had in plenty, which is not so small as to require magnifying, nor so large as to be cumbrous in storing or handling, which will feel no pain if roughly treated, which contains few parts, and these not very elaborate. It should be a live object, not pressed or pickled, or fossil. It should open the way to a wide and interesting inquiry, every part of which can be pursued in future years—followed further and further, but never worked out.

A BEAN-SEED.

All these requirements are met by any good-sized seed, and I can think of nothing better for a first lesson in experimental natural history.

To make my suggestions as definite as possible, I will suppose that we have to deal with a class in a secondary school, which has attended many object-lessons, and has made some little progress in physics and chemistry.

Let us begin with a handful of beans, and give them out, just as they come from the shop, one bean to each pupil. What can be made out by naked-eye examination and dissection with a penknife? We shall learn something, but not very much. With soaked beans, which have been kept in wet sawdust for three or four days beforehand, we shall do better. Beans which have been kept one week, two weeks, three weeks, in trays of wet sawdust, will have sprouted, and these will show the early stages of the bean-plant. So much material will suffice for the first lesson.

ENCOURAGE INDIVIDUAL OBSERVATION.

Most teachers would accompany or even anticipate the examination of the seeds with their own explanations, and would take special care to teach the accepted names of the parts. It would be better, I think, to begin by calling upon each pupil to examine his own seed, draw what he finds, and answer a few plain questions. Any tolerably successful drawing could be handed round, or copied by the boy himself on the black board. Names for the parts will soon be wanted; I should adopt, after discussion with the class, the very simplest that can be found. The drawings should be made to scale. Drawing-books with ruled centimeter squares and little wooden centimeter measures are required. Threads stretched across the object by pins at measured intervals will be useful. The scale of the drawing should not, as a rule, be that of the object itself. In the case of a small object like a bean we should multiply by $\frac{3}{2}$, 2, or some other convenient factor greater than unity. A clean, firm stroke with a hard pencil is to be recommended. No shading is called for.

It is enough if the first lesson has caused the pupils to record, each for himself, the form, size, and general structure of the bean-seed. We will then allow a few weeks for the seedlings to grow up into green plants. At the end of the time we must be ready with plenty of examples in two or three stages. While the beans are growing we may start other things for comparison, but not many at once. Maize, vegetable marrow and pine are particularly interesting. When all are sufficiently advanced we shall come back to our seedlings. It is no drawback that lessons on utterly different objects should be interposed. The naturalist has to learn that he cannot work anything out; he must study bit by bit, as his capacity and his opportunities allow, and a methodised treatment of any branch of natural history is only to be found in books.

A SCHOOLROOM GARDEN.

The work of starting and tending the seedlings may properly be entrusted to the class. A clear space, not exposed to dust, or to mischievous interference, is required. It should be open to full sunlight, but capable of being darkened at pleasure. The trays and other necessary appliances should be made by the class. I know of schools where the drawing-books could be ruled and sewn, and the wooden measures cut and divided.

Find out by actual trial what difference it makes to the seedlings whether they are kept in the dark, exposed to faint light, or to full sunlight. Examine and compare the results at the end of every week. Measure some one result, *e.g.*, length of stalk, and plot the measurements in curves.

THE FOOD OF PLANTS.

Find out by actual trial to what point seedlings will develop which are planted in wet sawdust or wet sand.[1] Try to account for the fact that their growth under these circumstances is limited. Grow other seedlings in good garden-mould, well-watered and well-drained. Compare the results and reduce them to figures. The actual trial will suggest that the garden-mould contains something in which the sand or sawdust is deficient. Can we find out what ingredients of plant-food are present in the one case and absent in the other? If the chemistry taught in the school is pretty good, something may be learnt by actual analysis. Then we may make an artificial nutritive solution, and try the effect of adding this to the sand or sawdust. When the notion of the method has been fully grasped, we may adopt the exact proportions of nutritive salts determined by careful experiment as the most suitable. We can go on to try how seedlings behave when grown in sand moistened only with pure water, in sand moistened by a good nutritive solution, or in the nutritive solution itself.

When the method of water-cultures has grown familiar by practice, we may ask ourselves the reason of every small detail. Why do we support the seed above the surface of the water? Why do we darken the sides of the jar? Why do we change the water frequently?

Then we take a set of, say, six jars, each containing two healthy seedlings. From each jar one ingredient of the plant-food is omitted, except that one jar, for comparison, is supplied with all. At the end of the season compare and photograph all the seedlings.

Seedlings of bean, maize, vegetable marrow, and pine raise questions as to the form, number, and arrangement of the seed-leaves, the place of origin of the roots, the functions of the root-hairs, the mode of liberation of the embryo from the seed-husk, the changing form of successive leaves, and so on. We are already started on a road which branches often and has no end.

INFLUENCE OF SUNLIGHT.

The experiments on seedlings grown in the dark, in faint light, and in full sunlight, will suggest further inquiries. For they will show us that while sunlight is at first a matter of no consequence to the seedlings, there comes a time when they cannot thrive without it. Deprived of light, they remain small, fail to acquire the bright green of healthy plants, and at length die away. Why is light indifferent to the young seedling? Why is it essential to the older plant?

Examples show that light is not essential to plants of every kind, even though mature. Moulds and mushrooms grow well in the dark. But no green plant can be found which thrives in uninterrupted darkness. What, then, can sunlight do for the green plant? This is a hard question, and a tolerably complete answer can only be reached by much study. But we can attack it in detail. We can use Sachs's beautiful iodine-test, to show that green plants form the well-known nutritive substance, *starch*, wherever they are exposed to sunlight, while in the dark, not only do they form no starch, but the starch previously formed disappears. To demonstrate this important fact we take green leaves (all are not suitable, but primrose, tropæolum, cabbage and marigold answer well), and expose some to sunlight for many hours, while others are kept in the dark for at least twenty-four hours. Pains must of course be taken to prevent drying up. When the light has acted thoroughly upon some of the leaves, but not upon others, all must be boiled (why?), decolorised with alcohol (why?), and then placed in a weak solution of iodine of the colour of sherry. Wherever the light has acted starch will have been formed, and the leaf will turn purple; where the light has been excluded the leaf remains pale.

It is easy to vary the experiment by exposing one-half of a leaf and shading the other half with a card. Or, we may cut a letter out of the card, and so imprint the letter upon the leaf in purple. It is even possible to get a distinct copy in starch of a good photographic negative possessing plenty of contrast. On replacing the leaves in alcohol they soon fade, and the same leaves can therefore be used any number of times.

FOOD OF PLANTS OBTAINED FROM CARBONIC ACID.

By a variation of Sachs's iodine-test we can establish the fact that starch will not form in the leaf unless carbonic acid as well as sunlight is supplied. Two leaves may be illuminated under exactly similar conditions, one being supplied with more than the atmospheric proportion of carbonic acid (say 3 per cent.), while the glass vessel which contains the second leaf has all the carbonic acid removed by potash solution. In the absence of carbonic acid no starch forms. We can cause starch to appear in one half of a leaf, while none appears in the other half of the same leaf, though both are fully illuminated. An intelligent schoolboy, whose wits have been sharpened by previous experiments, should be able to devise a suitable arrangement for testing this statement. Moll's experiment with carbonic acid, the principle of which has now been described, shows that if starch is to be formed, both carbonic acid and sunlight must be supplied to the very same cells of the living leaf and at the same time.

Take one of the many variegated leaves of the garden which are green in some places and white

[1] If sand is used it must not be such as cakes, and resists penetration by roots. Sand containing lime is often unsuitable for this reason.

in others. Apply Sachs's iodine-test after exposure to light, and show that starch forms only where the green matter is present.

Starch and sugar are rich in carbon. Establish this in a variety of ways (sulphuric acid, charring, production of carbon dioxide by oxidation). The tissues of the plant are also rich in carbon. Find out in a particular seedling how much of its increase in weight is due to water, how much to carbon.

Take six small test-tubes and fill each half-full of water. Weigh out equal quantities (very small) of the hair-like, green alga (Spirogyra), so common in ponds and horse troughs. Leave two of the tubes open to the air; cork a second pair tightly; to a third pair add a little carbon dioxide day by day, keeping them corked in the intervals. Place one tube of each pair in the dark, the other in a sunny place, and observe the rates of growth of the Spirogyra.

Spirogyra supplied with carbon dioxide gives off bubbles in bright sunshine. One of the larger water-plants, such as Anacharis, gives off bubbles in rapid succession. Try to devise a good method of collecting the gas, and of determining its properties. Repeat Priestley's experiment of 1779. He removed as nearly as possible all the free oxygen from a receiver by allowing a taper to burn out within it; then placed a green leaf in the receiver, and exposed the whole to sunlight (not remarking that he had done so—an omission which caused him great vexation in the end). After some hours the air was restored by the liberation of oxygen, so that the taper would burn in it once more.

We can now make it evident to our pupils that the green plant draws carbon dioxide from the air, forming starch from it, and using up the starch in the manufacture of its permanent tissues, as well as in other ways which we cannot now pursue. The green leaf is a machine run by the sun's rays. Carbon dioxide is the raw material, starch the first visible product. Oxygen is formed as a bye-product, and allowed to escape.

The disappearance of Starch.

Why does the starch once formed disappear from a leaf in the dark? Here we enter upon a new branch of the inquiry, a branch which we shall not soon exhaust. We can easily and satisfactorily demonstrate that starch disappears from a thin mucilage under the action of human saliva.

Make a little starch paste with cold water. Stir a very small quantity of this paste in a thousand times its bulk of boiling water. Allow the mixture to cool; that is our mucilage. Test the mucilage with iodine solution; it turns blue.

Take three small glass tubes; place in one a little mucilage; in a second, mucilage to which human saliva, diluted with water and then filtered, has been added. (Why do we filter? Why do we dilute before filtering?) In a third tube put mucilage and saliva, diluted and filtered as before, but this time boil the saliva before adding it to the mucilage. All three tubes must now be kept at the temperature of the human body for three minutes. This is easily effected by a water-bath and a thermometer.

Or we can simply keep the tubes in the mouth, but a longer time is required, for the tubes do not so quickly rise to the necessary temperature as when they are immersed in a large bulk of warm water. Now test all three tubes with iodine as before. The first of course turns blue; the second remains unchanged except for the pale yellow tint given by the iodine; the third turns blue like the first. Diluted and filtered saliva removes the starch; boiled saliva does not. What has become of the starch removed by the saliva from the second tube? If the chemical attainments of the class justify us in pursuing this question, we can show the use of Fehling's test for sugar, and make it evident that the starch acted upon by saliva has been converted into sugar.

This simple series of experiments not only demonstrates that human saliva changes starch into sugar; it also shows that filtered saliva acts perfectly well, and that the conversion is not due to solid bodies, probably therefore not due to living bodies, like yeast-cells, which cannot pass through a filter-paper; lastly, it shows that the power of conversion of starch into sugar is destroyed by boiling the saliva.

Ferments.

Now there are many other substances found in living animals and plants which behave in a more or less similar fashion, effecting chemical changes of various kinds, and they differ from most inorganic reagents in this respect, that the quantity of the substance is no measure of the effect produced by it. To a certain extent they resemble in their action such living ferments as yeast-cells. A thimbleful of yeast will make any quantity of alcohol if you allow time enough. There is a further likeness in the circumstance that the activity both of the living ferment and of the saliva is destroyed by heat. Such a substance as the active constituent of human saliva may therefore be called a ferment, but it is a *soluble or unorganised ferment*, not composed of living cells.

Now is it possible that, just as starch is converted into soluble sugar by the action of human saliva, it is also converted into sugar by some soluble ferment found in green leaves? Perhaps the ferment in green leaves acts only in the dark; perhaps it acts alike in the light and in the dark, but in the light its action is overpowered by the starch-forming process, whatever that may be. All these questions have been put and answered; we shall try to answer them for ourselves. Take fresh green leaves, and bruise them in a mortar. Pour a little cold water upon them, and test the action of the extract upon the starch-mucilage. In some cases we shall get clear proof that the starch is converted into sugar, as, for instance, when tropæolum leaves or leaves of leguminous plants are employed. Potato, onion and sunflower

leaves act much less energetically. An hour may be required instead of the three minutes allowed to the saliva, and the action is not at all accelerated by heat.

Certain green leaves contain, therefore, a demonstrable ferment which acts upon starch, converting it into sugar, and so rendering it soluble. What is gained by reducing the sugar to a soluble form? Make the facts that starch is insoluble and sugar soluble quite evident to the class, and see whether they cannot answer your question for themselves.

Developing the Spirit of Inquiry.

Here we must stop, though we are only at the beginning of a large inquiry. The work, when described in writing, looks harder than it is in practice. Close attention to details is, however, absolutely necessary to success, and it is only by repetition that the work becomes easy.

No book should be produced in class when an experimental inquiry is on hand. We want our pupils to get results of their own, not to verify statements. Darwin's "Elements of Botany" and Darwin and Acton's "Physiology of Plants" are useful helps to the teacher. Detmer's "Praktikum," of which an English translation has just appeared, contains practical instructions for many interesting experiments, most of which are too difficult for school-boys, though they would be of the greatest service to anyone who attempts to teach to school-boys the elements of plant physiology.

"Very slow work this!" I can fancy some teacher saying. "What a time it will take to get through all these experiments!" Yes, it is slow, in the same way and for the same reason that raising a crop is slow. We have to allow plenty of time, not merely that we may get our experiments done in an orderly and conclusive fashion, but also because we wish to encourage the growth of a new faculty—the faculty of questioning and trying. It is a desperate remedy for the farmer to leave out, for lack of time, the ploughing and the sowing, and it is not much better for the teacher to save time by telling his class what has been found out by experiments which neither he nor they have ever performed. As an examiner of elementary science-classes, I find that I can get definitions and descriptions and explanations, all clear and careful enough. But experimental results of the simplest kind I cannot get as yet. The teacher explains what would happen if the experiment were tried, and hopes that his explanations will do almost as well as the real thing. But the mere recollection of verbal statements is treacherous, and the simplest cross-examination brings to light the hollowness of all knowledge which has been merely communicated to passive learners. A bit of real knowledge grows and branches like a bramble in a hedge, rooted in the ground to begin with, and clinging by an infinity of hooks to all that it touches. The dead knowledge, hammered into the memory by repetition, is at best only a nail; it sends out no shoots. We can really trust in practice Jacotot's maxim: *Apprendre quelque chose et y rapporter tout le reste;* but *apprendre*, in natural science at least, does not mean any kind of memory-work, but active, living effort, with choice and responsibility. The growth of a seedling, if really mastered by observation and experiment, will vivify many a chance observation, or even things which are merely read of in books.

I would have every science-lesson take the form of an inquiry. It may be that neither pupils nor teacher are really able to advance knowledge in any appreciable degree by their inquiries, but they can at least learn how to inquire. Nobody who does not habitually inquire is fit to teach science at all. Our work is only scientific in spirit when it springs from the desire to know of our own knowledge some definite thing concerning which our curiosity has been moved.

THE SCHOOLS OF PUBLIC MEN.

I.—Members of Parliament.

HOW often it is said that "the boy is father of the man"! Sometimes the remark has made a grace before meat as the headmaster, having fruitlessly endeavoured to woo us to the paths of virtue by persuasion and reasoning, proceeded to make an urgent appeal to our bodily senses. Or, the distinguished person, making the presentations at the annual prize-giving, rounded off his references to a distinguished "old boy" by observing that the industry and ability which the subject of his panegyrics showed while at school marked him for success in the serious business of life.

Whatever the degree of truth in the aphorism, there is always an interest in trying to follow the connection between early training and after attainment. But every boy, assuming the truth of the proverb, does his best to glorify his own school by pointing with unmistakable pride to the achievements of this or that old boy. Ill-defined though it may sometimes be, the tacit assumption is fairly general that, in some measure at least, a high position in one of the professions is the natural result of the moral and intellectual training received at school.

Considerations of this sort have led us to examine the question a little more closely and to classify the schools of some of our public men, with a view to determining which schools exert the largest influence in the different spheres of men's activity. But the matter is too extensive to be dealt with in one short article and must be treated in parts. As a beginning, we deal with the House of Commons and tabulate, as far as possible, the schools where our Members of Parliament have been educated. Unfortunately, this cannot be done as exhaustively as could be wished. In the various publications which supply short biographies of our distinguished men, the name of

his college is often all that is given concerning the education of a Member of Parliament, and for our present purpose the University career is to be disregarded. In other cases no sort of information is given. But, after all, this only applies to a fraction of the total number, for it has been possible to ascertain the school, or its equivalent, of all except about a hundred members. When it is further borne in mind that this lack of information very often means that the Member of Parliament has attached so little importance to his school life as not to have supplied the data to the compilers of the records, our general conclusions will be seen to be interfered with comparatively little. Of the five hundred and sixty members or thereabout whose schools are before us, more than one-fifth come from **Eton.** That there should be a hundred and twenty old Eton boys in the present House of Commons will come as a surprise to many of our readers. Among the distinguished members who are Etonians are:—

Rt. Hon. Arthur J. Balfour,
First Lord of the Treasury.
Rt. Hon. G. W. Balfour,
Chief Secretary for Ireland.
Rt. Hon. Sir M. E. Hicks-Beach,
Chancellor of the Exchequer.
Rt. Hon. A. Akers-Douglas,
First Commissioner of Works and Buildings.
Rt. Hon. William St. J. Brodrick,
Under Secretary for Foreign Affairs.
Mr. William Grey Ellison-Macartney,
Parliamentary Secretary to the Admiralty.
Mr. Henry Torrens Anstruther,
Junior Lord of the Treasury.
Sir William Hood Walrond,
Patronage Secretary to the Treasury.
Mr. James William Lowther,
Deputy Speaker and Chairman of Committees.
Mr. George Wyndham,
Under Secretary for War.

Harrow comes next on the list, but a long way behind Eton, with forty-nine old boys in the House. Among these we find:

Rt. Hon. W. H. Long,
President of the Board of Agriculture.
Rt. Hon. Sir M. White-Ridley,
Secretary of State for the Home Department.
Rt. Hon. Lord G. F. Hamilton,
Secretary of State for India.
Rt. Hon. Henry Chaplin,
President of the Local Government Board.
Mr. Dunbar P. Barton, Q.C.,
Solicitor-General for Ireland.
Rt. Hon. A. G. Murray, Q.C.,
Lord Advocate for Scotland.

With another drop in numbers, we come to **Rugby**, with its twenty-three representatives. These include several officers of State, for the following are old Rugby boys:

Rt. Hon. G. J. Goschen,
First Lord of the Admiralty.
Mr. J. Austen Chamberlain,
Civil Lord of the Admiralty.
Rt. Hon. R. W. Hanbury,
Financial Secretary to the Treasury.

Winchester ranks next to Rugby with thirteen old boys who are members of Parliament, and is followed by Cheltenham with nine. The Rt. Hon. John Morley and Rt. Hon. W. E. H. Lecky are both from Cheltenham. As far as we have learnt, Westminster and Edinburgh Academy are each represented by seven members; Sir R. Bannatyne Finlay, Q.C., Solicitor-General, is an old boy of Edinburgh Academy. Marlborough and Clifton each contribute six members, while Rossall, Charterhouse, Liverpool College, and King Edward's High School, Birmingham, each have five old boys in the House. Sir Richard E. Webster, Q.C., Attorney-General, and Professor Jebb are both from Charterhouse, the former having first been at King's College School. With four old boys among members of Parliament we find Shrewsbury, City of London School, University College School and Manchester Grammar School. The Rt. Hon. Joseph Chamberlain, Secretary of State for the Colonies, is, we understand, an old boy of University College School; the Rt. Hon. H. H. Asquith, Q.C., represents the City of London School.

Wellington, Amersham, Mill Hill, Glasgow High School and Royal Institution School, Liverpool, are each, we find, credited with three members. Lord Manners is from Wellington, Mr. Augustine Birrell from Amersham, and the Rt. Hon. James Bryce from Glasgow High School.

A much larger number of schools have two old boys in the House, among them being Loretto, Merchant Taylors, Radley, Edinburgh College, Tettenhall College, Wesley College (Sheffield), Aberdeen Gymnasium, Bramham College, Summerhill College (Athlone), Clongowes Wood College (Kildare).

A very large number of members were educated privately. We have found this to be true in the case of fifty-one, but surmise that if data had been available concerning the remaining hundred members to whom reference has been made, this number would have been much increased. The Rt. Hon. C. T. Ritchie, President of the Board of Trade, was privately educated for some years, and then proceeded to the City of London School.

At least fifteen members of the present House of Commons were educated in elementary schools, chiefly of the National School type, and several others received no school education at all. The number who attended private schools is large but difficult to exactly estimate, for though in some cases the name of the school is given, in others it is not specified further than as "private school" or by the name of the town. But in spite of the incompleteness of the records the foregoing information is interesting. It is proposed to deal with the chief professions in a similar manner in future issues.

Women Students in America.—It is not without great interest to observe the very large number of women students participating in higher education in the States, which cannot fail to result in a keener recognition on behalf of the next generation of the value of education, and a much deeper interest in its problems, its aims, and methods.—J. H. Reynolds, "Report on Technical Colleges, &c., in the United States and Canada." (Manchester, 1898.)

POINTS FOR DESCRIPTION IN OBSERVING BRAIN CONDITIONS IN BOYS AND GIRLS IN SCHOOL LIFE.

By FRANCIS WARNER, M.D.(Lond.), F.R.C.P.

II.

IN the former article I described ten modes of brain action for observation, and showed that each can be studied both as to visible movement and as to the mental action corresponding. The points for observation were expression in movement, the modes of brain action were inferred; observation and inference should go hand in hand with child study and physiological psychology. We classed eye movements, finger twitches, and certain movements in the face as signs of spontaneity, and some modes of expressing emotion as spreading areas of movement: if movement in general is to be observed as indicating brain status and action, it is obviously desirable to have a descriptive account of the principal points or individual nerve signs which experience has shown to be useful in such studies.

You want to observe an individual child. In order to prevent your personal equation from acting too strongly upon him, it is convenient not to talk, and not to touch him, and to avoid his looking at you, as you look at his face. Thus: let the child stand; hold a small object, say a shilling, for him to look at; thus he does not see you, and you can fix his eyes, keeping them still, while you rapidly survey his head and face. Carry your eyes to each zone of the face in turn: (1) The forehead above the eyebrows; (2) The eyelids and parts around; (3) Then below the cheek-bones and the area around the mouth. Something may be said about each of these facial zones.

The child's forehead should be generally smooth and placid, corresponding to brain action and mental status neither wholly uncontrolled nor too much stimulated. There are vertical muscular fibres under the skin of the forehead (frontal muscles), whose contraction produces horizontal creases; while other small muscles (corrugators) are placed horizontally between the eyebrows, and in action draw them together or knit the brows.[1]

Frontals overacting is a subnormal sign. Such frowning is far more common in boys than in girls; it appears often among children leading a monotonous life, and usually disappears when the child is interested and neither worried nor much pressed; by removing this sign you brighten the child. In this, as in other cases, the usefulness of observation in the school-room lies in the fact that the degree of the sign is inversely proportional to the suitability of the school environment. When this is best adapted to the child the sign lessens, and so a judgment can be formed from your observations.

Knitting the eyebrows (corrugation), with vertical creases in the mid-forehead, most frequently results from overflow of nerve energy in strong mental action, or in a state of mental stress: look at your class during mental arithmetic. The same sign results when too strong a light shines on the eyes; in company with "frontals overacting" it may indicate a low mental status or deficiency, producing a uniformly repeated habit when the child is unoccupied, or it may occur as a spreading area of action in nervous disturbance and in stammering.

Fulness under the eyes (orbicularis oculi lax). This generally indicates fatigue, which may be temporary, as after a full day's healthy work, showing the need of rest; when present in the morning it shows want of restfulness; if continuous, exhaustion of nerve power in the child is to be feared; this is particularly disastrous among girls. Such sign of fatigue does not necessarily depend on school work, it frequently accompanies headaches, late hours, a close atmosphere, or worries at home may exhaust the child. There is a large thin layer of muscular fibres (orbicularis oculi) that surrounds the eyelids, and by its good tone gives shapeliness to the lower lid, showing the rotundity of the eyeball; this muscle is energised as a smile spreads about the eyes and is convulsed in laughter. When this muscle is relaxed there is fulness and bagginess under the eyes, which disappears during laughter. Fulness under the eyes often accompanies a general want of tone in facial expression and cheerfulness.

Smiling and grinning. Smiling as a mode of facial expression, under appropriate stimulus, is due to a gentle overflow of nerve energy, producing a spreading area of movement, usually symmetrical and causing creases in the face, running from the margins of the nose to the angles of the mouth; these naso-labial grooves may be fine or coarse. Grinning may occur spontaneously or whenever the child is spoken to, as a uniformly repeated low habit. In smiling, the angles of the mouth are drawn up, in contrast with their depression at the commencement of crying; smiling and crying express antithetical mental states, yet they may quickly alternate.

Mouth open. The mouth may be open from the lower jaw falling, as may be seen in a person sleeping in the upright position; the jaw is drooped under depressing emotions, following sudden disappointment. Habitual mouth breathing is, however, more often due to obstruction of the throat or nose, requiring medical treatment.

Expression in the Face. When you have looked at muscular movements in the forehead, about the eyes and the mouth, it still remains to observe and describe the general aspect of the facial expression as a whole, which though most difficult of definition is most important as an indication of spontaneity, control, and of mental action even when there is delay in verbal expression. A bright, lively, changeful expression is a hopeful sign of brain activity; on the other hand, the face may lack expression, being dull-looking, monotonous, unimpressionable. Absence of facial expression often occurs with a low, monotonous voice, and but few thoughts corresponding; it has

[1] See "Study of Children," p. 21, Drawing of Muscles of Face. (Macmillan & Co.)

already been pointed out that fulness under the eyes often accompanies a low expression, it may be due to the same causes. Each of the nerve signs described in the face may form a part of the general expression, and those points present should be described individually.

Eye movements. When you look at the face of a child you see the eyeballs, which are moved by their own muscles and nerves, independently of the face, and should therefore be observed separately. Eye movements may show much spontaneity, the eyes moving everywhere, though mostly in a horizontal direction; this movement should be under control, and arrested for the time, when the eyes are directed to the book, the blackboard or the face of the master in oral teaching; the eyes should be under control of hearing and the word of direction. Spontaneous movements of the eyes lead to but vague impressions at sight; though many objects may be seen, they need to be co-ordinated by training; wandering eyes make a bad observer, and a pupil who reads and spells indifferently. Eye movements need training; some children look about them and at the parts of an object by moving the head only, not by turning the eyes in the head; exercises in eye drill usually remove this defect.

Looking at the visible expression of brain action in the child, many points for observation are to be seen in the face. Next to this, the hand, when held out free, is the best index of the brain condition and mental status. Let the child stand; tell him to hold out his hands in front with the palms downwards, and show him the action momentarily. In the well-trained normal child the arms are raised to the horizontal position, level with the shoulders, the elbows being straight, and the arms parallel to one another, with the hands the width of the chest apart; the hands being straight at the wrist in a plane with the arms, each finger and the thumb on a level with the palm, so that a card placed on the back of the hand is touched by each digit. This shows good balance among the brain centres well co-ordinated by training.

Weak hand balance. In the listless, careless or tired child one hand, usually the left, is held lower than the other, with drooping of the wrist, and some folding of the bones of the palm together, while the fingers also droop. If you gently raise the forearm of a child in sleep the hand falls into this attitude owing to the absence of brain energy coming down to the muscles. The attitude is undesirable in a school child, and should be removed by training—it indicates a lack of energy. If you can get the pupil to hold his hands straight in imitation of yours you will produce a better status of his brain and aptness for mental work; you will energise him by removing his listlessness or careless habit. It is desirable that any means you adopt should not produce at the same time any spreading movement as of the head, spine or shoulders.

Nervous hand balance. Children who sleep badly, suffer from headaches, often with capricious or voracious appetite and vague debility, may be classed as of the nervous type. They tend to tire quickly, though usually bright and quick in mental action. In this class of children the hand balance is modified from that last described; as before, the wrist droops, and the palm is somewhat contracted by slight folding of the bones together, but the fingers are drawn backward at the knuckles, while the second and third joints are slightly bent; the thumb is also bent backwards. This is usually most marked in the left hand.

Finger twitches often accompany the nervous hand balance. As the hand is held out, they are best observed if the fingers are slightly separated so as to be free, not supporting one another. Each movement indicates the discharge of nerve-force from some separate piece of brain tissue. This sign is further indicative of the nervous type of child.

Some points for description in observing brain conditions as seen when looking at the face and the hand of a child in school have now been described; others might be added.[1] It is in the association of individual points that grounds for a judgment are afforded.

The nervous hand-balance and finger twitching, with fulness under the eyes, and a lack of expression, especially if accompanied by wandering eyes and facial grimaces or other indications of too much uncontrolled spontaneity, suggest at once that the child is in low health. If also he is under the normal body weight for his age, serious debility or an attack of St. Vitus dance may be apprehended.

On the other hand, the mere observation of a nervous hand-balance, or the weak hand-posture, other indications being healthy, suggests the want of adapted physical training.

I said that observation of children might aid classification and facilitate arrangement in school. Children of the nervous type—those with much spontaneity in movement, restless eyes, finger twitches, and the nervous hand-balance—are often bright mentally, though not necessarily of good memory: quick at work, they are apt to be playful and talkative; in habits they are gregarious, and seek one another's company; they are liable to exhaustion, and the mid-day meal should be supervised to see that they eat proper food, not buns and lemonade. Uniform training from early days is the best safeguard against breakdown at the years of adolescence.

In the "nerve-signs" you see indications of the present working condition of the brain. They may vary on different occasions, just as mental status may vary. Any point that you want to alter is better effected by your gesture, and in imitation of your action, rather than by a spoken word. Some children show much spreading nervous movement when spoken to, and are better controlled by a look than a word. When nerve-signs alone are seen in a child well made in head and features and well nourished, they suggest the need of further training. If the pupil is also dull a means of improvement is indicated, but this need not cause anxiety, as in the delicate and poorly-developed

[1] *See* Op. cit., chap. iv.

children of whom I have to say a few words later on. In the following tabulated descriptions individual nerve-signs are given.

A Bright Healthy Boy 10 Years Old.

General balance of body. Is symmetrical, head held erect, shoulders straight, back not stooped, feet equally planted, limbs balance alike.

Expression. Bright, smiling when pleased or successful in work, good tone about eyes, no fulness of lower lids, no repeated overaction in any part of the face.

Eye movements. The eyes often turn to the teacher, also to other faces and objects; the eyes move sometimes in looking without the head being turned.

The hands. When held out are straight, no drooping of fingers or thumb, the elbows are straight, and each hand balances alike; the fingers are not quite steady when separated. The effort of holding out the hands is not accompanied by any bending of the back.

A Healthy, Active-brained Girl, but not sufficiently Trained to Complete Self-control, age 13 years.

General balance of body. Fairly good, shoulders not quite equal, and the feet are not placed symmetrically as she stands; head often inclines to one side.

Expression. Smiling and inclined to laughter, steady when interested at work. No darkness or fulness about eyelids; forehead smooth.

Eye movements. Eyes turn well to objects looked at, as apart from her head movements. The eyes follow a moving object well, as long as the observer's face is not within view; she always looks at the eyes of any one in front of her.

The hands are held out promptly, and balance in the "nervous posture" especially marked in the left, which is held lower than the right. This action is accompanied by throwing the shoulders back, and other extra movements, such as turning the head and smiling, while the fingers are unsteady.

Sneaking.—A boy's idea is very comprehensive, and covers everything from the telling of a trifling fault to the answering of questions put by a master, or the reporting of serious moral delinquencies. It is curious that the feeling does not seem to exist among children in the elementary schools at all. Is it a right feeling to encourage or not? I shall run counter, I am afraid, to the general set of opinion, when I say that a master ought to try and upset the code which boys ordinarily observe on this matter. . . . . The ideal thing would of course be that an offender should be willing to give up his name when challenged, or better still, in grave cases, without challenge; but, until our moral nature is much nearer to perfection than at present, I fear that such a consummation is more to be wished than attained. Now in such cases I say that it is the duty of every boy to disregard the claims of an individual schoolfellow and have regard solely to the welfare of the school as one corporate body. —F. H. Matthews, M.A., Headmaster of Bolton Grammar School. "A Dialogue on Moral Education" (Swan Sonnenschein & Co.).

THE TEACHING OF ALGEBRA.

By G. B. Mathews, M.A., F.R.S.

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II.

Sign.

THE arithmetical meaning given to $a-b$ is that it is the remainder when b has been subtracted from a. In order to make this intelligible it must be assumed that a and b are ordinary (abstract or signless) arithmetical quantities, and that a is greater than b. We can *write* $2-5$ just as easily as $5-2$, but while the second expression has an arithmetical meaning, the first has none. But consider the statement

$$a+2-5=a-3;$$

this is true and intelligible so long as a is greater than 3. a being to this extent indeterminate, we may agree to write

$$+2-5=-3$$

and interpret this to mean "an addition of 2 followed by a subtraction of 5 is equivalent to a subtraction of 3." This is an intelligible statement, just as

$$+5-3=+2$$

may be read "an addition of 5 followed by a subtraction of 3 is equivalent to an addition of 2." Thus the introduction of such symbols as $+2, -3$, standing by themselves, may be justified by convenience, each of these symbols being distinguished from the purely abstract numbers 2, 3.

Again, take the formula

$$a-(b-c)=a-b+c;$$

this can and should be proved (with numerical illustrations) when a, b, c are abstract numbers and $a > b$, $b > c$. If we place a sign before a, and reason as above, we can show that, provided $b > c$,

$$\pm a-(b-c)=\pm a-b+c;$$

but if $c > b$, we must make a new step; the simplest and ultimately the most scientific course is to say that we *assume* the law to be universally true. It cannot conflict with any arithmetical application, because it has been proved correct whenever it is arithmetically intelligible; and it cannot upset any of our algebra, because we avowedly base our algebra upon it, and hence are excluded from framing any new assumptions which contradict it. This may limit our algebra, but it cannot make it nugatory.

In the formula

$$a-(b-c)=a-b+c,$$

thus assumed to be universal, put $b=0$; then we obtain

$$a-(-c)=a+c,$$

which shows that we must interpret $-(-c)$ to be $+c$. In a similar way the formulæ $+(-a)=-a$ and $-(+a)=-a$ may be established.

RULES OF SIGN FOR MULTIPLICATION.

If a, b, c, d stand for ordinary abstract numbers, and $a > b$, $c > d$, it may be proved, by a diagram or otherwise, that

$$(a-b)\,(c-d) = ac - bc - ad + bd\,;$$

and now, assuming the universal validity of the formula, and putting $a = c = 0$, we have $(-b)\,(-d) = +bd$, and similarly $(+a)\,(-d) = -ad$, and so on. As in the previous case, these rules of sign are necessary consequences of generalising an arithmetical result which has only a limited application; experience justifies the conviction that the generalised law is not inconsistent with itself. No doubt it would be possible, although it would certainly be troublesome, to give a strict proof that such self-contradiction is impossible; but an experienced mathematician scarcely feels the need of it, and a beginner could not appreciate it.

But it is necessary to protest against unsound "proofs" of the rules of sign. As an example, take the following attempt to show that $-a \times -b = +ab$:—

"$-a \times -b = -a \times m$ (assuming $m = -b$)
$= a \times -1 \times m = a \times -m$
$= a \times -(-b) = a \times b = ab$."

Here every step is unjustifiable. As appears from the context of the book from which this has been taken, the author had no right to replace $-a$ by $a \times -1$; still less to put $-m$ for $-1 \times m$ when m stands for the *negative* quantity $-b$; in fact, this begs the whole question by the easy method of introducing a latent sign. It may be added that the equivalence of $-(-b)$ with $+b$ had not been previously established.

The rules of sign for division follow, of course, from those for multiplication.

POLARITY OF CONCRETE QUANTITIES.

So far we have been concerned with the purely formal development of algebra. It is true that the letters used have been tacitly or explicitly supposed to have (abstract) numerical values, and the signs of operation to have their arithmetical meanings, at least in the first instance. But the laws of operation, in their final form, are independent of these assumptions. Strictly speaking, every algebra, as such, is an exclusively formal calculus, and quite independent of any meaning assigned to its symbols.[1] It is a curious fact of what it is the fashion to call Applied Psychology that, whereas a mathematical student of some experience is apt to confuse algebra with its applications, the beginner is led into error by too hasty extensions of purely formal laws. Such mistakes as $\sqrt{(a+b)} = \sqrt{a} + \sqrt{b}$, $\cos\frac{1}{2}\theta = \frac{1}{2}\cos\theta$, are simply due to illegitimate extensions of $m(a+b) = ma + mb$, $abc = bac$; and when they are corrected, this ought to be pointed out.

When we come to apply algebra to the solution of problems, and the construction of geometrical or physical formulæ, any letter used stands almost invariably either for the number of a group of things or for the numerical measure of a concrete quantity. Beginners, at any rate, should be strictly forbidden to use letters for concrete quantities; such remarks as "Let x equal A's share," or "$x = 30 = 2$s. 6d.," or again "$\sin\theta = \frac{1}{2} = 30°$" are mere nonsense, and ought never to be allowed.

So long as the concrete quantities with which we have to deal are completely specified by their measure in terms of a unit (for example, quantities of mass or energy), there is no difficulty in applying algebra to questions involving them. The signs + and − have their usual meaning, and the letters used represent abstract numbers. But the most important applications of algebra deal with quantities possessing polarity or "sense." A typical case is that of a thermometer. Here any displacement of the end of the column must be specified as so many degrees up or down. Suppose we agree to write πa for a rise of a degrees, and νb for a fall of b degrees. Then a displacement πa followed by a displacement πb (or the same in the reverse order) gives a total displacement $\pi(a+b)$. By an obvious analogy we call this the sum of the displacements, and write

$$\pi a \dot{+} \pi b = \pi(a+b)\,;$$

where, on the left hand, $\dot{+}$ is put for + to show that the symbol is not used in its strict arithmetical sense.

Similarly $\nu a \dot{+} \nu b = \nu(a+b)$;

while $\pi a \dot{+} \nu b = \pi(a-b)$ if $a > b$,
$= \nu(b-a)$ if $a < b$.

Now compare these with the purely formal identities

$$(+a) + (+b) = +(a+b),$$
$$(-a) + (-b) = -(a+b),$$
$$(+a) + (-b) = +(a-b) = -(b-a)\,;$$

the remarkable result follows that we may put + for $\dot{+}$, + for π, − for ν, reduce by ordinary algebra, and in the result interpret + as π and − as ν. In other words, the symbols + and − are used both as signs of quality (rise and fall) and also as signs of operation. This does not lead to any difficulty, either in calculation or interpretation of results, and greatly simplifies our notation. The fact that this is so is very remarkable, and not sufficiently emphasised in text-books, although it was pointed out years ago by De Morgan (see his article "Negative and Impossible Quantities," in the *Penny Cyclopædia*).

It is of the utmost importance that the student should become familiar with this double application of + and −; valuable exercises are afforded by the rudiments of analytical geometry (as far as the plotting off of simple functions), by the formulæ for lenses and mirrors, and such like.

[1] The one weak brother among the myriad readers of THE SCHOOL WORLD will forgive me for observing that this does *not* mean that "any meaning whatever may be assigned to the symbols of an algebra," nor does it imply that proposition.

Latent Sign.

It is often convenient to use letters to denote, not merely abstract numbers, but numerical quantities affected by sign. In this case the sign is said to be latent; thus, in writing x,y for the rectangular coordinates of a point, it is understood that x and y may be either positive or negative as the case may be. So in the formula for an arithmetical progression, $s=\frac{1}{2}n\{2a+(n-1)d\}$, n is a positive integer, while the signs of a, d, and s are latent. This often puzzles beginners, and is a point that requires attention; practice in the sort of exercises last alluded to is the best remedy. It is worth while remarking that all general formulæ of algebra are true whether or not the quantities involved are affected by latent signs.

Unless the laws of sign are thoroughly understood, progress in algebra or its applications is impossible; moreover, a mistake in sign during a calculation is the easiest of all errors to commit and the most difficult to discover. For both reasons the subject demands a large share of the teacher's attention; and I hope this rather long discussion will not be thought superfluous.

Importance of Secondary Education. — Primary Education is indeed precious, as everything that uplifts and elevates the masses must be. But we must not forget that Secondary Education is the real nurse of our literature, the foster-mother of science and the art of government, and that through it the intellectual progress of the nation is maintained. And if, as is undoubtedly true, ideas lead the world, or, in other words, those who conceive and possess them lead it, then, without losing sight of the ethical side of education, in which we are far from being last, we must admit that the race will be to those who are the best trained and educated; and thus it comes to pass that the question of Secondary Education, so dry and technical as it seems, owing to its terminology, and difficult because of its complexity, becomes for every English parent, nay, for every one who has the welfare of his country at heart, a question of the deepest and most momentous import. Now is the accepted time. Our statesmen have practically asked the nation to take up the question. Great and small, let us take it up! The least among us can at least, if we are honest, arouse and deepen public interest, if we add but little really new to it. Put simply, the organisation of Secondary Education, and, through it, of National, means setting to rights a part of the National Defence *every whit as important* as the proper arming of our soldiers and sailors. And let us in no wise shut our eyes to the danger of refusing to face the question, for the danger is a great and a growing one. If we are content to jog along with our haphazard system of education, with our premature specialisation so fatal to the development of the race, the day of reckoning will not be long in coming. The competition of other nations will soon make itself felt in every home; our sons will find increasing difficulty in taking their place in the world, and, when it is then too late, we shall see, in our lust for immediate gain, in our greed to get back as soon as possible a part of the price paid for education, we have been sending our sons but half trained and half armed into the "Weltkampf" of nation with nation, when others more wise have forgotten the allurements of a premature and temporary gain, in order to secure later on advantages more lasting and permanent.—Cloudesley Brereton in *Fortnightly Review*.

ON THE EARLY TEACHING OF FRENCH.

By Professor Walter Rippmann, M.A.

II.

THOUGH we are concerned only with the very early stages of teaching French, yet if we regard them as the foundation of the building, we must make up our minds what kind of a building we wish to erect.

Now, the teacher of modern languages recognises the value of a training in the classical languages; but he protests against the very low place often assigned to his subject. He claims that by his teaching he also educates, and not merely instructs; and that if a real knowledge of Latin and Greek is undoubtedly of lasting value, a real knowledge of French and German is becoming more and more essential for us, from many points of view.

Progress is cosmopolitan, and literature is its expression. To a quite insufficient extent the translator comes to our help; but his work is often slovenly, and the true spirit of the original is not preserved. This does not apply to scientific works; but here, as a rule, the translator only undertakes popular writings, while the works which lead the way can only be read in the foreign language. In belles lettres the abyss that separates the original and the translation is vast; a few wonderful achievements like Luther's Bible stand out amid great wastes of inferior work. When will the minor versifier cease to maul Heine?

We teach modern languages, in the first place, in order to throw open fresh fields, to widen the intellectual horizon of our pupils. Thereby we shall deepen their sympathies, making them see what is good in other nations, and teaching them that much which raised a smile appears simple and reasonable when it is understood. Here we have a most valuable aid to education, which is less potent in the classical languages; the thoughts and feelings of French and German children are far nearer to those of our own children, and they arouse far greater interest and sympathy than the deeds of men two thousand years ago.

In the Middle Ages, when Latin reigned supreme, and the mother tongue was "barbarous," it was customary to speak the old language, and to make the children learn it as though it were living. That we have given up. Latin is now called "dead," and rightly so; for we cannot regard classical verse composition as anything more than an academic exercise, when we remember that no one can claim that he reads Latin or Greek verses as they were read by those who wrote them, and that what seems harmonious to us might have jarred badly on the ears of a Greek or a Roman.

But we are concerned with *living* languages. We can ascertain how they are pronounced; and if we can speak them ourselves we gain a fresh source of power in the struggle for life. Not merely "speak" in the sense of a facile use of

a few conversational tags, but implying the power of expressing ourselves freely in the foreign idiom, so as to be able to keep up a conversation on the great questions that occupy the attention of cultivated men and women. Thus we shall also gain great additional profit from our travels; and in the world of commerce we shall be better able to hold our own.

I have placed the requirements of commercial intercourse last; not from any attitude of foolish superiority towards the merchant, but because it has lately been the fashion to support the demand for better teaching in modern languages by sensational statements as to the decline of our trade and the alarming progress of the Germans. Now, we are ready to acknowledge that when a boy leaves our hands he should have acquired such a knowledge of modern languages as will be of great use to him in a commercial career; but we refuse to make this consideration the central motive in our teaching.

Our subject has been the Cinderella long enough; and if we can help it, she shall not remain among the ashes for ever.

A question which will force itself upon our head masters in the near future is: Which shall be the first foreign language taught—Latin or French?

I have no doubt as to the answer myself. As I have said already, French life and thought is far closer to the English child than Roman life and thought; and it is a common-sense maxim in education that we should pass from the known to the unknown. If a modern language is only taught systematically, it gives a very valuable training to the mind; and the weary drudgery of mastering the Latin primer will be minimised, and much time saved, if the child has acquired the elements of French before taking up the more remote language on which French is based. Strictly speaking, it would be still better to make German the first foreign language, owing to its kinship with English; but, at any rate, in boys' schools the study of German has not received much encouragement.

In girls' schools modern languages have met with more consideration, and the teachers have as a rule given more thought to questions of method. The results are on the whole more satisfactory than in boys' schools, mainly because the teaching is less weighed down by classical traditions. This is well known, and yet publishers and editors of schoolbooks usually leave the girls quite out of account; the choice of texts and the manner of annotation is governed only by the requirements of boys.

The obvious drift of my remarks is that we should make it our aim to teach French as a living language, and enable our pupils to speak and write as well as to read it.

Can we do this at school?

Well, we cannot, except in a few rare cases, teach our pupils to speak so as to make a Frenchman believe they are French. We cannot make them Frenchmen; and we do not want to. But we can help them to express themselves freely and without hesitation; and the time we spend in obtaining this result is not lost in other respects. If they are led to speak, it will help them to write a letter or an essay, and at a later stage to translate from English into the foreign tongue; it will enable them to read prose fluently, without the constant necessity of word-for-word translating, and to read verse with all the pleasure to be derived from the actual sound of the words.

It is sometimes maintained that this cannot be done at school, and other expedients are suggested. In a recent article in *Longman's Magazine*, Mrs. Lacky recommended the *bonne*. But we must consider the large number of families who cannot afford a French nurse; and where there is one, the results are rarely encouraging. The child's pronunciation is often very incorrect, its stock of words extremely limited, and its grammar shaky. Let the child rather have a good training in English to begin with; that is much more important.

Again, we are told that the pronunciation is best acquired by going abroad. It may be. If the learner is fortunate and is taken in hand by a really competent teacher, who insists on the foreign language only being spoken, and who has had a thoroughly good phonetic training, the end will no doubt be achieved. But in ninety-nine cases out of a hundred the importance of getting a good teacher is ignored; it seems to be thought that the foreign language will be absorbed by a kind of natural process. We all recognise the "good pronunciation" that has been gained in this way; it is a travesty comparable only to the "imitated pronunciation" of certain First Courses.

The pronunciation can and should be taught at the very beginning; and in my next paper[1] I propose to show how our fellow-teachers on the Continent have attempted to solve the problem, and how we can best overcome some of the principal difficulties experienced by English children. The important question of how to furnish them with a suitable vocabulary will next be discussed, and then the systematic teaching of the elementary facts of grammar.

III.

Pupils cannot be expected to pronounce a foreign language better than their teacher. It is, therefore, the duty of the teacher to give careful and unremitting attention to the acquisition of a good pronunciation.

He is, no doubt, able to pronounce French after a fashion before he thus subjects his organs of speech to systematic training, having learnt it at school, and perhaps by imitation of foreigners with whom he may have come into contact. But this knowledge is quite insufficient if he wishes to teach.

[1] The above article was to have appeared in the first number of THE SCHOOL WORLD.

He must first obtain a general idea of the organs of speech, and of the sounds uttered in English and French. He will very soon realise that there are many delicate *nuances* which he had not observed, and ignorance of which has hampered him hitherto. Above all, he will soon come to recognise that in speaking French the "basis of articulation" differs from that which he has been used to in English, that is to say, the average position of the tongue is not the same, the lips are more active, the formation of sounds is more "tense" or "narrow" (the usual technical term). He will be led to exercise his organs of speech systematically, in order to give them greater flexibility, and he will not rest satisfied until he is able to pronounce without difficulty any sound or combination of sounds in the foreign language.

The handiest book for this purpose is Professor Vietor's "Kleine Phonetik," an English edition[1] of which has just appeared. The teacher should read it through at least twice, first rapidly, that he may become familiar with the terminology and obtain a general idea of the subject; and then slowly, examining every statement and uttering aloud every example. If this has created in him an interest for what is really a very attractive subject, he may like to work through Klinghardt's book.[2]

Having studied the elements of phonetics in a general way, the teacher will also require some book giving the rules for pronouncing words, to which he may refer in case he is doubtful. Many volumes have been published in recent years pretending to supply such rules; but hardly one of them is trustworthy. These, as well as the chapters on pronunciation in most of the French grammars, reveal at the first glance a considerable ignorance of the progress which has been made in the science of phonetics during the last fifteen or twenty years. I shall here recommend only M. Passy's convenient "Abrégé"[3] and his "Le Français Parlé."[4]

Equipped with the knowledge of the living speech to be derived from these books, the teacher will derive real benefit from a stay in France, which must be regarded as an essential part of his training. He will not hesitate to speak the language, for he may be confident that his pronunciation is not very bad, and his ear will have been trained to observe; this will be particularly important in picking up the intonation, a chapter of the subject in which our manuals are, and will for some time yet, be deficient. Visits to the Continent will have to be repeated, for the pronunciation is otherwise apt to deteriorate. Even Frenchmen who have stayed in England for several years, and have not spoken much French during this time, lose the purity of their accent.

[1] "Elements of Phonetics: English, French, and German." With numerous diagrams. (J. M. Dent & Co.) 1898. Price 2s. 6d. net.

[2] H. Klinghardt, "Artikulations-und Hörübungen." (Cöthen: Schulze.) 1897. Price 5s. 6d. net.

[3] Paul Passy, "Abrégé de Prononciation Française" (Phonétique et Orthoépie). (Leipzig: Reisland.) 1897. Price 1s. net.

[4] Paul Passy, "Le Français Parlé." Morceaux choisis à l'usage des étrangers, avec la prononciation figurée. (Leipzig: Reisland.) 1892. Price 2s. 6d.

IV.

If the teacher has taken the course suggested above, he may be trusted to be a thorough believer in the value of phonetics. He will have become quite familiar with the alphabet of the *Association Phonétique Internationale*,[1] and will utilise it in teaching his pupils.

It is still a matter of dispute to what extent this should be done; but that the use of these phonetic symbols is a great help to the teacher is only denied by those who have never made the attempt. I have never heard of a teacher who introduced the *Association* transcription and gave it up again of his own free will.

But there are many teachers who cannot at once spare the time necessary for carrying out the course of study suggested above, and would yet like to have some hints how to overcome the principal difficulties experienced by English children in learning French pronunciation.

I shall have to confine myself to the case of those using southern English speech; but many of my remarks will apply equally to children in the North.

In general, the pronunciation must be clear and precise. There must be no mumbling, no slurring. The breathing should be good. This, of course, is true of English also, but the teachers of English are not always alive to the importance of encouraging such habits among the children.

At the beginning of each lesson let the children draw twenty or thirty deep breaths. (I am assuming that there has been an interval of at least five minutes, during which the windows have been kept open.)

It is convenient to give the children French names, and to teach the pronunciation in connection with these. A list of suitable words is given on p. 18 of my "Hints on Teaching French."[2]

Vowels.—These usually present considerable difficulties, mostly due to the faulty teaching of English reading. The children must be made to understand clearly that in *bait* and *boat* they are pronouncing diphthongs, and that in *beat* and *boot* there is also not one sound of uniform value between *b* and *t* in each case. The action of the lips in the case of back vowels[3] (expressed in French writing by *o*, *ou*) must be shown by the teacher, and it will take some time before the children round their lips instinctively in uttering the French sounds. A hand mirror can be used to good purpose in the class-room. If this is objected to, the children may be called upon to watch each other.

When *o* and *ou* are correctly pronounced, the more difficult front vowels with lip-rounding (*eu* and *u*) may be attempted. Here the tongue must be in the same position as for *é* or *è* and for *i* respectively, whilst the lip-rounding is the same as

[1] The annual subscription to this Association is only three francs, for which members receive the journal, *Le Maître Phonétique*, edited by Dr. Paul Passy (11, Route de Fontenay, Bourg-la-Reine), to whom subscriptions may be sent.

[2] J. M. Dent & Co. 1898. Price 1s. 6d. net.

[3] So called because the back of the tongue is raised.

for *o* ("close" or "open"[1]) and for *ou* respectively. Sounds very much like the true French sounds can be produced without lip-rounding, in various ways, and are usually substituted for them in English schools; but the teacher should not be satisfied until his pupils produce them properly and with ease.

The "neutral" *a* of *âme, pas*, in which the tongue lies flat in the mouth, presents difficulties to some children, who utter instead either the "clear" *a* of *rage, ma*, or northern English *pat*, or the "dark" *a* of southern English *father*.

The nasal vowels require a good deal of practice; but the children will be much helped if they are shown to which "oral" or "pure" vowel each of them corresponds. Roughly, the relationship is as follows:—

Oral.	*Nasal.*
o in *porte.*	*on* in *oncle.* *om* in *ombre.*
e in *perte.*	*in* in *fin.* *ein* in *plein.* *ain* in *main.*
eu in *peur.*	*un.*
a in *lâche.*	*en, an* in *enfant.* *em* in *temple.* *am* in *champ.*

Note.—The teacher will use his discretion in giving special exercises for training the organs of speech. For lip-rounding the following may be found useful: *a-o-ou-o-a, ou-o-a-o-ou, o-eu-o-eu-o, ou-u-ou-u-ou, a-o-eu-ou-u, é-eu-i-u-i-eu-é*, etc. The sounds should be uttered rapidly, but quite distinctly.

Consonants.—Perhaps *r* is the most troublesome. It is not, indeed, necessary to teach the pronunciation of the "uvular" *r*, common in the speech of Paris and the other large towns; the lingual *r* is preferred by the French themselves, in theory. But it must always be trilled; the English *r* is lingual also, but it usually consists of a single "tap" only, where it has not disappeared altogether. To get southern English children to pronounce every French *r* that should be pronounced, and to make them trill it, requires constant vigilance for some months.

The *l* must also receive attention. In English we draw our tongue further back, and our *l* consequently has a "darker" sound than in French, which is particularly noticeable when it is final.

The sounds which come second in *Louis* and *lui* should not be confused. In *Louis* the *ou* is very much like our *w, i.e.*, a consonantal sound corresponding to the vowel *ou*; in *lui* the *u* is the consonantal sound corresponding to the vowel *u*, the front (not the back) of the tongue being raised.

In English we often aspirate *p, t, k* (*c*), *i.e.*, these sounds are followed by an *h* sound. This is never the case in French.

The nasal *gn* is never formed further back than the line between the hard and the soft palate; this distinguishes it from our *ng*.

[1] *O* is "close," *e.g.*, in *rose, côté*; "open," *e.g.*, in *or, robe*.

In words beginning in French with *j* or *g*, these sounds are sometimes pronounced as in English. The children should be led to compare the sounds of *leisure* and *ledger*.

It is well to let the sounds be practised in connection with words, and in the beginning without referring to their conventional spelling. At first, each individual should be made to pronounce the new sounds; the teacher will very soon come to know which of his pupils require special attention. When the sounds have been taken through with individuals, the whole class may be asked to repeat the teacher's words in chorus.

It is hard to say how much time should be given to the teaching of pronunciation. Much depends on the previous ear-training of the children, which is, as a rule, grossly neglected in our English schools; much, I believe, on the use of a phonetic transcription; much also on their age and general intelligence. But, whether a phonetic transcription be used or not, the teacher must not hurry on to other things before he has enabled his pupils to produce the foreign sounds without difficulty; and though this will naturally call for less attention after the first year's teaching, yet he should never allow a slovenly pronunciation to pass unremarked.

Right Method of Teaching a Language.—The right method of teaching a language may be put in a nutshell: grammar, reading, writing and conversation should go side by side. For convenience, and because of the importance of the subjects, grammar and exercises in composition will naturally have special times assigned to them; but they should never be left out of sight. No construing lesson ought to be done without some grammatical drill, or without a few sentences of conversation, which is in fact composition in brief. The importance of grammar can hardly be over-estimated; and the first thing the learner must understand is that the skeleton of the language, the inflections, have to be known by heart. A knowledge of cognate languages may help, and comparative tables of forms may help both intelligence and memory, but in the end it all comes to the same thing; however the pupil may have learnt them, he must be prepared to say off his declensions and conjugations from memory in the usual tabular form. There are, in this slipshod age, those who affect to despise precise knowledge, such as geographical names and facts, historical dates, and the paradigms of a grammar. "Learn by reading" is their motto in language—a most false and pernicious principle, as I can testify from sad experience. It has been my lot to learn one or two languages sufficiently well to enable me to read in them, and I grieve to relate that in these I shirked the drudgery of the grammar. The result is that, although a certain amount of grammar has soaked in, I cannot yet read without a manual by my side. The most such a method can do is to give the general sense of a sentence; but it often fails to do even that, inasmuch as the general sense of a sentence is made up of precise sense of its parts. Exactness in understanding is not to be had without paying the price, and the price is an exact knowledge of the grammar.—W. H. D. Rouse, M.A., Master in Rugby School. "Work and Play in Girls' Schools" (Longmans).

WINTER GAMES FOR GIRLS.

By Jane Frances Dove,
Head-mistress of Wycombe Abbey School, Bucks.

THOUGH the subject of this short article is Games, the writer is desirous of making it clear from the beginning that they are not to be regarded or treated as of the smallest importance in themselves. Games are healthful only as a recreation; and recreation implies previous expenditure of energy in the form of work. As a means of education the forms of organised recreation which we call Games may be invaluable, but, pursued as the chief object in life, their effect is wholly demoralising.

Having thus defined the place which Games may justly claim in the lives of reasonable beings, whether in the great world of society at large or in the smaller world of school, we have now to discuss some special forms of recreation which are suitable for girls, and which may be carried on when outdoor exercise is impossible. It may be remarked that outdoor exercise is often considered to be impossible when a little extra care and trouble would render it perfectly safe: a shower of rain may be faced with impunity if damp clothes can be changed before the girls sit down, and brisk exercise in a very cold wind is, if not carried to the point of physical weariness, a most bracing form of recreation. But there are days when a steady downpour keeps even the most robust within the house; there are schools where much of the organised recreation must be carried on indoors.

Let us begin with the most unfavourable circumstances that can be imagined. Most schools, however limited their space, possess a room not less than 35 feet by 20 feet. In such a room as many as twenty-two girls of, say, twelve to fourteen years, can be kept occupied for an hour or more with a game of basket ball. For those who have not seen the game, it may be described as a kind of football played with the hands. The goals are two strong baskets placed on high standards, which, if the school possesses a workshop, should be made by the girls themselves. The opposing teams face each other in pairs all over the field of play, and each pair must keep within their own lines. The ball, a small-sized football, must not be held by any player: it is constantly bounced on the ground, or thrown from one to the other. Any rough play, such as jostling or wrenching the ball out of the enemy's hands, is at once declared a foul. The game promotes readiness of hand and eye, it gives excellent practice in self-control, it teaches each girl to think only of the general good of her team, and not solely of her own opportunities of distinguishing herself. It is not, of course, basket ball at its best that is here described. A level green field is the ideal ground; but basket ball has been played with the utmost interest and enjoyment within the more confined limits of a small school-hall.

Again, such a room would admit of from nine to twelve girls practising with skipping ropes the graceful exercises which admit of endless variation, and which, if possible, should always be accompanied by music. Roller skating is possible for a considerable number, and a capital way of spending a wet afternoon is to engage the older girls in a Badminton tournament. The net should be made by the girls themselves; the racquets and the shuttlecocks are not expensive. Only four can play at one time in the space we are considering, but the games are short, the players soon change, all have their turn of play, and, for spectators and players alike, the interest never flags.

But let us suppose that there are more players to be provided for than the hall will hold. There are, doubtless, corridors which can be used, and in these jumping matches, with apparatus made in the workshop, can be arranged. The apparatus is of the simplest kind. A pair of stands provided with pegs that can be driven into holes at various heights, a rope with shot bags at the ends resting upon the pegs, are all that is absolutely necessary. A cocoa-nut mat is desirable, and a spring board is often used, but very good jumping may be done without it. Care must be taken that style is not sacrificed when jumping becomes a game; a high jump should count for very little, unless it is done in the best form. Another corridor game is a development of the old-fashioned "bean bags." A sloping board, with three to five holes in it, is placed at one end; the players, divided into two teams, play alternately. Here again good form must be observed; the girls must not be allowed to fall into awkward and unhealthy positions when throwing the bean bags into the holes.

But the forms of exercise which may be devised even with limited space and without elaborate apparatus are practically innumerable. It will have been observed that the writer lays stress on the principle that the girls should be encouraged to make the requisites for their games as far as they can. This at once suggests the advantages of a workshop as a means of recreation from mental labours, but as the subject before us is more especially games and their possibilities, we may be satisfied with the suggestion only.

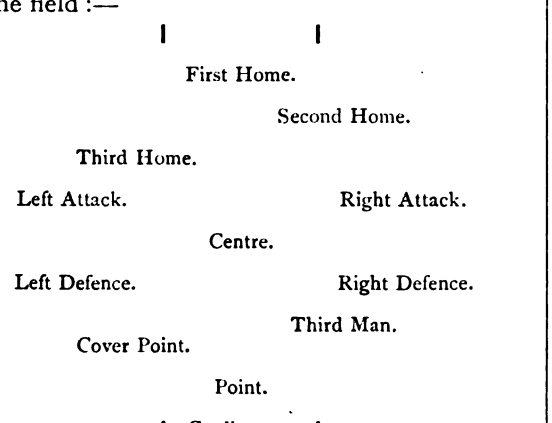
Before turning to the game which, of all others, may be played out of doors, even in unfavourable weather, a plea may be put in for the old country dances which are so simple, so graceful and so full of enjoyable movement. All young people enjoy rythmical exercise, and the enlivening tunes to which our grandmothers danced should not be allowed to pass into oblivion.

To turn, then, to out-door exercise. Golf can be played in all weathers if the ground is a good one. Skating, sliding, tobogganing, snow-men and snow-forts, are obvious resources under the proper climatic conditions, and there is hardly a school or a neighbourhood, such has been the spread lately of a desire for healthy exercise, that does not possess at least one hockey club. But while giving hockey its due as a most useful and practical game for players who can only meet once

or twice a week, and have therefore no time to acquire any considerable amount of skill, the palm must be awarded to our Canadian brothers and sisters for having adopted and developed that most beautiful and graceful of all games—Lacrosse. "Now lacrosse is more essentially a game of combination than any other known field game. All field games are more or less susceptible to the influence of combination, but none so much as lacrosse. At no other game are the abilities of a few good players on a side so utterly swamped and useless if they be not employed in conjunction with the remainder of the team."[1] Players, therefore, must be unselfish, and never lose sight of the fact that they play not for themselves but for their side.

The game is Indian in its origin, and the crosse, with which each player is armed, is probably developed from a snow-shoe. In this country it is played a good deal in the neighbourhood of Manchester. There are several lacrosse clubs in or near London, and there is one at Cambridge. It is, or was, played at St. Paul's School, and is also played in the autumn term in lieu of hockey, which is left over for the spring, by St. Leonards School, St. Andrews, St. Stephen's College, Clewer, and Wycombe Abbey School, Bucks, thus giving an organised game for each term of the school year—a great advantage, as then the interest never flags. If more schools adopted this plan it would increase the possibility of matches, and so improve the standard of play.

In the game of lacrosse two goal posts 6 feet above the ground, and 6 feet apart, are placed at either end of the ground, and at a distance of not less than 100, and not more than 150, yards from each other, and form the only fixed boundaries of the game. Other limits are arranged by the captains of the opposing teams. A full team consists of twelve players. The places are as follows: goalkeeper, point, cover point, third man, right defence, left defence, centre, right attack, left attack, third home, second home, first home; and they are arranged according to the following plan on the field:—



PLAN OF FIELD.

[1] "Lacrosse for Beginners." By E. T. Sachs. Crosses can be obtained from Messrs. Hammersley & Co., Manchester, price 7s. 6d. each.

The object of the game of lacrosse is the same as that of the game of hockey, that is, to score goals by shooting the ball between the goal posts of the opposing side. But while the object is the same, it is attained in a widely different way. In hockey the ball is always on the ground, and the players are stooping and groping after it and hacking one another's ankles. In lacrosse the ball should be always in the air, being passed rapidly from crosse to crosse between players of the same side. This obliges them to maintain an upright position, with head raised and chest expanded, and the arms more often than not above the head or the waist. Another great advantage is that the ball passes very much more quickly up and down the ground, and in this way gives every player about the same amount of exercise and opportunity of play, each player's object being not to keep the ball, but to pass it as quickly as possible.

Again, of the two games there is less opportunity for roughness in lacrosse, because, if the game is properly played, there are very few, if any, of those scrimmages so often seen in hockey. But before these advantages can be gained in lacrosse it is necessary for each player to go through a difficult training by those who have already acquired the skill, in learning to combine quickness, accuracy, judgment and knack, and this needs above everything else perseverance in practice. For if a player means to take a useful place in the game, it is essential that she should first spend much time and trouble on learning to catch thoroughly well. Then, after this is done, to combine catching and playing is difficult; and here is the necessity for quickness both in throwing and in seeing where to throw; also judgment is needed so as to be able to make a useful pass. Then after all this slow practice the knack comes, and the player finds her reward in the joy and exhilaration of being able to play well and usefully for her side.

Experience of both games in girls' schools shows that it is a mistake to suppose that lacrosse is a dangerous game. It is always possible for a clumsy or inattentive player at any game to get herself damaged more or less slightly, but the care with which throwing and catching must be taught and practised before a player can think of joining a game, together with in a well-played game the absence of scrimmages, very much minimises the possibilities of any ill results. And the speed in running, keen eyesight and fine upright positions, with the head well thrown back, that are necessary, make it immeasurably superior as an exercise to hockey.

THE following humorous story is told by the Rev. S. Bernays in a contribution to the *Cornhill*:—"A very just complaint was brought before a bishop that a certain clergyman in the diocese was wearing an Oxford Master's hood, when, as a matter of fact, he had no such degree. 'I call it, my lord,' said the complainant, 'wearing a lie on his back.' 'We need not use quite so strong a word, Mr. Smith,' the bishop replied in his blandest manner; 'call it a *falsehood*.'"

ON THE TEACHING OF HISTORY.

By A. Johnson Evans, M.A.

II.—The Norman Conquest. 1016-1087.

FOR two hundred years (1016-1216) England was under the rule of **foreign kings**. To this there was but one exception, Edward the Confessor (1042—1066), and even he was foreign in his rearing and his tastes. Compare and contrast this period with the much later period when we were again under foreign kings, 1688-1760; though then, too, we had one exception, Anne, whose foreign policy was a continuation of her Dutch predecessor's. There are many ways of making this comparison, the most fruitful of which would be an enquiry into the differences between parliamentary and unparliamentary monarchy.

But to confine ourselves for the present to the mediæval period of foreign rule. For exactly two centuries England was governed by kings whose home was not in this country, who used its resources for other than national purposes, and yet who exercised the profoundest influence on her history, both international and constitutional.

And first to consider Cnut the Dane. His ideal was a great **Northern Empire,** whose centre should be Winchester. The story of the waves and the courtiers tells us what his relations were to the Christian clergy. His journey to Rome and his doings there show how the Holy Catholic Church attracted the recently heathen Northman. Cnut would be the ruler and protector of a great Northern Christian Empire similar to that of the Othos (962-1002) in Germany.

Unfortunately, the dominion was too vast for personal rule. Englishmen were sent to Norway, England itself was divided into earldoms, and after Cnut's death the crown became the object of ambition to several of these princes and their neighbours. When Cnut's two sons had passed away, an Englishman again ruled, a parallel to Ludovicus Pius, the weak successor of Karl the Great. Under his nominal reign, English and Norman princes strove for mastery and for the succession. Note the critical years **1051-2** and **1066.** In the first, Godwin and the English party triumph, and the Archbishop of Canterbury is **deposed** for **"patriotic" reasons.** In the second, the Norman triumphs, and Stigand is **deposed** because **uncanonically** appointed. What does this mean?

The Normans of both Gaul and Italy (for in this century Normans were winning the kingdom of Naples and Sicily) were the most enthusiastic supporters of a reforming party in the Church, whose principles and methods should be carefully studied. We hope to have a further opportunity of giving space for this; but now we must content ourselves with a brief statement.

The monks of the recently founded Cluniac order wished to separate the **Church as a divine institution** from the entanglements of politics. They claimed for the clergy as opposed to kings and nobles the *right to appoint* the bishops. They demanded that the priests should be celibate. Their influence had increased. They had captured the Papacy, and were claiming for that institution higher powers in order to advance their cause against kings and nobles. They had caused their programme to be officially adopted as the canons, or rules of the Holy Catholic Church. Hence the condemnation of the deposition of 1052, and the setting aside of Stigand.

The Norman Conquest brought England under the influence of all these new ideas to which she had been till then a stranger, having isolated herself from Western Christendom. Hence arose in England as elsewhere a differentiation between Church and State. Hence bishops could no longer sit in shire moots, but must administer **canon law** in ecclesiastical courts. (Decree of 1080.)

But William I., though a Cluniac, was yet a king. Weigh well the three rules of conduct which his biographer tells us he followed in Church matters. Read carefully his reply to **Hildebrand,** the Cluniac leader, when as Pope **Gregory VII.** (1073-86) he had asked William for homage and for the payment of Peter pence.

And beware of treating the Hildebrandine or Cluniac movement, the Reformation of the 11th century, as a merely clerical movement. It *led to* a growth in the powers of the Pope; naturally so, as the Popes led in the reform. It was *not* a "Papal plot" made by "proud prelates."

The Norman Conquest was therefore preeminently an ecclesiastical revolution. The consecrated banner which the Pope sent to William on the eve of the invasion marks it as a *Crusade*. It was also a change in the lay constitution, but, whereas our text-books almost ignore the first, they emphasise the second too strongly.

We might begin best by saying that there was *no* change in the lay constitution. William carefully persisted in posing as the **King of the English**, the lawful successor to Edward the Confessor. Of course the bastard who had forced his way to the Dukedom of the Normans was a far stronger king than the "pious" Edward. The Witan lost all power of resistance to so "stark" a king, but it existed, a shadow of its former self.

Shire moots still continued to meet, and were used by William to keep in check the "foreigners" who had helped him to his throne, and whom he had been obliged to reward with manors and lands. Lawsuits were referred to them, and the fyrd was called out to suppress revolts. Of course, the inferior courts in the hands of these new lords did not lose vigour.

The only institution to which we can point as quite new in William's reign, and even to this with doubtful finger, was the Exchequer, an organisation of the machinery for collecting the royal revenue, with which we should couple that monument of good government, the Domesday Book.

What, then, was new in the lay constitution as a result of the Norman Conquest? The bishop and priest disappeared from shire moot and hundred; but these are matters for the present of minor interest. Their importance is later. The novelty of Norman rule was largely personal. And with the new personal element came a change of ideas.

The **land system** of England, which had gradually developed into something like feudalism, with all its varieties of territorial relationships, was forced forward into greater conformity with continental ideas, because Norman lawyers, all gradually and almost unconsciously, assimilated it to the rules with which they were familiar on the other side of the Channel.

While **William I.** and his successors were working, naturally enough, **against feudal** tendencies, except in so far as they increased kingly power, Norman lawyers were feudalising English land law, and thereby transferring the *ownership* of land from dependents to their lords. It is in this sense, and this sense only, that the popular phrase is true that the "Normans introduced the **feudal system** into England." Only as a land law, **not** as a **system** of **government.**

ELEMENTARY EXPERIMENTAL SCIENCE.

BY PROFESSOR R. A. GREGORY and A. T. SIMMONS, B.Sc., Associate of Royal College of Science, London.

HAVING dealt with the measurement of lengths, areas, and volumes, the teacher can proceed to introduce the ideas of mass and weight. It is scarcely necessary to point out that it is taken for granted the teacher will supplement the typical practical exercises selected in these short papers by others of a similar nature, so that one subject may be thoroughly understood before another is attempted.

IV.—MASS AND WEIGHT.

Things required.—The two pieces of iron or brass which in ordinary language are called "pound" and "half-pound" weights; or a "pound" and a "two-pound" will do; also a set of "weights" from 1 to 16 ounces. Pair of scales. Spring balance graduated up to 8 or 16 ounces. A yard of thin iron wire. Strong magnet. Equal masses of lead and cotton wool.

Practical Work for the Class.—Lift the two pieces of metal. One feels heavier than the other, or the masses are different.

Place a certain amount of lead in one pan of a balance, and counterpoise it with cotton-wool in the other pan. The masses are equal, but the volumes are different.

Drop one of the pieces of metal; it falls to the ground on account of the earth's pull upon it. If the attractive force were doubled when you held the piece of metal, what difference would you feel? If the attraction suddenly ceased, what would happen when you released your hold of the piece of metal?

Wind a piece of iron wire round a smooth walking stick or a round ruler, and so make a coil. Hang one end of the coil from a support, and to the other attach the iron pound. Observe that the spring is made longer by the downward pull of the iron.

Examine the parts of a spring balance. Attach 1 ounce to the balance and show that the marker is pulled down to the division 1. The pull of the spring upwards and of the 1 ounce downwards are equal. Add other masses and notice the position of the pointer in each case.

If possible, using a delicate spring balance, such as is used for weighing letters, show that the downward pull of a mass of iron can be increased by holding a strong magnet beneath it.

LESSON GIVEN TO THE CLASS.

What Mass is.—Before we attempt to learn how mass is measured we must know what is meant by this word. When we say that the mass of one piece of metal is twice as great as the other, we mean that one of them contains twice as much iron, brass, or other material as the other. And always when we speak of the mass of a body we mean the amount of stuff or matter, of whatever kind, it contains. Though the masses of two lumps of material may be equal, as can be shown by making one balance the other in a pair of scales, their volumes may be very unequal. This is very well seen by comparing equal masses of lead and cotton-wool. (Fig. 1.)

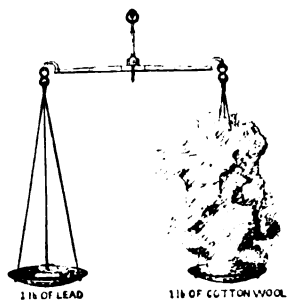


FIG. 1.

The mass of a thing is not the same as its weight, though one is often confused with the other. Keeping in mind what is meant by mass we can, by doing one or two experiments, find out what should be meant when the word weight is used.


FIG. 2.

Mass is not Weight.—If the mass of a pound is dropped from the hand it falls to the ground. If the same mass is hung upon the end of a coil of iron wire, the coil is made longer by the downward pull of the mass fixed to its end. (Fig. 2.) The amount which a steel spring is lengthened, as the result of such downward pull of masses attached to its end, is used to measure their "**weights**" in the instrument called a **spring balance.** (Fig. 3.) If we use a very delicate balance of this kind, like those used in weighing letters, we can make the **weight** of a small piece of iron hung on to the balance appear greater by holding a strong magnet beneath it. (Fig. 4.) But though the weight may


FIG. 3.

appear greater, the mass or quantity of matter is, of course, the same whether the magnet is under the iron or not.

If you have understood these experiments you will have no trouble in seeing clearly what exactly is meant by the **weight of a body**. Unsupported things fall to the ground; a fact which can also be expressed by saying that they are attracted to the earth. Now, even when they are supported, like the objects on the table, the earth attracts them just as much, only the table prevents them from falling, as they would do if there were no table there. **The force with which a body is attracted by the earth is its weight.** But it must be remembered that this force is just the same whether they actually fall to the ground or not. You become aware of the weight of a heavy thing when you hold it on the outstretched hand. You feel that it is only by using your strength, or as it is sometimes said, by exerting force, that you prevent it from falling. This force which you exert is equal to the weight of the heavy object. If you have understood this, and it is necessary that you should, you will never confuse mass and weight, for while **mass is the amount of substance in a thing, weight is the force with which the thing tries to get to the earth.**

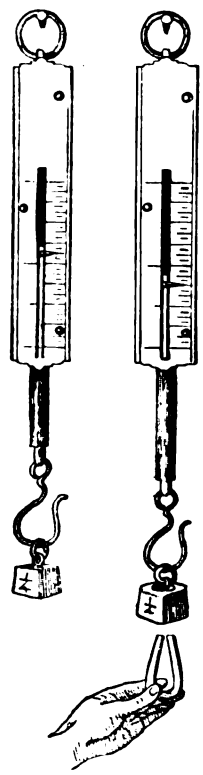


Fig. 4.

To be Committed to Memory.

The *mass* of a body and its *weight* are not the same thing.

The *mass* of a thing is the quantity of matter in it, and this remains the same wherever the body is placed.

The *weight* of a thing is the strength of the earth's pull upon it. In other words, it is the force with which the thing is attracted by the earth.

Exercise.

(1) What do you mean by the mass of a thing? Is there any difference between the mass of a pound of cotton-wool and the mass of a pound of iron?

(2) Which is larger in size, the mass of a pound of cotton-wool or the mass of a pound of iron?

(3) What experiments would you perform to show that masses are attracted by the earth?

(4) What do you mean by the weight of a mass? Write down the difference in the meaning of (*a*) the mass of a book; (*b*) the weight of a book?

(5) It is possible to make the weight of a piece of iron appear greater than it really is. How would you do it?

V.—Measurement of Mass.

Things required.—Examples of British masses, *e.g.* an ounce, a pound, a half-hundredweight. Box of metric masses, generally spoken of as a box of "weights." A kilogram. Spring balance.

Practical Work for the Class.—Compare the pound and the kilogram. Hang the 100 gram mass from a spring balance, and notice that the downward pull, or its weight, is equal to the weight of $3\frac{1}{2}$ ounces.

What, then, is the British equivalent of the weight of a kilogram? It is evidently equal to the weight of $3\frac{1}{2}$ ounces $\times$ 10 = weight of 35 ounces = the weight of $2\frac{1}{5}$ lbs. (roughly).

Lesson Given to the Class.

Measurement of Mass.—Just as in measuring lengths we found it was necessary to have a standard with which to compare, so in measuring mass we must also have a standard or unit. Then we can say how many times the mass of a given body is greater or smaller than our unit. In this country the standard of mass is the amount of matter in a lump of platinum which is kept with the standard yard at the Standards Office. This

Fig. 5.—The Imperial Standard Pound (actual size).

lump of platinum is called the **imperial standard pound avoirdupois**. (Fig. 5.) The divisions, etc., of the imperial pound you have already learnt in your arithmetic lessons under the name of "avoirdupois weight." A mass of 1 lb. avoirdupois is kept at a weight-and-measures office in every city, so as to test the lb. "weights" used by tradesmen, and see whether they really have the mass of 1 lb. or are too light.

The Kilogram and Gram.—The standard of mass which is adopted in France, and other countries where they use the metric system, is called the **kilogram**. The kilogram is the amount of matter in a lump of platinum which is kept in safety at Paris. (Fig. 6.) It is bigger than the British pound; indeed it is equal to about two and one-fifth of these pounds. It is very interesting to know how the mass of a kilogram was obtained. It was agreed to give the name **gram** to the mass of water which a little vessel holding one cubic

centimetre would contain.[1] The lump of platinum was made equal to the mass of one thousand cubic centimetres of water; it would therefore have the same mass as one thousand cubic centimetres of water, or, as you know this amount is called, a litre of water. The names used for the divisions, etc., of the gram are obtained in the same way as in the case of the metre, thus:

METRIC MEASUREMENT OF MASSES.

10 milligrams = 1 centigram.
10 centigrams = 1 decigram.
10 decigrams = 1 **gram**.
10 grams = 1 dekagram.
10 dekagrams = 1 hectogram.
10 hectograms = 1 kilogram.

You now see that what you have learnt to call the metric system of weights and measures is much simpler than ours, and the boys in countries

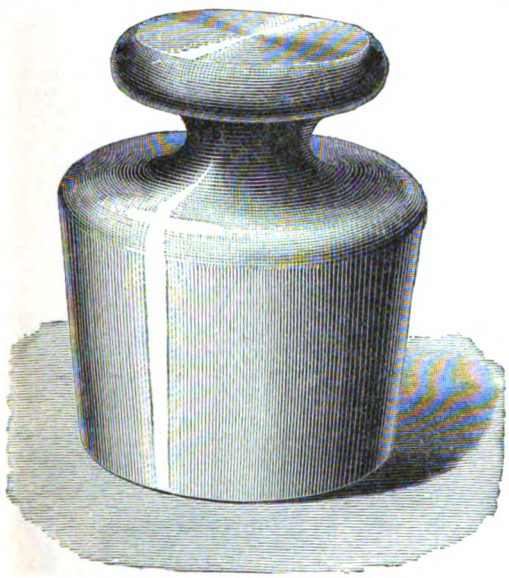


FIG. 6.—Standard Kilogram (actual size).

where it is used have not to learn so many different tables as they have in England when they begin "weights and measures" sums.

TO BE COMMITTED TO MEMORY.

The *British standard of mass* is the imperial pound avoirdupois.

The *metric standard of mass* is the kilogram (= $2\frac{1}{5}$ lbs.), or the mass of 1000 cubic centimetres of water at a certain degree of temperature. A *gram* is the mass of 1 cubic centimetre of water.

Exercise.

(1) What is the standard of mass in British countries and what in France?

(2) Write out "avoirdupois weight."

(3) State exactly what a kilogram is. How much water by volume has a mass of a kilogram?

(4) Write down the table you have learnt of the metric system of masses.

[1] The temperature being 48° C. But it is unnecessary for the beginner at this stage to consider why the temperature must be mentioned.

CURRENT GEOGRAPHICAL TOPICS.

By A. J. HERBERTSON, F.R.G.S.

The Great Plain of China and the Shantung Highland.[1]

THE Great Plain of China stretches from Peking, which is built at its northern apex, to the mouth of the Yangtse-kiang, between 40 and 32° N. It is narrow in the north, but widens to about 400 miles in the south. It is bounded on the west by mountains rising like a wall above it (Taihang-shan = great wall mountains), the boundary being a great fault which can be traced from Ichang, where the Yangtse-kiang issues from the gorges, northwards along the Khingan mountains, probably as far as the Sea of Okhotsk.

The Yellow Sea forms the eastern boundary and the coast is low and regular, except where the Shantung peninsula juts out to the east. Here the coast is rugged with many inlets, owing to the drowning of the valleys of this mountainous area.

The plain is not a delta, formed entirely by the river. Its surface is not quite level, but a series of shallow troughs with slight ridges between. It is formed of loess, and of alluvium only near the rivers. On a dry, cloudless, winter's day the wind drives the dust from the desert over the plain, often obscuring the sun, and depositing a fine dust which clings to all it touches. This is washed into the soil by the summer's rains. For ages this has been going on, forming the loess deposits of the plain.

This Loess is a very loose, fine, porous, yellow earth containing an amount of lime sufficient to let it form perpendicular cliffs when undermined by water.

This Loess is light and easily carried by the rivers, which rapidly excavate deep beds, often many hundred feet below the surface, where the height above the sea allows the river to flow at such a low level. In the lower parts of the plain, the rivers flooded by the summer rain may overflow their banks. The heavier pebbles and sand are still carried on by the main current, and those at the side of the stream get deposited when washed over its banks where the speed of the water is checked, but the muddy flood waters spread over the plains and leave a rich, fine, fertilising mud when they recede. (Cf. the Nile.) An accumulation of the sand in the river's bed may dam back the flood waters and cause extra pressure on the river's banks, which yield where they are weak, and the river pours through the breach, across the plains, and ultimately reaches the sea, usually by another river bed. Many old river beds can be traced by the line of sand among the finer deposits that predominate.

The Hwang-ho, or Yellow River, is the great river of this yellow plain, and carries most of the silt which colours its waters and those of the Yellow Sea (Hwang-hai) into which it flows. This stream is called both China's wealth and China's sorrow; its wealth because of the water it brings for irrigation, and its sorrow because of its damaging floods. For ages its banks have been strengthened by man, and as they rose the river bed rose too, until it stood above the level of the plain. Then in some great flood the banks were broken, thousands of square miles flooded, occasionally hundreds of thousands of people drowned, and enormous loss sustained, not merely in the newly-flooded regions, but also along the old river course, where the irrigation waters were dried up. Seven hundred years ago the river flowed to the north-east from Kaifeng. This is the place, 250 miles from the sea, where the river leaves the mountains, and where the great river presses hardest against its banks. In A.D. 1300 the banks were broken and the river rushed to the south-east, and until 1851 entered the Yellow Sea, south of Shantung and not far north of the mouth of the Yangtse-kiang. Then it once more ruptured

[1] This article is largely based on Baron von Richthofen's recently published "Shantung und Kiautschou." (Berlin: Reimer, 1898.)

its banks at Kaifeng, and since then its mouth has been in the Gulf of Pechili, north of the Shantung peninsula.

The Shantung Highland is about the area of Ireland, and is bordered by the sea on all sides but the west and north-west, where it rises above the Great Plain. It is a much broken-up, irregular highland, divided into two parts by a depression, the Kiaulai basin, where the Kiau flows to the Kiauchou Gulf and the Lai to the Gulf of Pechili. It is crossed by many faults, and has been greatly denuded, so that the raised land, which reaches 5,000 feet, is of hard gneiss, while the lowered regions contain rich coal measures in addition to other sedimentary rocks. In composition and structure it reminds us of the mountains of Shansi, rich in minerals.

The eastern part of Shantung is more rugged than the western, and many ridges rise with cockscomb-like crests. In this it resembles the Liautung peninsula opposite, at whose tip is Port Arthur, rather than the western part of Shantung.

The climate of this region is continental. In China the temperature varies very little in the summer months at sea level in north and in south. The heart of Asia is heated, the warm moist winds pour into the continent and bring rain with them. In winter inner Asia is excessively cold, and cold dry winds blow outwards. These affect the north of China, where the winter temperatures are very much lower than in the south. At Peking it is as cold as at Moscow, or St. Petersburg, in January. At Shantung the winters are not quite so severe, but are still very cold, and thickly padded garments must be worn.

The rainfall regulates the agriculture, which is the chief occupation in these regions. In Shantung most rain falls in June and July, and two-thirds of the annual total is precipitated in the three summer months. In the south of the plain the summer rains are longer, in the north shorter; and here there is danger of drought as well as of flood. Locusts are another form of pestilence the Chinaman may have to contend with. In spite of all difficulties and misfortunes, the land is carefully cultivated and densely peopled. There are no forests but orchards and mulberry groves, the latter supplying the food for the silkworm. The Shantung Hills are bare, the forests have been destroyed for firewood, with the usual result that floods are increased, surface soil washed easily away, and no humus accumulates in the soil, for the people burn the dry stalks and even roots of their crops. There are no green meadows, for a constant supply of water is necessary for grass to flourish, and it pays far better to grow other plants on irrigated lands. Cattle and sheep and other grass-eating animals cannot be kept, and pigs, fowls and fish are the chief animal food of the Chinese who can afford it.

Roads are difficult to make across the loose loess-covered land, and the flat coasts have no good harbours. Water communication is the best. The Imperial Canal crosses the plain, cutting the great rivers at right angles, and requiring most elaborate works to regulate its waters. Now railways are to be built, and concessions have been granted for a line passing from Peking to Hankau over the plain, and for one girdling the western part of Shantung. The latter has Kiauchou as centre, and it is of interest to note that Baron von Richthofen fixed on the gulf of this name as strategically, both from a military and commercial point of view, the key to Shantung and the Great Plains. Now his countrymen hold it and the surrounding land. Kiauchou will communicate with the south of the plain by the railway passing south-westwards along the coast, and through the Kiaulai basin, and the railway will bring commodities from the north to it more easily than to Chifu, the treaty port in the north of East Shantung, which is further away from Europe.

The British leasehold, Weihaiwei, is at the tip of Shantung, isolated commercially, far from the coal which will help to make Kiauchou important, but as a naval port guarding the entrance to the inner Yellow Sea, the approach to the capital of the Yellow Land.

THE MAKING OF RELIEF MAPS.

By J. Stephen.

Maps furnished for the teaching of geography in schools are, as a rule, unprovided with any good means for bringing out strongly those features in a country which are of capital importance—the heights and hollows, and the slopes that connect them. These determine the positions of the fertile lands, the directions of the water-ways, the sites of cities. Knowledge of them furnishes the key to understanding much that otherwise is not, and cannot be, understood, even if the unrelated facts be learnt by rote.

Geography, essentially a science of three dimensional space, might be, so far as the school-map maker is concerned, a science involving knowledge of but two; the dimension which he all but leaves out of account being precisely that one which it were most important should first of all be regarded. Maps exist, indeed, which are provided with contour lines; but these appeal but

little to such as are uneducated in their use, and, at the best, they are useful rather for analytic than for synoptic purposes. Of actual relief maps some are obtainable, but they are either too small for class teaching purposes, or, being large, are expensive, whence it comes that there are few of them in use in any one school. Moreover, they are heavy and cumbrous.

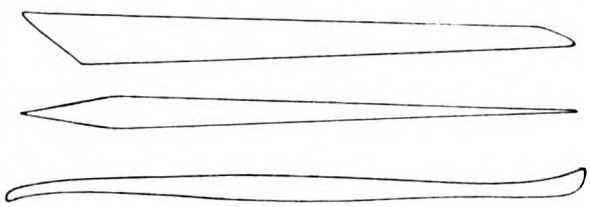
Because of these things, and because it is recognised that relief maps are of the utmost value in the teaching of geography, and that no map is ever so valuable as that produced before, or by, the pupil, it has been suggested that relief maps should themselves be made by the school-master or by the pupil. Putty and also modelling clay have been used for this purpose, but against both obvious objections may be brought. Against the use of very thin sheets of metal, which may with great facility be modelled, the objections which are valid in the case of other materials do not exist. It is found that rolled sheets of certain metals are capable of being impressed and embossed quite easily, by means of the simplest of tools, or almost without the use of any tools. On such sheets, corrections, additions and oblitera-

tions, may be made with perfect ease and to any extent. The manipulations do not call for the use of any special form of desk or table, and neither hands nor clothes are in the slightest danger of being soiled. Moreover, the work is easily within the skill of anyone who can draw an ordinary flat map, and the force brought into play in depressing valleys or elevating mountains is not greater than, or is but slightly greater than, that which is required for shading with a lead pencil. Indeed, it is much easier to produce an actual relief map than it is to simulate even such relief as is by courtesy supposed to be simulated when, in marking the position of mountains and high lands, recourse is had to hatching, vertical or horizontal, or to the use of the chalk or black-lead pencil stump sometimes recommended for the purpose.

The material, tools and processes necessary for making relief maps like those of Africa and England and Wales which accompany this article will now be described.

The material may be either copper, brass or tin. If the question of money economy be not a very important one, a sheet of pure tin is recommended. It should be purchased of the proper size, that is, of a size a little larger than the map to be done upon it. It will cost at about the rate of half-a-crown a pound. Copper, thin enough for the purpose of relief maps, will cost less; brass will cost less still. It is strongly advised that the first experiments be made with sheet tin.

Let it be assumed that the sheet has been procured. The first thing to do is to flatten it with a ruler rolled over its surface while it rests upon a drawing board or other smooth and hard surface. By this process any crease or inequality will be removed. By means of tracing, or by drawing directly, the outline of the country is now to be marked upon the surface of the metal sheet. It will be found that a black-lead pencil, or a piece of stick sharpened to a moderately fine point, will make a ditch all round the country. It is not well to make the ditch a deep one. That portion of the map which is to correspond to the sea-level is now smoothed away from the coast line by using a flat modelling tool, sold at the Kindergarten and toy shops for from twopence to fourpence, in a manner much resembling that of spreading butter thinly upon bread with a knife. When this shall have been done the whole surface of the "land" will stand up somewhat above the level of the "ocean." Reference to a good geography and map will show where, in the country, are the high and where the low-lying lands. These will first be broadly put in by means of the tools, illustrations of which are here given; for the accomplishment of this the map will require to be turned upon its face from time to time, as the heights are embossed from behind. Two thick pads of blotting paper will be needed, upon which to lay the metal while it is being so



MODELLING TOOLS USED TO MAKE RELIEF MAPS.

manipulated. Upon one pad of blotting paper marks ought to be made by means of pencil or pins, in such a way that it will be possible always to place the metal map upon the pad in the same place when the metal map is face upward; and upon the other pad similar marks ought to be made which will make it easy to place the map always in the same position upon that pad when the map is face downward. On one sufficiently large pad of blotting paper the two positions may be marked side by side. The blotting paper is itself somewhat modelled by the pressure of the metal being modelled above it, and the heights and hollows so produced on the blotting pad fit into the corresponding places on the metal and support it while fresh modelling is being done.

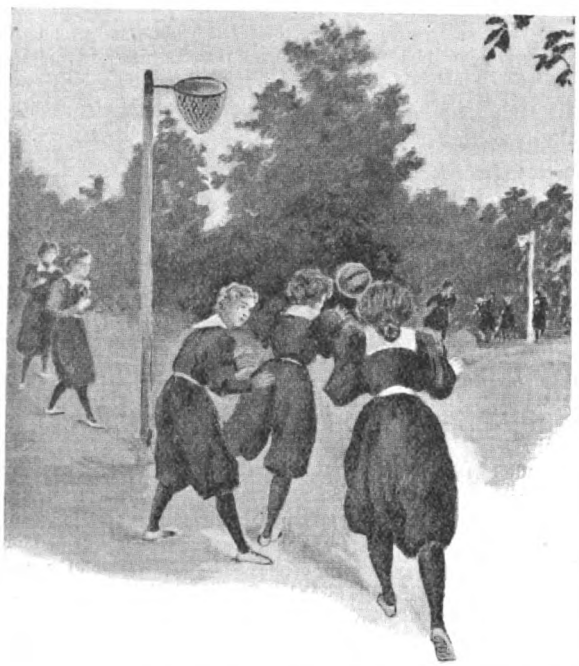
ITEMS OF INTEREST.

A LARGE number of flattering opinions referring to our first number have been received both from correspondents and contemporaries, and we desire to express our appreciation of them. Judging from the cordial welcome extended to THE SCHOOL WORLD, there was a distinct need for a periodical conducted upon the lines we propose to follow. The only doubt which appears to exist is as to whether it will be possible to maintain the standard of the first number. The present issue will serve to some extent as a reply to this, and we are confident that in future months contributions of even greater variety and value will be published. Numerous suggestions have reached us, and several will be acted upon as opportunity occurs. We regret that the limitations of space will not permit us to accept many of the valuable articles which have been submitted.

To prevent misapprehension, it may be worth while to remark that we do not necessarily advocate the views described in these columns as to the order or method of teaching various subjects. Our purpose is to present the plans of practical teachers well qualified to write upon the matters with which they deal, and it must be left to our readers to decide what parts are worthy of adoption.

THE great length of this month's guide and test papers for the London Matriculation and the Junior Oxford Local is unavoidable. But in future numbers the suggestions as to books will not, of course, be repeated, and every test paper for the Oxford examination will be reduced in length.

The game of basket ball described by Miss Dove in her article on "Winter Games for Girls," which appears in another part of this issue, is fully treated in a well-illustrated paper by Miss Corbert in the January number of *St. Nicholas*. The accompanying illustration, reproduced from Miss Corbert's interesting account of the game as played by girls in the United States, serves to explain the shape of the basket and the method of fixing it.



The first papers in General Elementary Science, the new compulsory subject for candidates wishing to matriculate at the University of London, are a little disappointing. The morning questions show that the examiners duly considered the italicised instructions published in the regulations for matriculation, viz.; "In particular, the subjects of the present Syllabus will be treated, wherever possible, from an experimental point of view." The afternoon paper is not so satisfactory. It is more largely numerical, and there is an ambiguity about Question 8, dealing with hard water, which is unnecessarily puzzling to a beginner. The question reads as follows: "Hard water is (*a*) boiled, (*b*) mixed with lime water, (*c*) mixed with sodium carbonate. Describe and explain exactly what happens in each of these cases." Moreover, the candidate cannot, we think, be expected to know the appearances of the sulphates of sodium and calcium referred to in Question 7, which reads thus: "Write the names and describe the appearances of the substances produced when diluted sulphuric and hydrochloric acids respectively are mixed with soda and lime respectively, and the water evaporated away."

Special interest attaches to the French paper set at the London Matriculation Examination in January, as it was the first under the new regulations, in which it is specified that there shall be (in addition to what had previously been required) "a piece of easy translation into French" and "questions . . . in Elementary Syntax." We are afraid that the introduction of composition will turn the balance in the case of many students who are wavering between an "optional language" and an "optional science"; especially as they can only score half as much as hitherto in unseen translation, since not more than one passage (formerly two) is to be taken. Surely it is a mistake to curtail this, and not the grammar; for easy composition is intended mainly to test the power of applying grammar rules. Elementary syntax comes off badly: there is only one (optional) question not dealing with the accidence.

We notice that changes have been introduced in the regulations for the 1899 Local Examinations for Junior and Senior students in connection with the University of Cambridge. These alterations apply to Natural Science, Shorthand, Book-keeping, and Drawing, as far as junior candidates are concerned, and to the English, Mathematics, and Drawing of senior candidates. The time-tables of these examinations have also been modified. Elementary Experimental Science, and Elementary Chemistry have been added as subjects of examination for Preliminary pupils, but Elementary Mechanics has been omitted. Changes have also been made in the regulation relating to the selection of optional subjects, and in the Algebra schedule for the Preliminary examination.

After July 1st, 1899, the subjects of the open competitive examination for Boy Copyists in the Civil Service will be as follows, viz.:—*Obligatory Subjects.* (1) Handwriting and Orthography; (2) Arithmetic, including Vulgar and Decimal Fractions; (3) English Composition. *Optional Subjects, any two of the following.* (1) Copying Manuscript; (2) Geography; (3) English History; (4) Translation from one of the following languages — Latin, French or German; (5) Euclid, Books I. and II., and Algebra up to and including Simple Equations; (6) the Rudiments of Chemistry and Physics. The limits of age are 15 to 18, and the rate of pay is fourteen shillings a week. The new regulations give boys in secondary schools the opportunity of presenting themselves for examination in subjects which, under the old scheme, were of no use to them.

After June 30th, 1900, the subjects of examination for clerkships of the second division of the Civil Service will be as follows, viz.:—(1) Handwriting and Orthography, including Copying Manuscript; (2) Arithmetic; (3) English Composition; (4) Précis, including Indexing and Digest of Returns; (5) Book Keeping and Shorthand Writing; (6) Geography and English History; (7) Latin, or French, or German (translation from and into the language); (8) Elementary Mathematics, viz.:—Euclid, Books I.-IV., and Algebra up to and including the Binomial Theorem; (9) Inorganic Chemistry, with Elements of Physics. Not more than four of the subjects numbered 4 to 9 may be offered. Subjects 7, 8, 9 are introduced for the first time in this examination.

In the latest Report of the Commissioner of Education for the United States, published at Washington, is an instructive chapter on Institutions for Higher Education. The popularity of the several branches of study among American graduate students is shown by diagrams, one of which is here reproduced.

Language and Literature Studies (35·4 per cent.).

Historical and Social Sciences (20·6 per cent.).

Philosophical (ethics, psychology, education) (18 per cent.).

Natural Sciences (14·2 per cent.).

Mathematical Sciences (11.1 per cent.).

IN the institutions of various grades reporting to the Bureau of Education at Washington for the fiscal year ending June, 1897, there were, we find from the new Report before us, 16,255,093 pupils enrolled. Of this number 584,904, or more than 3½ per cent., were secondary students, *i.e.*, students who had passed beyond the eight grades of the common school course and were pursuing studies usually taught in the four years' high-school courses. This was a gain of 25,901 in the number of secondary students over the preceding year.

THERE are several points of interest to lady teachers in secondary schools in a paper by Clara E. Collet, on "The Expenditure of Middle-class Working Women" in the current number of *The Economic Journal*. The following table, giving a detailed account of the expenses of certain high-school mistresses, invites inspection and analysis. Few ladies would be prepared to make such detailed statements concerning their expenses, accounting for every farthing of their incomes. The first column gives the expenditure for one year; No. 2 the average expenditure for six years; and No. 3 the budget for one year of a high-school mistress living in lodgings.

Accounts of Expenditure of three High-school Mistresses boarding in Private Houses, and of one High-school Mistress in Furnished Lodgings.

AMOUNT SPENT ON

	1.	2.	3.
	£ s. d.	£ s. d.	£ s. d.
Lodging and board	41 0 0	50 17 11	54 9 3
Washing	(a)	3 0 7	3 7 11¾
Dress	10 10 0	12 14 1½	16 0 5½
Books, newspapers, &c.	0 7 9	3 16 8	2 15 4½
Travelling	3 18 0	} 17 4 2½	{ 12 0 5½
Holidays	9 10 10		—
Amusements	(a)	(a)	3 11 5
Subscriptions, donations, &c.	(a)	4 4 5½	1 17 11
Presents	(a)	9 15 7	5 18 3¾
Postage and stationery	(a)	1 15 2	4 15 1½
Miscellaneous	7 0 0	3 16 3	3 11 11
Doctor and medicine	2 0 0	3 2 1	0 19 5
Insurance	—	23 10 10	—
Savings	—	1 13 4	—
Not spent	25 13 5	—	20 12 4½
Total	100 0 0	135 11 2½	130 0 0

(*a*) Included in "miscellaneous."

DR. MARSDEN, Medical Officer of Health for Birkenhead, writing to the *Times* on January 17th, says:—"It is a well-known fact that all sorts of rooms are used for the purposes of private schools which are quite unsuitable therefor, and large numbers of children are frequently crowded together in such places for many hours of the day in a totally inadequate amount of air space, and generally without any attempt at partial ventilation. Is it to be wondered at, then, that we so frequently get complaints amongst these children of headache, *malaise*, nervous affections, and other derangements of health, which are usually attributed to over-pressure in work?" Dr. Marsden goes on to advocate that medical officers of health be given the same powers of inspection over all secondary schools, with regard to light, air space per head, and ventilation, as they possess over workrooms under the Factory and Workshops Acts.

MR. R. ST. J. CORBET, in a recent letter to *The Times*, offers a version of the Iron Duke's well-known saying connecting Waterloo and Eton, which should considerably modify the anecdote. He states that when the Duke uttered words which have become famous and been quoted annually, if not oftener, he had no thought in his mind of sports and athletics. In his time, outdoor pastimes, from cricket to leap-frog, had no such vogue as to-day, no such hold upon public-school boys and their masters. The Duke's reference was solely to that portion or corner of the playing-fields in which the school fights used to take place, and all he meant to say was that these fights had taught British officers how to win the battle of Waterloo.

THE *Educational Review* has taken on a new lease of life. With its new cover it assumes a new *rôle*—the functions of a pedagogic monthly. The first number of the new volume was published in January.

THE "Public Schools Year Book," which, as many readers will know, is published by Messrs. Swan Sonnenschein & Co., Ltd., and edited by three public schoolmen representing Eton, Harrow and Winchester, has reached its tenth year of issue. The 1899 edition makes a work of reference of a most valuable kind, and should be in every master's library.

THE current numbers of *Young Wales* contain an interesting series of articles on Commercial Education on the Continent, by Mr. R. E. Hughes, M.A. Wales has for some time had the advantage of an advanced system of intermediate education, and Welshmen will be anxious to bring their secondary schools up to date in every way. About the great commercial institute of Leipzig the author says: "There can be no doubt that it meets the modern requirements of a great city in a very complete and satisfactory manner. Those lads who, leaving the public elementary school at fourteen, become apprentices, doubtless find in this apprentice school that special training in the theory and practice of their daily work which was, of course, absent in their previous training, but which that training well fitted them to receive. Then the higher course, whilst qualifying them for partial exemption from military service, would give them a thorough grasp of all the details of their future career."

THE Scottish Provident Institution has issued in a blotting-book a series of monthly star maps, which have been prepared by Mr. Walter B. Blaikie. Two maps for each month, one showing the aspect of the sky in the latitude of London, at 10 p.m., when looking north, and the other the southern aspect, are provided. The stars are printed in gold on a blue ground, and the positions of the chief planets visible at the time mentioned are clearly indicated. In addition to the maps, which enable the observer to find his way easily among the constellations, a number of interesting notes on astronomical subjects are added by Mr. Blaikie. These maps will be of great assistance to those teachers into whose hands they may happen to come.

CLIFTON COLLEGE has achieved remarkable success in the recent examination for admission to Woolwich and Sandhurst, the first place in each list having been gained by a Clifton boy direct from school. This is the first examination held under the new syllabus which was so severely criticised in the papers about two years ago. Though materially reduced, the scheme still remains the most exacting that has yet been proposed to army candidates. From the details of marks officially supplied to the succcessful candidates, it appears that they have established a record very difficult to beat, and one that reflects the highest credit upon those who have the control of army work at Clifton.

THE two following sentences from the Queen's Speech will interest most of our readers:—

(1) A measure for the establishment of a Board for the administration of primary, secondary, and technical education in England and Wales will again be laid before you.

(2) Bills will also be introduced for encouraging agriculture and technical instruction in Ireland.

A MONTHLY CHRONICLE.

THE Winter Meeting for Teachers conducted by the College of Preceptors was held at Bloomsbury Square, W.C., during the first fortnight of January. The programme was of the most varied kind, the lecturers were authorities of established reputation, and the hours convenient. But judging from the meetings which we were able to attend, the number of English schoolmasters interested in the science and art of education must be very small. The number of men in attendance on three separate occasions was always less than thirty, but as many more ladies were present, the total attendance was at most meetings very fair. It is to be hoped that the authorities of the College will not be discouraged by the want of enthusiasm up to the present exhibited by schoolmasters, and also that the latter will emulate the laudable example of their co-educators. There may be differences of opinion as to the value of systematic training of teachers in secondary schools, but of the benefits to be derived from statements of methods and results there can be no doubt.

AT the Teachers' Guild Congress, held on January 9th, 10th, and 11th, it was resolved:—"That a central authority should be established, either simultaneously with or prior to local authorities, but local authorities, if not simultaneously set up, should follow in the immediate future." Resolutions were afterwards carried in favour of secondary education being dealt with by a separate branch of the Education Department; approving the constitution of the Consultative Committee foreshadowed by the President of the Council, but urging that it should be permanent, and identical with the Registration Council; declaring that the formation of a register of efficient schools is essential; urging that the inspection of schools by the Board of Education, either directly or through the recognised authorities, should be compulsory; in favour of the establishment for English schools of a leaving certificate, and of providing, in connection with the registration of teachers, that for a period of (say) seven years, no unregistered person should be appointed a teacher, except as a probationer.

A CONFERENCE of Science Teachers arranged by Dr. Kimmins on behalf of the Technical Education Board of the London County Council was held at the Chelsea Polytechnic, S.W., on January 12th and 13th. Papers on the teaching of different branches of physics and chemistry were read by well-known teachers from different parts of the country. Each paper was illustrated by practical demonstrations, and led in every case to an instructive and well-sustained discussion. A good collection of apparatus was displayed in the laboratories of the Polytechnic and comprised the devices and "tips" elaborated by different teachers in their work of instruction. We hope that the generally expressed satisfaction which marked the speeches throughout the Conference will lead to its institution as an annual event. The success of the Conference suggests the establishment of a National Association of Science Teachers to meet periodically at different centres and publish detailed reports of proceedings. We believe an association of this kind would obtain a large and active membership.

THE annual general meeting of the Headmasters' Association began on January 13th, on which day the following resolutions were adopted: (1) "That this Association cordially welcomes the Board of Education Bill as a first step towards the organisation of secondary education in England, and is of opinion that the consultative committee proposed therein ought to be permanent and to contain representatives of the Universities and of bodies of teachers." (2) "That this Association records with satisfaction the statement made by the Lord President in introducing the Board of Education Bill—viz., that the proposed Education Office would probably be so organised as to consist of three departments, dealing with primary, secondary, and technical education respectively." On the second day the question of local authorities was discussed, and resolutions were passed recording the belief of the Association in the necessity for such authorities and for the adequate representation of secondary schools upon them. It was also agreed that "the Secondary Education Department of the proposed Education Office should include inspectors, specially appointed on the recommendation of the Secondary Education Department, for the inspection of secondary schools." Also that "the Education Office should recognise, *pro tanto*, as an alternative to the inspection required under section 2 (4) of the Board of Education Bill, a system of inspection, or examination, conducted by any University in England or Wales, and approved for the purpose by the Consultative Committee of the Education Office."

THE Association of Technical Institutions held its annual conference in London on January 12th, when the following resolution was carried:—"That the Association desires to place on record its appreciation of the Board of Education Bill, 1898, as a first instalment of legislation on the lines recommended by the recent Royal Commission, and its hope that the Government may see its way to proceed further in the same direction."

THE Association of Directors and Organising Secretaries for technical and secondary education held its annual meeting on January 13th. The chief subject discussed was the Government Secondary Education Bill, and the constitution of the proposed local authority to be responsible for technical and secondary education.

AT the last meeting of Convocation of the University of London it was resolved:—"That, in the opinion of this house, the new regulations for the Matriculation examination tend to discourage the study of modern languages in schools, by making them entirely optional and alternative to science." The following resolution was referred to the Standing Committee:—"That the examination in general elementary science should be restricted to the first part of the subject, and comprised in one paper; the second part to be made optional with the other sciences, and a third language to form a separate and obligatory section taking its place."

THE Geographical Association, founded in 1893, aims at raising geography as a school subject from its present low level in secondary schools by spreading the knowledge of all such methods of geographical teaching as bring into play the pupil's intelligence and reasoning powers, instead of merely loading the memory with names and isolated facts. A memorial to boards of public examiners on the subject of reforms in examinations in geography has already, in many cases, led to a marked improvement in the character of the questions set. Amongst other means adopted by the Association for the furtherance of its object are lectures and meetings for discussion; the adoption of the *Journal of School Geography* as a medium for the publication of information of service to teachers of geography; and the circulation of lantern slides (maps, diagrams, and views of scenery). Particulars as to membership can be obtained from Mr. J. S. Masterman, 55, Campden House Road, London, W.

EDUCATIONAL MUSEUMS.

Two instructive articles on Educational Museums are included in the second of the volumes of Special Reports recently issued by the Education Department, and briefly reviewed in the last issue of THE SCHOOL WORLD. The first of these, by Mr. John L. Myres, M.A., is concerned with the Museum of the Teachers' Guild; the second, dealing with an Educational Museum at Haslemere, is contributed by Dr. Jonathan Hutchinson, F.R.S.

THE MUSEUM OF THE TEACHERS' GUILD.

The Museum was formally opened at 74, Gower Street, London, W.C., in May, 1892, largely as a result of a generous offer from the Royal Geographical Society, who placed as a loan in the hands of the Guild the apparatus which had been collected for an exhibition in 1886. As at present arranged, the Museum consists of five sections, viz.: Class Books, School Documents, Apparatus for the Teaching of History, Apparatus for the Teaching of Geography, and Apparatus for the Teaching of Classical Antiquities. It was originally intended to arrange branches dealing with School Plant and Apparatus, Anthropometry, Music and Dancing, and Natural Science. But from various causes these have not yet been organised.

The main object of the Museum is to give teachers and all interested in education an opportunity of inspecting and obtaining full information concerning the most recent aids to teaching employed at home or abroad. The hours during which the Museum is open are 10 a.m. till 6 p.m. (Saturdays till 5 p.m.); but members of the Guild who wish to bring classes to work in the Museum must give two days' notice to the General Secretary, or to one of the Curators. In addition to members of the Teachers' Guild, the following persons are entitled to make free use of the Museum for the purposes of consultation:—(*a*) All individual donors of £5 and upwards to the general funds of the Museum, or to any section of it, whether members of the Guild or not. (*b*) All individual subscribers of 10s. and upwards annually to the general funds of the Museum, or any section of it, whether members of the Guild or not. (*c*) All persons introduced by the Royal Geographical Society, or the Hellenic Association, or by a member of the Teachers' Guild. (*d*) All contributors to the Museum, whether by loan or gift, are entitled to a card of introduction from the Curators.

Class Books.—The collection of class books in all subjects taught in schools is fairly complete, and almost self-supporting. The books are arranged in subjects, and the teacher need, consequently, experience no difficulty in comparing different volumes.

School Documents.—The collection of school documents, such as school curricula, time tables, syllabuses of lectures and lessons, specimen exercises and examination papers has, it is true, been started, but is by no means good. Head-masters and head-mistresses have not, as yet, sufficiently co-operated with the Curators.

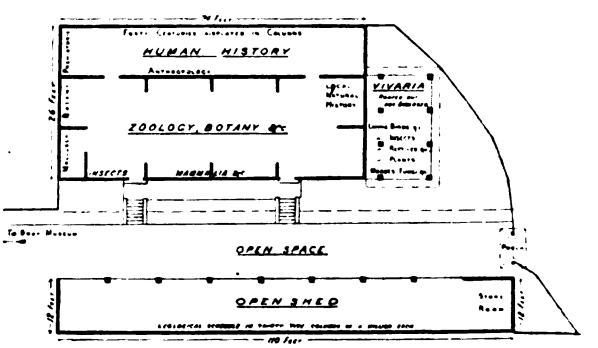
History and Classical Antiquities.—The sections concerned with History and Classical Antiquities are amalgamated, and the combined department is subdivided into three collateral divisions, viz.:—(1) A reference collection of maps, plans, diagrams, views, portraits and facsimiles available in illustration of historical teaching. (2) A loan collection of such lantern slides and of such other illustrations as may be found practicable for the use of members of the Teachers' Guild, and all others entitled to use the museum. (3) The correspondence carried on between the Curators and those teachers who consult them from a distance, or whose wants are not supplied by the apparatus actually exhibited.

Geography.—The apparatus for the teaching of geography makes the largest show of exhibits. The articles on view are divided into the following classes:—I. Books; II. Models, &c.; III. Atlases; and IV. Wall Maps and Pictures. The books number about 600, and include many foreign works. The models include relief maps, globes, telluria, orreries, and models of a volcano, a glacier, ocean currents, and many similar things. There are 450 atlases lent by the Royal Geographical Society, and about 40 added from time to time by the Guild. 280 wall maps and pictures lent by the Geographical Society, together with the 150 collected by the Teachers' Guild, make a valuable reference collection for teachers to examine before making new purchases. Various classes of illustrations have been arranged by the Curators of this section, and these can be obtained in the form of lantern slides from Messrs. Philip & Son, 32, Fleet Street, London, E.C.

It was originally hoped that a fund would be collected consisting of annual subscriptions sufficient to pay the rent of the rooms assigned to the Museum, and that the exhibits would be mainly supported by contributions from publishers, &c. This expectation, however, has not been fulfilled; the whole burden of rent has fallen, after the first year, on the Teachers' Guild, and such funds as have been contributed have been applicable only to the provision of exhibits. But increased efficiency must necessarily depend, in a great measure, upon the funds at the Curators' disposal; and these, except in the department of Hellenic History, which has been subsidised from a special source, have not been sufficient to enable them to add continuously to their exhibits.

THE HASLEMERE MUSEUM.

The Haslemere Educational Museum took its beginning from a wish to try how far such collections might be made useful as a means of popular instruction. The design was to collect in a building, large enough to avoid crowding, objects of all kinds likely to interest the observer and to aid his clear comprehension of descriptions which he might read in books. This purpose could not be served by a merely local collection. Geology must be illustrated by fossils from all strata, and Botany, Zoology and



PLAN OF HASLEMERE EDUCATIONAL MUSEUM.

History by specimens from all parts of the world. In designing the buildings at Haslemere Dr. Hutchinson provided for a large open shed for the exhibition of specimens, chiefly geological, which do not require much protection. Between this large shed and the main building there is an open space in which lectures can be given. The shed not only offers a suitable place for the arrangement of geological specimens on the "space-for-time"

method, and for temporary displays of flowers, fungi, or seaside objects, but also as a ready resort in the case of rain during an open-air lecture. The shed measures 110 feet by 12 feet, is open on the south side, and closed at the back and ends. The back is fitted with shelves, and is also divided by bars of wood into 35 vertical compartments, each 2 feet wide. Each such compartment is meant to represent a million years, passing onwards from the earliest geological times to the present century. Specimens, or drawings, of fossils appropriate to the several periods are placed in each, a few modern objects being also introduced, the utility of which serves as an apology for the anachronism. Dr. Hutchinson finds that this method serves better than any other to impress on the visitor the lessons of the immense duration of geological time, of the order and relative length of different periods, and of the succession of animal and vegetable life on the earth's surface.

The principal building is a room measuring 74 feet by 26 feet, and is divided lengthwise into two. One, the wider, is devoted to Zoology and Botany, the other to the History of Mankind. Two long tables occupy the floor of the wider compartment, and there are plenty of chairs. Pedestal sets of drawers, for a systematic collection of fossils, rocks, eggs, insects, shells and vegetable products, are supplied. In labelling specimens every care is taken to avoid pedantry and the intrusion of scientific phraseology. On one of the long tables are cases devoted to the various classes of invertebrates, and others given up to objects found at the seaside.

The whole of one side wall in the Human History room is taken up by a "space-for-time" display of the course of the history of mankind from the twentieth century B.C. to the present time. There are 40 vertical spaces, with a width of 18 inches, each representing a century; before each space are placed names, portraits, maps, or engravings, having reference to the time. Busts of Homer, Socrates, Cæsar, Dante, Chaucer, Shakespeare, Milton, Newton and others, stand at their proper positions on the table which fronts the diagram, and a certain number of medals, coins and other objects, also find their places on this table. This gallery also contains an anthropological collection.

These buildings have not been very expensive. They are all on the ground floor, have no raised galleries, and are built of wood. The large natural history and history museums, with the geological shed, cost £636. Although at first glass cases were dispensed with, it has been found desirable, as specimens of increased value have been added, to resort to such cases. Several cheaply-made cases, 6 feet long, have been constructed a cost of 13s. each. All tables are of deal boards on trestles. The collection of specimens has undoubtedly profited much by the liberality of Dr. Hutchinson's friends, but the greater part has been bought very cheaply at Stevens's sale rooms. The interesting paper from which the above information has been culled also describes temporary museums which may, in proper hands, be made to serve a useful educational purpose. The balance sheet in connection with a museum of this character, open for six weeks during the summer of 1897 at Hunstanton, shows that the total expenditure was only £3 9s. 1d. We must refer the reader to Dr. Hutchinson's paper for an account of the Book-room and Picture Gallery in connection with the Haslemere Museum. The special features of the museum may be summarised under three heads, viz.: its wide scope; the use of the wall space for large permanent diagrams; and the close juxtaposition into which books, maps, drawings and specimens are brought. The plans of the buildings, the schedules of Geological History and the History of Mankind on the "space-for-time" method, which are printed after the paper, should prove of great assistance to those masters and mistresses who are interested in school museums.

THE SCHOOL PULPIT.

Notable Passages from Sermons Preached in Public Schools.

Truthfulness.[1]

I have known some natures to which a lie was a thing simply impossible. They could not lie if they would; they would not if they could. In the very clearness of their eyes, in the very openness of their faces, you may see a transparent truthfulness—an utter impossibility of anything serpentine and base. Hopeful, manly, noble natures these! Even if they go astray, they have one strong anchor to save them from drifting to perdition: one indissoluble chain to tie them to the shore. I thank God that truthfulness has ever been held a right English virtue. Ask the brightest virtue of our English Alfred, and Asser will tell you that it was truthfulness; ask the chief characteristic of the good Lord Falkland, and Clarendon will record that he abhorred the semblance of falsity; ask the most prominent strength of the great Duke of Wellington, and Gleig will answer, "He always told the truth." But though we may be proud of truth-telling as a national virtue, yet all good men have loved it. Take the Jews. "As for lies," says David, "I hate and abhor them." Take the Romans. When a man had pledged his word to Hannibal that he would return, and, going back to the camp for a moment on some trivial pretext, returned no more, the Romans, because though he had kept the promise to the ear he had broken it to the sense, branded him with the just ignominy of their contempt. Take the Greeks. Of their noblest—of Aristides and Epaminondas—we are expressly told that they would never, even in boyish sport, say what was other than the fact. The house of Glaucus, the son of Epicydes, is torn up, root and branch, because he had even meditated a lie; and at the very dawn of poetry the old Greek bard exclaims—

ἐχθρὸς γάρ μοι κεῖνος ὁμῶς Ἀΐδαο πυλῆσιν . . .
"Who dares think one thing and another tell,
My soul detests him as the gates of hell."

Nor has it been otherwise in modern history. When the Emperor Sigismund, at the Council of Constance, is charged with having broken his word to Huss, there, before prelates and princes, it is visible to every one in that vast hall how the blush mantles on his guilty cheek; and all goes ill with Harold after he has broken his oath to the Norman; and it is all down-hill and ruin with Francis the First when he has violated the treaty of Madrid. And shall English boys, the sons of the gallant gentlemen who have made England what she is—shall English boys degenerate into the shame and cowardice of falsehood? God forbid! And when, as sometimes, alas! happens—an English boy can look you in the face, with all the air of openness, with all the affectation perhaps of injured innocence, with all the semblance perhaps of just indignation,—and will, to rebut a charge, or to parry a suspicion,—knowing, as he does know, that his word will be taken—will look you in the face and tell you a lie (a thing which he cannot do, unless everything wholesome in his nature has been sapped by that effeminate cowardice, which is the leprosy of the weakest and the feeblest of natures)—I say when an English boy can do this, there is nothing which so all but drives one to despise him, all but compels one to despair of him. I hardly know what can become of such a boy; I can but dimly read the prophecy of one more to join the miserable

[1] From a sermon on "Truthfulness and Honesty" given to the boys at Marlborough College by the Very Rev. Dean Farrar, when Headmaster of the school. The sermon is printed in full in "In the Days of thy Youth" (Macmillan).

multitude of the world's living dead; of those who live for evil and not for good; of those through whose selfishness and through whose corruption the world is a world of misery and shame. From being such as this I utterly acquit the vast majority of you.

Yes; but consider, is there not "a manslaughter upon truth," as well as a murder? Are there not more who, though they could not thus lie deliberately and designedly and in cold blood, are not so strong in virtue, so armed in the "hauberk's twisted mail" of sturdy integrity, as never to be surprised into a falsehood. As timid creatures fly from danger into the nearest refuge, so too often if a boy has committed some, perhaps even a quite venial fault, a sudden question (which I, for my part, think it my duty never to ask) may startle him into a denial which is a lie. Put him on his guard, and the boy who has any honesty in him at all will be safe at least from this worst aggravation of the offence; but do you not see how far braver, stronger, more hopeful, is a nature that could not even in the first instance, under any surprise, thus run its head into the strangling noose of falsehood, but at once, but naturally, but inevitably, but instinctively, but at whatever cost, tells the truth and shames the devil? Now what I would urge on you to-day is—now in this sacred place, here in the sight of God—to register a resolve in heaven that as for you, come what will, you will never stain your soul, you will never burden your life, you will never wound your conscience, with a lie. Oh, block up, I entreat you, in your souls not only every avenue, but every lane, and byepath, and little winding way to falsehood. And do not be content with the vow that no lie shall ever defile your lips, but nothing which has the most distant odour or complexion of a lie; no half lie or quarter lie; no sneaking subterfuge; no bragging exaggeration; no prevaricating ambiguity; no stammering suggestion; no half confession; no lie which, because it is half the truth, is ever the greatest of lies. And oh! if any one of you has ever given a promise to your father, or mother, or brother, or master for your good, consider that promise as a pledge, made for your own protection, in the very hearing of your God; and let your word be as your bond, and your bond be as your oath, and that oath sworn on the inviolable altar of your hearts. Let that promise be as a strong chain to bind you to integrity; let it be as a vast barrier to screen you from temptation. And, as a part of this subject, let me, as my distinct duty, however painful, warn you with all affection, but with all honest plainness and in no doubtful words, against that dishonesty, that unfairness, that (let us here at all events call things by their right plain English names)—that cheating in work which, deceive yourselves about it as you will, saps all honest industry, defrauds your fellows of their just dues, and proves a boy to be unworthy of the confidence which is, and which I hope always will be, placed in him till he has justly forfeited it. With this it is perfectly shocking to think that even the dullest and most ignorant of you should feel a spark of sympathy, because it is nothing more or less than a mean thing, a blot and a stain upon any one's character,—into which a boy may perhaps fall once from weakness and thoughtlessness, and not from radical falsity, but into which if any boy who has a conscience does fall, he will at least be most heartily ashamed of it, and feel for it a sincere and bitter repentance. That such practices, if unchecked, must simply ruin for life anyone of you hereafter—that they would earn you the contempt even of a man of the world of ordinary honour,—this is bad enough; but it is even worse to have in the character a poisonous fibre which may make a whole life shifty and worthless. I have known boys—thrown in large schools at eight years old—placed in forms where not one boy was free from this miserable meanness,—and yet never led for one moment to make either of those wretched excuses which are so often made—either that the examination was so important, which makes the fraud only greater, or that it was so unimportant, which only makes the temptation less—but able to say that not from their early childhood have they ever shown up one word which was not most strictly their own, or got one mark which they had not most honestly deserved. I am sure that many of you could say the same, and I am sure also that I could name those that could. But oh! that every one of you could say it; or, if it has not been so hitherto, that you would vow that henceforth you will scorn dishonesty as a base and slavish thing. I do most confidently hope that the coming examination will not be stained by one single instance of this un-English and mean offence. If there be decadence, as men say there is, in the proud old honesty of England—if there be forgery and swindling in our commercial enterprises—if there be adulteration and trickery in our trade—if among foreign nations the word of an Englishman is no longer as his bond—if, as the blood of martyrs has shown, the villanies of people who call themselves our countrymen have come to be distrusted by the very savages of the Pacific,—then let every one who has the honour of England at heart see that faith, and honour, and fairness, and simplicity, and honesty, and any other noble name we like to call it—in one word, see that truthfulness be as the very girdle of the loins of English boys.

LONDON MATRICULATION, JUNE, 1899.

Guide and Monthly Test Papers.—No. II.

I.—Latin.

GRAMMAR AND COMPOSITION.

(1) GIVE the gender, and, if found, the accusative singular and genitive plural of—puppis, urbs, tībicen, tempus, rete, glis, vis, paries, iter, lepus.

(2) Give the ablative singular and genitive plural of—vetus, par, memor, pauper, dives.

(3) Give the comparative and superlative of—iuvenis, nequam, gracilis, utilis, saluber.

(4) Distinguish between the uses of the genitives nostri and nostrum, and give the accusative singular and nominative plural of—ille, ipse, qui, idem.

(5) Give the present infinitive passive, future infinitive active, and the third person plural perfect indicative active of—veho, figo, uro, spargo, scisco, lacesso, alo, illicio, pario, defetiscor.

(6) Classify the main uses of the locative and ablative.

(7) What verbs govern (*a*) the ablative case; (*b*) the genitive.

(8) Put into Latin:

(*a*) Lucius Catiline was born of noble race, with great energy mental and physical, but of a bad and vicious disposition.

(*b*) Ariovistus forbade the whole of Gaul to the Romans.

(*c*) He was growing old from grief and tears.

(*d*) They leap down from their chariots and fight on foot.

(*e*) The more we have the more we desire.

(*f*) I asked why the farm had been sold for more than the house.

(*g*) Where in the world shall we find another so fond of learning, so patient of labour?

(*h*) It is of little importance in what kind of house you live, if only you live in Rome.

(9) Translate and explain the cases of:

Tanti est: æquo animo: paucis respondit: iniuriā:
Aut vi aut fraude: mea sententiā: mea causā.

Cicero. Pro Marcello.

Ch. IV., V., VI.

(1) Translate:
(*a*) § 11. Haec enim res . . . . . adferat laudibus.
(*b*) § 14. Hominem sum secutus . . . . . fuerit iratior.
(*c*) § 18. Quidam enim . . . . sapientem contulisse.

(2) Translate, with grammatical and historical notes where necessary—
(*a*) Equidem cum C. Marcelli lacrimas modo vobiscum viderem omnium Marcellorum meum pectus memoria obfudit.
(*b*) Vereor, ut hoc, quod dicam, perinde intellegi possit auditum.
(*c*) Nam, cum M. Marcellum deprecantibus vobis rei publicae conservavit, me et mihi et item rei publicae nullo deprecante, reliquos amplissimos viros et sibi ipsos et patriae reddidit, quorum et frequentiam et dignitatem hoc ipso in concessu videtis: non ille hostes induxit in curiam.
(*d*) Non enim iam causae sunt inter se sed victoriae comparandae
(*e*) Alterius vero partis nihil amplius dicam quam id quod omnes verebamur, nimis iracundam futuram fuisse victoriam.

(3) Give the principal parts of:
Diligit, extimescendum, perculit, gaude, audebo.

(4) Parse:
Fruĕre, recordabere, vindicasti, inferis, bono.

Cicero. In. Catilinam I.

Ch. V., VI., VII.

(1) Translate:
(*a*) § 12. Quare quoniam id . . . . . sentina rei publicæ.
(*b*) § 13. Quae nota domesticae . . . . . facem praetulisti.
(*c*) § 18. Quae tecum, Catilina . . . . . non est ferendum.

(2) Translate and, where necessary, explain:
(*a*) Educ tecum etiam omnes tuos, si minus, quam plurimos.
(*b*) Non est saepius in uno homine summa salus periclitanda rei publicæ.
(*c*) Compressi conatus tuos nefarios amicorum praesidio et copiis, nullo tumulto publice concitato: denique quotienscumque me petisti, per me tibi obstiti . . . .
(*d*) Praetermitto ruinas fortunarum tuarum, quae omnes proximis Idibus tibi impendere senties.
(*e*) Quot ego tuas petitiones ita coniectas, ut vitari posse non viderentur, parva quadam declinatione et, ut aiunt, corpore effugi.
(*f*) Si hoc post hominum memoriam contigit nemini, vocis expectas contumeliam, cum sis gravissimo indicio taciturnitatis oppressus?

(3) Translate carefully, and explain the subjunctives of:
(*a*) . . . . dum modo inter me atque te murus intersit.
(*b*) Potestne . . . . huius caeli spiritus esse iucundus cum scias esse horum neminem qui nesciat . . . .
(*c*) Quae quidem quibus abs te initiata sacris ac devota sit, nescio, quod eam necesse putas esse in consulis corpore defigere.

(4) In what sense are the following words used in these chapters: vastitatem, coniurationem, subsellia, iniuria, sica.

(5) Give a brief account of Catiline's conspiracy. What was its object?

Unprepared Translation.

Translate:

(*a*) Lucius Catilina, nobili genere natus, fuit magna vi et animi et corporis, sed ingenio malo pravoque. Huic ab adolescentia bella intestina, caedes, rapinae, discordia civilis grata fuere, ibique iuventutem suam exercuit. Corpus patiens inediae, algoris, vigiliae, supra quam cuiquam credibile est. Animus audax, subdolus, varius, cuius rei lubet simulator ac dissimulator, alieni appetens, sui profusus, ardens in cupiditatibus: satis eloquentiae sapientiae parum. Vastus animus immoderata, incredibilia, nimis alta semper cupiebat.

(*b*) Prima fugit domina amissa levis ala Camillæ;
turbati fugiunt Rutuli: fugit acer Atinas,
disiectique duces desolatique manipli
tuta petunt et equis aversi ad moenia tendunt.
nec quisquam instantis Teucros letumque ferentis
sustentare valet telis aut sistere contra,
sed laxos referunt umeris languentibus arcus,
quadrupedumque putrem cursu quatit ungula campum.

II.—English.

Language and Literature.

Modern English Grammar.—Etymology.

(Nesfield, Chaps. i.—ix.)

(1) Distinguish between: (*a*) collective nouns and nouns of multitude; (*b*) numeral adjectives and adjectives of quantity; (*c*) conjunctive adverbs and conjunctions; (*d*) simple and gerundial infinitives.

(2) Give the rules for forming the comparatives and superlatives of adjectives. What classes of adjectives do not admit of comparison?

(3) Give an account of the various ways of forming gender in English nouns. What principles govern the gender of personified things?

(4) Explain the different uses of the verbal forms in -ing. Discuss the term "*Present* Participle."

(5) Define tense. In what sense may the infinitive mood be said to possess tenses? Illustrate the uses of the different tenses by means of the verb "lie" (recline).

(6) What parts of speech do adverbs modify? Apply the answer to the adverb in "he lives quite near us."

(7) What is there noticeable in each of the following words: alms, sempstress, its, innings, nickname, worth (in "woe worth the day"!).

(8) Give the plurals of the following words: Carte-de-visite, colloquy, apparatus, mongoose. What are mutation-plurals? How are the plurals of nouns ending in *f* formed?

(9) "A pronoun is a word used instead of a noun." Discuss this definition. Distinguish between the forms *our* and *ours*. Discuss the use of the term *relative* as applied to a particular class of pronouns.

(10) Give examples of the various parts of speech to which the following words may be referred: as, but, that, the, like.

History of England, with Geography relating thereto.

(1200—1500 *A.D.*)

Ten questions to be answered.

(1) Trace carefully the steps of John's quarrel with the church authorities, marking especially the legal points raised at each crisis.

(2) Discuss the importance of Magna Carta in the history of the Constitution, with reference to that which preceded and that which followed. Quote as exactly as possible its most important articles.

(3) Summarise the events of 1216-1258. Why has this period been called the "Misrule of Henry III."?

(4) Tell the story of Edward I.'s wars. Discuss the legal questions arising in connection with each.

(5) What were the constituent parts of the "Model Parliament"? What previous parliaments had resembled it in any way? Why did later parliaments not conform to its pattern?

(6) State the grounds of quarrel between Edward I. and each of the Estates in 1296-7. Quote the "Confirmatio Cartarum." What is the "Statute de Tallagio non Concedendo"?

(7) What were the various sources of royal revenue down to the end of the 15th century? How were they granted, assessed, collected?

(8) Trace carefully the rise and fall in the importance of the House of Commons in the 14th and 15th centuries (*a*) in general affairs; (*b*) in the grant and control of taxation; (*c*) in legislation.

(9) Define impeachment, attainder, appeal of treason. Give the circumstances of each instance till 1500.

(10) Compare the circumstances, the contents, and the consequences of the Provisions of Oxford and the Ordinances of 1310-11?

(11) Arrange the events of the Hundred Years' War. Discuss the origin and legality of the English claim on the French crown. Draw a map of Northern France to illustrate.

(12) Write an essay on the social and political discontent of England about 1380, introducing Wiclif, the Statutes of Provisors and Præmunire, John of Gaunt, Wat Tiler.

(13) Make a genealogical table to illustrate the Wars of the Roses and Henry VII.'s reign, adding brief biographical notes where necessary.

(14) What was the importance in English history of: William Longchamp, Simon de Montfort, Gaveston, the earls and dukes of Lancaster, Edward the Black Prince, Oldcastle, Glendower, Hotspur, Caxton, Cabot, Cardinal Morton, Empson and Dudley, Simnel, Cardinal Beaufort, the members of the de la Pole family?

(15) Define: excommunication, interdict, estate (in the phrase "the three estates"), ordinance, statute, commissions of array, coroner, provisions, heresy, mortmain, the New Learning, maintenance. Give illustrations wherever appropriate.

III.—Mathematics.

Arithmetic and Algebra.

This paper includes, in addition to the work necessary for the first test, Percentages and Profit and Loss, in Arithmetic, and H.C.F. and L.C.M. in Algebra. Read:—

Arithmetic:—Pendlebury, to end of chap. xxviii. Loney, chaps. xv., xvi. Lock, chap. xii., pp. 217-224, chap. xiv. Hamblin Smith, chaps. xxiv, xxv.

Algebra:—Hall and Knight, chaps. xviii.-xx. Hamblin Smith, chaps. viii.-xi. C. Smith, chaps. x.. xi., xii., pp. 121-137. Todhunter and Loney, chaps. xii., xiii., xv., xvi., pp. 132-136.

(1) A train travelling at the rate of 48 miles an hour passes over a distance of 45,060 metres in 35 minutes; find, to two places of decimals, the number of inches in a metre.

(2) A sells some metal to B at a gain of 10 per cent.; B then sells to C at a gain of 4 per cent.; if C gives £457 12s. for it, how much did A give for it in the first place?

(3) Find, correct to six places of decimals, the value of the series:—

$$\frac{1}{1.4} + \frac{1}{1.4.7} + \frac{1}{1.4.7.10} + \frac{1}{1.4.7.10.13} + \ldots$$

(4) A man buys 5,175 yards of cloth at a remnant sale for £300; one third he finds unfit for sale, and sells it for waste at 6d. per piece of 50 yards; one-sixth of the remainder he sells at 2s. 6d. per yard; and the rest at 1s. 9d. per yard. What is his total gain, and how much does he gain per cent.?

(5) Divide $(2x^2 + 2xy - y^2)^2 - (x^2 + xy - 2y^2)^2$ by $x^2 + xy + y^2$.

(6) Reduce to its lowest terms:—

$$\frac{2x^3 - 8x^2 - 42x}{3x^3 - 12x^2 - 60x + 21};$$

and find the L.C.M. of

$x^3 - xy^2 - x^2y + y^3$, $x^4 - y^4$ and $(x^4 - x^3y + xy^3 - y^4)$.

(7) Solve the equations:—

(i.) $$\frac{3}{x-4} - \frac{2x+1}{6-x} = 2$$

(ii.) $$ax + by = py - qx = ap + bq.$$

(8) A man can run two and a half times as fast as he can walk, and can cycle twice as fast as he can run; if he takes $4\frac{1}{2}$ hours to reach a destination 51 miles away by walking, running and cycling for equal intervals, how fast does he walk?

(9) If A divides both B and C exactly, show that it will also divide $mB \pm nC$ exactly.

Simplify the expressions:—

(i.) $$\frac{1 - 7x}{5 - 2x} - \frac{x}{2x + 5} + \frac{5 - 8x}{4x^2 - 25};$$

(ii.) $$\frac{x^2 - 3x + 2}{x^2 - 5x + 6} - \frac{x^2 - 3x - 4}{x^2 - 2x - 3}.$$

(10) A sum of £15 is raised by subscriptions of half-crowns and florins; if there had been twice as many half-crown subscriptions, and 10 fewer florin subscriptions, the sum would have been increased by £9. Find the total number of subscriptions.

Answers.

1. 39·37. 2. £400. 3. ·289578. 4. £24 6s.; $8\frac{1}{10}\%$.
5. $3(x^2 + xy - y^2)$
6. $\frac{2x(x+3)}{3(x^2+3x+1)}$; L.C.M., $(x-y)^2(x^2+y^2)(x^3+y^3)$
7. (i.) $4\frac{3}{8}$; (ii.) $x = p - b$, $y = q + a$.
8. 4 miles per hour. 9. (i.) $\frac{6x}{2x-5}$; (ii.) $\frac{3}{x-3}$
10. 130.

Geometry.

Euclid, Books I. and II.

(1) If two triangles have two sides of the one equal to two sides of the other, each to each, and have also the angles contained by these sides equal, then shall their bases, or third sides, be equal, and the triangles shall be equal in area, and the remaining angles of the one shall be equal to the remaining angles of the other, each to each, namely, those to which the equal sides are opposite.

(2) ABC is an isosceles triangle; draw a straight line DE parallel to BC cutting the sides AB, AC in points D and E such that BD may be equal to DE and DE to EC.

(3) If one side of a triangle be produced the exterior angle so formed is equal to the sum of the two interior and opposite angles.

In any pentagon the sum of two of the interior angles is equal to the sum of three of the exterior angles.

(4) The bisectors of the adjacent angles ABC, BCD of a parallelogram ABCD intersect in P; show that the straight line joining P to either of the middle points of the sides AD, BC bisects the parallelogram.

(5) On one of the sides of a given quadrilateral figure describe a parallelogram equal in area to the given quadrilateral figure and having one of its angles equal to any one of the angles of the quadrilateral.

(6) State and prove the converse of the following proposition: In a right-angled triangle the square on the side subtending the right angle is equal to the sum of the squares on the sides containing the right angle.

(7) If a straight line be divided equally, and also unequally, the rectangle contained by the unequal parts together with the square on the line between the points of section is equal to the square on half the line.

ABC, ADE are two isosceles triangles having the same vertex A, and whose bases lie along the same straight line BC; show that the difference of the squares on the sides of the triangles is equal to the rectangle BD, DC.

(8) If a straight line be bisected and produced to any point, the sum of the squares on the whole line thus produced, and on the part produced, is double the sum of the squares on half the line bisected and on the line made up of the half and the part produced.

Also state this theorem in an algebraical form.

(9) Divide a straight line into two parts such that the rectangle contained by the whole line and one of the parts may be equal to the square on the other part.

(10) POQ is a right-angled triangle and the hypotenuse PQ is trisected at the points R, S; show that the sum of the squares on OP, OQ, OR, OS is equal to fourteen times the square on RS.

IV.—General Elementary Science.

The sections of "Elementary General Science," by A. T. Simmons and Lionel M. Jones to study, by reading and experiment, in preparation for this month's questions, are Chaps. v., vi., xvi. and xvii.

There are several points of exceptional importance in the work dealt with in the pages mentioned. The following are some of them:

Chap. V.—Carefully learn the definition of the equality of masses (p. 55). Do not leave the principle of the conservation of momentum until you are sure you understand it. Notice the

answer to the first worked-out example on p. 58 should be $4\frac{5}{8}$ feet per second. You are strongly urged to work out as many of the examples at the end of the chapter as possible, for this is the best way to impress on the mind the important formulæ discussed in the chapter. Perform several experiments to illustrate the parallelogram of forces. If you want more questions on falling bodies you should consult a book on Dynamics.

Chap. VI.—The experiments described in this chapter will do more than anything else to help you to understand parallel forces. The condition for the equilibrium of three parallel forces (pp. 77-81) is of prime importance. Follow each step of the worked-out examples given, and make some similar problems for yourself and then solve them in the same way.

Chap. XVI.—On the whole this is a straightforward chapter. In Expt. 234 galvanised iron is often used. Before experimenting with sodium re-read the note on p. 222. The most difficult paragraphs are those on p. 240 and p. 243; but they are highly important. Be sure that you understand the plan of the research dealt with in the chapter.

Chap. XVII.—This part of the subject requires more attention than the last chapter in order to remember it. The only proper way to study it is by performing the experiments as you read. Be able to draw fig. 129 and fig. 131. Notice what is said about double decomposition (p. 257).

(1) When are two masses said to be equal? and when are two forces said to be equal? Explain carefully the principles on which your statements depend.

(2) What relation exists between force, mass, and acceleration? A certain force acting upon a mass of 100 lbs. for 25 seconds produces in it a velocity of 50 feet per second. Compare this force with the weight of 1 lb., and find the acceleration it would produce if it acted on a mass of 112 lbs.

(3) Explain the terms "inertia," "resultant," "centre of gravity," and "unstable equilibrium." Give two definite examples in each case.

(4) Describe in detail how you would proceed to find the centre of gravity of a waste-paper basket, explaining all the precautions you adopt.

(5) You are provided with two spring balances, a lath, and a known mass of iron. How would you arrange two experiments to show the conditions for the equilibrium of three parallel forces?

(6) How could you prove that when hydrogen burns in air the substance produced is water?

(7) What do you understand by the term "double decomposition"? Give three examples.

(8) You are provided with some roll-sulphur. Explain how you would proceed to obtain a specimen of an "acid" and a "salt." What other substances would you require?

(9) What experiment would you perform to show that 250 cubic centimetres of sulphuretted hydrogen contains 250 cubic centimetres of the gas evolved when sodium is thrown upon water?

(10) How has the mass of the active constituent of the air contained in 100 grams of pure water been ascertained?

V.—French.

I. Translate into English the following passages:

Hyderabad.

(*a*) La nuit, dans la gare encombrée, une garde d'honneur, composée de cipayes, attend. Des cris parmi la foule, une agitation de convulsionnaires, des ordres tombant avec des bourrades sur les hommes. Quelque grand personnage descend de son wagon, entouré de secrétaires, d'officiers; les soldats, portant des torches, lui font escorte; ils remontent sur leurs chevaux, suivent la voiture, où s'entrevoit une robe claire . . . . Très vite, en grand fracas, tout cela s'éloigne dans la nuit silencieuse, embaumée d'odeurs fines, se perd sous des arbres, reparait dans le lointain sur une hauteur, les torches courant toujours, formant de leur fumée une colonne rousse au-dessus des aciers, des croupes blanches . . . . Puis, à un tournant, tout s'efface.

Après la ville moderne, aux spacieuses avenues plantées d'arbres, bordées de jardins un pont tout neuf, en briques voyantes, franchit la rivière presque à sec, où fourmille tout un monde de gens nus qui font leurs ablutions, lavent du linge, secouent à perte de vue des étoffes rouges et blanches.

(*b*) Le courage même, qui servait jadis de garant à la loyauté, ne fut plus qu'un moyen brillant de s'en affranchir: car il n'importait pas d'être vrai, mais il fallait seulement tuer en duel celui qui aurait prétendu qu'on ne l'était pas; et l'empire de la société dans le grand monde fit disparaître la plupart des vertus de la chevalerie. La France se trouvait alors sans aucun genre d'enthousiasme; et comme il en faut un aux nations pour ne pas se corrompre et se dissoudre, c'est sans doute ce besoin naturel qui tourna, dès le milieu du dernier siècle, tous les esprits vers l'amour de la liberté.

II.:

(1) Give the plurals of—bal, gaz, lui (disjunctive), lui (conjunctive), joujou; and the feminines of—dû, roux, poli, aigu, tiers.

(2) Write in full the imperfect indicative and imperative of—être and se réfugier.

(3) Give the first singular present indicative, second plural imperfect indicative, third singular conditional, third singular imperfect subjunctive, and the past participle of—valoir, rire, savoir, croire, craindre and s'en aller.

(4) What are the different meanings of the following nouns, according as they are masculine or feminine—garde, manche, mousse, vase, aide, pendule?

(5) Give the rule as to the use of the sign of the plural in—cent, mille, quatre-vingts; and translate into French:

(*a*) There are eight thousand centimes in eighty francs.
(*b*) Edinburgh is about three hundred and ninety miles from London.
(*c*) He is an inch taller than I.
(*d*) The army is two hundred thousand strong.

III. Translate into French:

A peasant who had never learned to read noticed that the clergyman always put on spectacles when he read the Bible in church. He thought that he would also be able to read if he had some spectacles. So he went to an optician's, and said that he wished to buy a pair of spectacles. The optician gave him one, and the peasant put it on and tried to read a book which was on the table. When he found he could not read he asked for another. When the optician had shown him nearly all he had, he grew impatient and said to himself: "I believe the stupid fellow cannot read a word." The peasant heard the remark, and angrily replied: "Of course I cannot read. If I could read I should not come to you to buy a pair of spectacles."

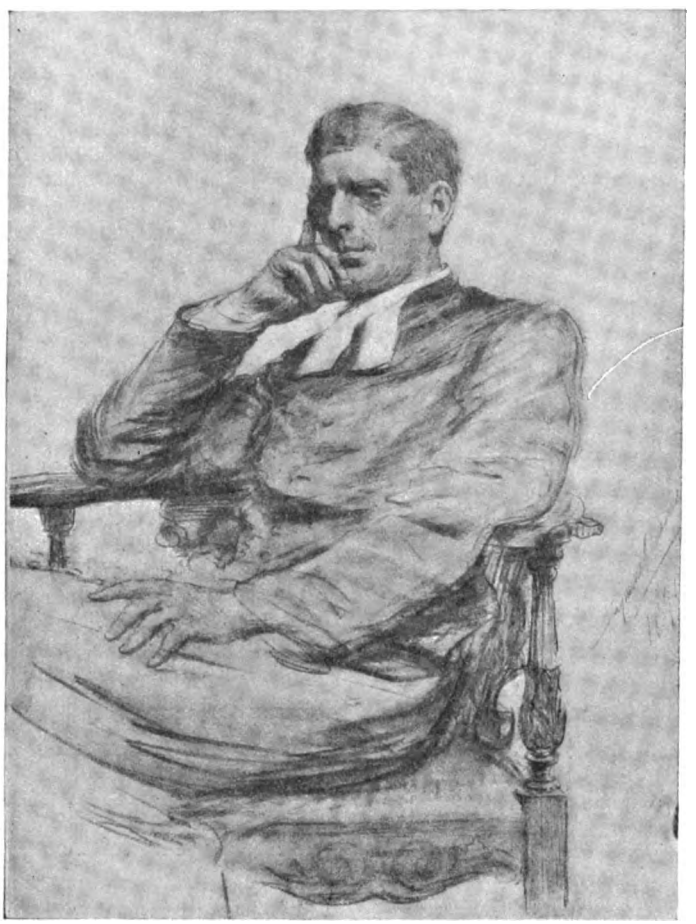
Time given to Athletics.—I suppose different schools vary very much in this respect from one another; but I do not know of any public school of which it could be said now that too little time is given to games; and certainly there are many against which the complaint is raised that they give too much. They most of them have their three half-holidays a week, and on whole school-days a solid space of two hours (perhaps two such spaces) left clear for play. Surely the time thus provided is enough; if on half-holidays the whole afternoon is sacred to play, then the morning should be sacred to work, and any encroachments there on the part of athletics should be firmly discouraged. At least, if there be such encroachment, it should be for the younger not for the older boys. Dr. Clement Dukes, who is a leading authority on school hygiene, gives a table of scales of work during school life. He thinks that boys of twelve to fourteen should work twenty-five hours a week, boys of eighteen to nineteen should work fifty. Some public schools seem to be inverting this proportion. There is another encroachment which must be resisted. We need not grudge the hours given to exercise in which a boy is himself actively participating, but we do need to restrict the time that is devoted merely to watching the play of others. It is an innocent occupation enough for a short period; but what a pitiful waste of opportunity are those long summer days of which most of the morning and the whole of the afternoon are devoted to "looking on" !— Rev. Lionel Ford, M.A., Assistant Master in Eton College. "Essays on Secondary Education."

WESTMINSTER SCHOOL.[1]

THE origin of Westminster School is lost in the obscurity of the Middle Ages. Mr. Sargeaunt is concerned with its continuous history from John Adams, the first Headmaster (whose appointment dates from 1540), down to the present time. As a boarding-school Westminster dates from 1560. Whichever date is taken as a starting point, there is still a bewildering amount of material to be disposed of in a single volume. Though Mr. Sargeaunt has not produced so readable a history as that of Eton by Mr. Sterry, there is plenty in his book to interest every class of reader.

The lot of the Westminster boy of past centuries does not seem to have been a happy one. William Taswell, in 1666, speaks of his "servitude" as a junior. The duties which fell to some of these little fellows were certainly onerous. "The 'Watch in College' was a junior who was on duty in the dormitory from early morning till late at night. The fires, the cleaning of cutlery and crockery, the preparation of tea, and the reception of parcels, all fell to his care. When the dormitory was locked in the evening he conveyed messages to the servant who sat at the door" (p. 152). When Carey was Headmaster (1803-14) things were no better. "Lord Albemarle relates how he had to brush the clothes, clean the boots, and fill the basin of his fag-master—a kinsman who was less than kind. Even with a gentle master a fag lived a slave's life" (p. 215). On p. 204 we read, "There must, however, have been children whose sufferings blighted their lives. Yet it would seem that, though the bullying was bad, the bullies were not numerous. In Southey's first room all the outrages were the work of one boy, and him mad. Southey's head was a mark for poker and porter-pot, water was poured into his ears while he slept, and he was held by the leg out of window . . . . Neither race had anything to fear from the vigilance of master or dame."

From the beginning, as Mr. Sargeaunt says, Westminster was under the shadow of the rod. Udall, appointed Headmaster in 1555, was known as the "greatest beater" of his time. The "terror of his rod" has helped to raise the name of Busby (Headmaster 1638-95) above all of his profession. Smith (1764-88), we read, quelled a rebellion "by unexpected energy and a thick stick." Of Vincent (1788-1802), said a Latin epigram, "He rolls his blood-shot eyes and looks round for the rod." On the other hand, "With Nicoll (1733-53), a prompt confession and an evident repentance always stayed the lifted arm." But naturally enough, the boys played on Nicoll's good nature. "A story goes that a lady in a sedan chair called on him and begged to be shown over the school. As he led her from room to room he was shocked by rude laughs, which seemed to justify Chesterfield's condemnation. In fact, the hoop and petticoat were worn by one of his own boys. The impostor was young Lord Higham-Ferrers, who as Lord Rockingham lived to win the veneration of every true Whig."



DR. RUTHERFORD.
From the Picture by J. Seymour Lucas, R.A.

A good story of a similar kind is told of Vincent. "One day in the gateway of Dean's Yard an aged and infirm crone besought his alms. He gave her half-a-crown, and a few minutes later descried the old woman held forcibly under the pump by Harley, afterwards Earl of Oxford, and Carey, afterwards Headmaster. A third boy plied the handle. When Vincent ran to stop the outrage, the woman's bonnet fell off, and disclosed the features of a King's scholar. The crone was James Hook, afterwards Dean of Worcester, and the father of a more famous son. Vincent was glad to hide his merriment by a precipitate retreat."

Of the growth of the Westminster Play, the variations in the curriculum from time to time, of the decline of the school (1819-46) and its subsequent revival, down to the beneficent rule of Dr. Rutherford, the present Headmaster, we must refer the reader to Mr. Sargeaunt's volume, which makes it possible even for the unfortunate who is not a "public school man" to become acquainted with a school which has, since its foundation, taken a large part in the life of London, and indeed of the whole country.

[1] "Annals of Westminster School." By John Sargeaunt. (London: Methuen & Co. 7s. 6d.)

St. Paul's School.—A settlement of the long-standing dispute between the Charity Commissioners and the governors of St. Paul's School has been arrived at. A new scheme is to be framed under which the school is to receive two-thirds of the income of the foundation, but never less than £14,000 a year. The governing body will remain as at present constituted.

THE SCHOOLMASTER MILITANT.[1]

IN these pages Thring appears as the typical Englishman keeping school. Too often in the learned professions national characteristics are toned down by training. But here Thring stands forth as the unmistakable embodiment of British pluck and pertinacity, British enterprise and energy. He is at once the iconoclast and the builder, the hard soldier and the knight-errant, the man of action and the dreamer of dreams. If the biographer has not softened the features with that delicate art so exquisitely employed by Mr. Skrine in his "Memory," he has given us with rare fidelity the rough cast of the man as he appeared to himself. For this work is chiefly autobiographical. During thirty years Thring kept a diary, which was, so to speak, a weeping-bowl. There is relief in tears. And in this diary Thring mingled ink with brine and blood. Writing on May 17th, 1862, of the approaching completion of his great school-room, he says:

"Every stone here is laid in sorrow and fear, and mortared with sweat, and blood, and perplexity. God help us" (vol. i., p. 121).

That is the prevailing tone of the voluminous extracts from this diary. The pleasant features of Uppingham life and the bright faces of its boys loom dim and visionary in the sombre background. It is the warrior we follow through the dense dust-clouds of battle, while sword and sabre flash in lightning, and cannon roar in thunder. Through the serried ranks of Endowed School Commissioners, Uppingham Trustees, sanitary authorities, newspaper-whining parents, and recalcitrant assistants, our dauntless hero cuts his victorious way.

And yet Thring's diary does not do him justice. Unfortunately he kept it only in term-time—the period when his burdens were heaviest. Hence we find little here that reveals the gentle heart which undoubtedly beat beneath the warrior's mail. He himself was aware of this, and wrote:

"I am often struck in writing this diary with its likeness to common history, how one puts down all the vexations and none of the good, or but little. How can one tell the quiet hours of faith and hope, the encouragement that comes into the heart, the feeling of work done, and the deep conviction low down under all the storms that God blesses the life here and will bless it" (vol. ii., p. 303).

But the author tells us of seasons when the tempest was stilled, when a devout placidity and a serene radiance sat on the brow of the militant headmaster. There was a sublime character beneath the stern exterior, but perhaps no man ever lived who was so likely to put himself in the way of being misunderstood. Whatever be said of Thring's work, his influence on the educational movements of the century has been unquestionably great. He was a pioneer in utilising music, painting, architecture and other liberal arts, to elevate and refine the life of the public-schoo boy. Above all he was the champion of the untalented and the unpromising—he recognised in each boy a distinct personality, a separate living force which for weal or woe was to exert itself upon the mass of society. Hence a cardinal article of his creed was, "Every boy can do something well." And amongst his other aphorisms, we note:

"An idle, obstinate boy is a problem for an able man to master" (vol. i., pp. 161-2).

"One sheep is the same as another to a man who is not a shepherd" (vol. i., p. 186).

"Honour the work and the work will honour you" (vol. ii., p. 119).

"A little judicious blindness and deafness is a great virtue in a wise teacher" (vol. ii., pp. 142-3).

"Complete mastery of little things makes a great man at last" (vol. ii., p. 269).

[1] "Life and Letters of Edward Thring." By G. R. Parkin. 2 vols. (Macmillan & Co.) 17s. net.

RECENT SCHOOL BOOKS.

Modern Languages.

Progressive German Composition and First Introduction to Philology. By L. Lubovius. xxxvii+161+95 pp. (Blackwood.) 3s. 6d.—The part devoted to composition contains many useful hints, in addition to passages that are well chosen and carefully annotated. The Introduction to Philology gives a good deal in brief space, and is trustworthy on the whole. The book is well got up.

É. Pouvillon, Petites Ames. Edited by Stéphane Barlet. xvii+179 pp. (Macmillan.) 2s.—A good text. The introduction and notes are satisfactory on the whole; the English, however, has rather a Gallic flavour occasionally. The *viva voce* exercises for fixing the vocabulary in the pupil's mind should prove useful; the passages for translation into French are not always expressed in good English. Why, for instance, say "to shy" and "to smash," when "to throw" and "to break" are available? The book is well printed.

Hints on Teaching French. By Walter Rippmann. ix+85 pp. (Dent.) 1s. 6d. net.—This little volume contains a general introduction to the method employed in Dent's "First and Second French Books," which is identical with the "new method" explained by Miss Brebner in the first chapter of her book (already noticed). There is also a running commentary to each lesson, which will prove very valuable to the teacher, as it contains many hints which will enable him to save time; the passages for dictation based on the text of the "Second French Book" should prove particularly useful.

The Facts of Life. Part II. (French Series, No. 1.) By V. Bétis and H. Swan. x.+131 pp. (G. Philip & Son.) 3s.—A further volume exemplifying the modification of the Gouin system known as "Psychological Methods of Teaching and Studying Languages," the principles of which are given in the Preface to Part I. This instalment supplies the series dealing with *Animals, Town Life, Social Life and Government, Industry, &c.* The authors have done their work conscientiously, and teachers may find this volume useful if they wish to strengthen the vocabulary of an advanced class. There is a good deal of quiet humour in these series.

Object Lessons in German. By J. J. Trotter, M.A. viii.+127 pp. (Nelson, 1898.) 2s.—This book is based on M. Alec Cran's "Object Lessons in French." It is not intended for beginners, but "can be used along with a First German Course." The great objection to the book is that the hints to the teacher are given in the text, instead of in a separate book. The vocabulary is much too large; there is not enough repetition. Clarendon type is used, but by no means consistently. The German text is correct on the whole, and the dialogue is bright; in some cases it is at variance with the illustrations. The book is to be welcomed as a step in the right direction, and may prove serviceable in the hands of a skilful teacher.

Classics.

Hercules Furens, from Euripides. By A. F. Hort, M.A. 63 pp. (Rivingtons.) 1s. 6d.—By judicious omissions the play has been reduced to 720 lines, a fair amount for a middle form to read in a term. The notes are the outcome of the

editor's own class-teaching, and will be found to facilitate the use of grammar and lexicon without superseding them. The index might, with advantage, be enlarged.

The Odes of Horace. Book I. By S. Gwynn. 148 pp. (Blackie.) 1*s.* 6*d.*—This is the first volume of Blackie's Latin Series, under the general editorship of Professor Tyrrell. The text is illustrated from ancient works of art, and is preceded by a life and appreciation of the poet, with numerous quotations from his writings and from Suetonius. There is also a scheme of metres. The notes are well suited to their purpose of "satisfying the requirements of junior students under the present conditions of education and examinations." The book is treated as literature, and the parallel quotations from Greek and English are happy. The controversies as to Ode xxviii. are touched upon, but cannot be considered as settled. Probably the editor himself does not expect it, though he is dogmatic. We do not care for the explanations given of *sublimi anhelitu* (p. 89) and *tempus erat* (p. 112), and do not understand "bickering" as a translation of *mobilibus* (p. 78). There is a vocabulary, and an index should have been added.

Pliny's Letters, I.-XII. By C. J. Phillips, B.A. xx.+ 55 pp. (Macmillan.) 1*s.* 6*d.*—This slight volume in the Elementary Classics Series contains a useful introduction and helpful notes. Some points call for criticism, as the statement (p. 22) that "*ut* is understood." The rendering of *aequus* in the notes (p. 23) and in the vocabulary (p. 41) is misleading. Events in Roman social life are well illustrated in the notes on *balineum* (p. 26), *toga virilis* and *sponsalia* (p. 35) and others.

The Tutorial Greek Reader. By A. W. Young, M.A. 180 pp. (Clive.) 2*s.* 6*d.*—The first edition of this book, with its description of the battle of Hastings in Greek, has been in the hands of teachers for some years. This, the second edition, is enlarged by the addition of a selection of more advanced pieces, to which no vocabularies are given. We think this is as it should be; the educative value of an intelligent use of the lexicon is in danger of being lost, when books intended even for high forms are provided with prepared vocabularies. There is also an appendix containing passages set at the London Matriculation for the last 25 years.

Cornelius Nepos. Vol. I. Greek Lives. By H. Wilkinson, M.A. xxi.+145 pp. (Macmillan.) 1*s.* 6*d.*—This book, in the same series as the last, has for introduction a good conspectus of Greek History from B.C. 550 to 367 to illustrate the Lives. The notes do not err on the side of excessive explanation. Indeed, beginners, for whom the volume is intended, will not, by themselves, get much benefit from some of them, especially those of the conundrum order. The vocabulary is much better than many to be found in elementary books, giving, as it does, phrases as well as single words.

Grammar and Composition.

Manual of English Grammar and Composition. By J. C. Nesfield, M.A. 342 pp. (Macmillan.) 2*s.* 6*d.*—An addition to the fast growing collection of volumes dealing with this important subject. This volume is nothing if not practical, and it falls into five parts. The first, on Parsing and Analysis, is simply crammed with examples. The section on Composition is of great value, and the part of it which deals with Punctuation might be laid to heart with advantage by many who are supposed to know all about it. The chapters on Purity, Propriety and Clearness of Diction constitute in themselves a valuable practical introduction to the art of rhetoric. The subject of Figures of Speech, and the enlargement of a vocabulary by composition or by prefixes and suffixes, will repay careful study, chiefly because the examples given are o. so broad and useful a character that almost every variety of difficulty is illustrated. The last section, on the History of the Language, is short, but it is admirably done. Altogether this little volume deserves to be widely used.

Oxford and Cambridge Junior Examination Papers in English Grammar. 52 pp. (Relfe Bros.) 4*d.*—This is another instalment of the Ten Years' Examination Series issued by Messrs. Relfe. The Oxford questions extend from 1886 to 1898, the Cambridge from 1884 to 1897, and the booklet has already reached a fifth edition. So far as parsing and analysis in English can be made mechanically accurate, the "schemes" in the introduction should smooth away many of the difficulties of beginners; but it may be doubted whether an average learner will perceive the logical relations which subsist between the different parts of a passage by this highly condensed method so well as of old from the more elaborate and more exact plan followed by Mason and his fellow grammarians.

A New English Grammar, Logical and Historical. 127 pp. (Clarendon Press.)—In this second part of his book Dr. Henry Sweet deals exclusively with English syntax. As he explains in his preface, the scope of this volume is limited to formal syntax, because the same subject had been dealt with in the introduction to the first part of this work (published six years ago) so far as the analysis of sentences is concerned. Within the limits thus set by himself Dr. Sweet has produced a volume which is an evidence of immense pains and careful scholarship, and which will supply teachers of English literature with a most valuable and novel way of presenting the subject. Dr. Sweet commences with the much-neglected topic of Word Order. He traces the logical development of sentences in English with constant reference to the Aryan model and the Germanic variations from it, and the historical element in this part of the subject is of the highest interest. The verb inversion in modern literary English is discussed at considerable length, as are also the topics of Broken and Cross Order. The vexed subject of the "split infinitive" Dr. Sweet dismisses cursorily. The chapters on Sentence Stress and Intonation will repay careful study, both subjects being fully and clearly treated. When the author comes to the actual parts of speech the same characteristics are preserved in his method, and the omission of any discussion of prepositions and mere dictionary work saves time without any expense of really important sacrifices. Throughout the whole of this part of the work the historical element is kept in view, particularly in the chapter upon Pronouns. As an English grammar the book is of high value; as an historical study it is of the deepest interest, while its clearness and careful style make it as readable to the literary man as the grammatical student.

History.

A History of England. By H. O. Arnold-Forster. Second edition, revised. 5*s.* (Cassell.) — An intentionally popular history of England, running to over 800 pages (much of which is occupied, however, by illustrations), should be readable, and readable this book undoubtedly is. Mr. Arnold-Forster has certainly achieved his aim of "clothing with flesh and blood" the dry facts of history. Sometimes, indeed, he seems to be "writing down" a little too much, and we are apt to tire of being told that there are many things for which he has no room. But those aspects of our national story on which the author has chosen to dwell are well and picturesquely told. Yet the very excellences of the book lead us to regret. We find abundant signs of the influence of J. R. Green, Macaulay, and the rest of all but our recent historians, but we have failed to trace any signs of Stubbs or Gardiner, much less of Maitland,

Prothero, and others of our still living and working historians. Surely Mr. Arnold-Forster could have made use of some of their work, and thus put more backbone into his book. As it is, a perusal of the work gives us the impression of a series of brilliant pictures, parts of a great transformation scene the inner meaning of which is still hidden from us. After the Norman Conquest we get no constitutional history, in the Stuart period we miss the religious controversy beneath the fight between King and Parliament. It is good—would it were better!

An Elementary History of Greece. By C. W. C. Oman. 234 pp. (Rivington.) 2*s.*—A readable short introduction, telling the familiar story with some freshness and more human treatment than usual.

Outlines of English History, B.C. 55-A.D. 1897. By Geo. Carter. 218 pp. (Relfe Bros.) Ninth edition.—A good epitome of English history, compiled summary-wise, followed by genealogical tables and short biographical sketches. It is not entirely up to date. The meeting of 1265 is still called the "First House of Commons," and the statute "De Tallagio non Concedendo" is described as an abstract of the "Confirmatio Cartarum." Only one Self-denying Ordinance is given; the Pragmatic Sanction of "1740" fame is called a treaty; Maria Theresa is styled "Empress of Austria." The danger of such books is that boys and girls are told to learn them by heart, and make astounding blunders in the attempt, because they are too condensed. *They should never be used alone.*

Cavour. By the Countess Evelyn Martinengo Cesaresco. (Foreign Statesmen Series.) 222 pp. (Macmillan.) 2*s.* 6*d.*—A most valuable monograph on the great Italian statesman of our own century, written evidently by one who knows not only the times but the men. The authoress has, however, not made the story quite clear to the ordinary Englishman who loves and admires Italy probably more than he knows her history. Many of the allusions and references, especially in the beginning of the book, want explaining. Still, it is a book to be read.

Geography.

A Class-Book of Modern Geography. By the late Prof. William Hughes. New edition; revised and largely re-written. 472 pp. (G. Philip & Son.) 3*s.* 6*d.*—Mr. Albert Hill is responsible for this revised edition of a successful school-book of geography. It is not a type of book we are inclined to encourage; and no student should be burdened with the statistics peppered over its pages. The information in the volume is, however, concisely expressed and generally up to date. It constitutes a good synopsis of the physical, commercial, and political geography of the world, but it will be a wearying text-book for young students unless the teacher is wise enough to point out the details which may be skipped.

A Geography of the British Isles. 128 pp. 1*s.* *A Geography of North America, including the West Indies*, 116 pp. By Lionel W. Lyde, M.A., F.R.G.S. (Black.) 1*s.*—Why teachers should continue to use the "soul-destroying" type of geographical text-book now that such admirable volumes as these are available is difficult to understand. The volumes belong to a series which has only to be seen to be adopted. The author is a teacher and examiner of wide experience, so he does not set forth an impracticable course of school work. As there are still teachers who think it necessary to make pupils familiar with geographical statistics for examinational purposes, it may be worth while to point out that the author, who writes with authority upon the subject, says, "I have intentionally avoided mentioning exact heights, distances or sizes, small industries and unimportant places." The volumes in the series contain no maps, and must therefore be used in connection with an atlas.

Practical Series of Memory Maps. (G. Philip & Son.) 1*d.* each, coloured; 8*d.* per dozen plain.—All the information which should be given in first lessons on geography is contained on these relief maps. To make a child learn geography from texts while maps of this kind upon which he can fix his mind are available ought to be a punishable offence.

Mathematics.

Geometry for Beginners. By G. M. Minchin, M.A., F.R.S. xii.+102 pp. (Clarendon Press.) 1*s.* 6*d.*—This admirable little book would be very hard indeed to improve upon, and it is easy to credit the author's statement that he has used it with boys of eight years with very great success. It contains a description of the scale, compass, protractor, parallel rulers, and set squares, and explains how they are used; and it gives, in a very simple and attractive form, the substance of Euclid's first book, with the exception of those theorems which depend upon the eleventh axiom.

Longman's Preparatory Arithmetic. By T. H. Bertenshaw, B.A., B.Mus. viii.+202 pp. (Longmans.) 1*s.* 6*d.*—On the whole, this seems to be a satisfactory book to use with beginners; a special and good feature is the large number of oral exercises. The complementary method of subtraction is not given; and that which is adopted, though easy to understand, is not a good one to apply in practice. It would be well to point out that percentages may often be usefully regarded as decimal (as well as vulgar) fractions. Finally, we think that sums which lead to such amounts as £2 2s. 10¾d. ought to be omitted, and that Simple Proportion should be treated by the fractional as well as the unitary method.

Elementary Mathematics. By J. L. S. Hatton, M.A. and G. Bool, B.A. viii.+356 pp. (Whittaker.) 2*s.* 6*d.*—Written chiefly for candidates for the elementary stage of the course prescribed by the Science and Art Department. The Euclid is passable, the algebra bad, and the arithmetic worse; a result partly due, no doubt, to the nature of the South Kensington examinations. Anything more absurd than some of the examples in arithmetic it would be difficult to imagine.

Modern Geometry of the Point, Straight Line, and Circle. By J. A. Third, M.A. viii.+228 pp. (Blackwood.) 3*s.*—Chap. i. deals with the use of signs in geometry; ii.—iv. with points, lines and circles connected with the triangle; v.—ix. with the elements of projective geometry, including involution; x.—xi. with coaxal circles, &c.; and xii. with inversion. The author has made use of the best sources of information, and is at the same time completely master of his subject; he has made an excellent choice of material, and is concise without being dull or obscure. At the end of the book there are about 300 exercises. This little treatise may be heartily recommended; its brightness and independence give it a charm which is not to be found in mere abstracts and compilations.

Spherical Trigonometry, Theoretical and Practical. By W. W. Lane, B.A. viii.+116 pp. (Macmillan.) 2*s.* 6*d.*—A well-written, practical book, well suited for students of navigation and others. The actual calculations are given with unusual fulness of detail and properly arranged; the type and figures are excellent; and the requisite modicum of theory is given in an attractive and satisfactory way. This little book certainly deserves a favourable reception.

The Tutorial Algebra. Based on the "Algebra" of Radhakrishnan. Part II. Advanced Course. By W. Briggs, M.A., F.C.S., F.R.A.S., and G. H. Bryan, Sc.D., F.R.S. viii.+596 pp. (W. B. Clive.) 6*s.* 6*d.*—We learn from the preface that the chapter on Graphical Representation, as well as much of

the later portion of the book, is the work of Mr. J. H. Grace. The chapter thus referred to is one of the best in the volume; the subsequent chapter on the binomial theorem for fractional and negative indices also deserves attention. The chapter on Zero and Infinity (after Radhakrishnan) is likely to be useful, and has a certain amount of freshness. In other respects the book is very like the usual "Higher Algebra."

Euclid's Elements of Geometry. Arranged by A. E. Layng, M.A. vi.+358 pp. (Blackie.) 3*s.* 6*d.*—An edition of the moderately conservative type. Abbrevations are freely used throughout; alternative proofs are occasionally given, and there are numerous exercises, worked out and otherwise. Although not presenting any very special features, the book is good of its kind.

Science and Technology.

Practical Inorganic Chemistry for Advanced Students. By Chapman Jones, F.I.C., &c. 239 pp. (Macmillan.) 2*s.* 6*d.* —Designed more particularly to meet the requirements of students working for the advanced stage of the examination in Practical Inorganic Chemistry of the Science and Art Department, this book will at the same time prove suitable for candidates in the Senior University Locals. The introduction to volumetric analysis and the exercises in manipulation will be especially helpful. Mr. Jones's great experience in teaching the subject has enabled him to appreciate and clear up all points of particular difficulty to beginners in analysis.

Carpentry and Joinery. By F. C. Webber. 319 pp. (Methuen.) 3*s.* 6*d.* — Intended for students preparing for the examination of the City and Guilds of London. The book is profusely illustrated and will doubtless be largely adopted in technical schools. We cannot help thinking that chapters ii. and xiii. are out of place and unsatisfactory. Mr. Webber has not sufficiently recognised that technical instruction is only valuable when it is based upon a previous study of the fundamental principles of science upon which practical applications depend. It seems to us incongruous to find a chapter on the "Mechanics of Carpentry," especially one in which the parallelogram and triangle of forces are dealt with and disposed of in a couple of pages. The student learns his mechanics best in the mechanical laboratory, and, in the absence of a systematic course in the subject, it is quite certain he will reap little advantage from such a chapter as is to be found here. Moreover, the carpenter or joiner gets the idea that there is a particular kind of mechanics for him and another kind for the engineer, plumber, or bricklayer.

JUNIOR OXFORD LOCAL EXAMINATION, JULY, 1899.

Guide and Monthly Test Papers.—No. 1.

FIVE test papers in subjects, the syllabuses of which change from year to year, in the Junior Oxford Local Examination, have been prepared for THE SCHOOL WORLD by teachers who have had experience in preparing pupils for the examination. The first of them is here published. The schedules of the subjects and the set books have been divided into five parts, and a test paper prepared for each of these divisions of the subject.

A list of books, suitable for students preparing for the examination, is given at the head of each test paper in the present issue. It must not be forgotten that the books named are those which, in the opinions of the teachers who have prepared the test papers, are the best for the purpose, but there may be books equally good which have not come under their notice. Advice has been added which it is hoped will be useful as a guide to what should be read and the order in which the parts of the subject can with advantage be studied.

English Grammar.

Text book:—West's "English Grammar" (Cam. Univ. Press). This should be supplemented by Mason's chapter on Analysis in his "English Grammar." (Bell, 3s. 6d.)

The following is the scheme of tests:

I. & II. West. Chapters viii.—xvi.
III. ,, ,, xxiii.—xxvi.
IV. ,, ,, v.—vii. & xxi.
V. Mason. Analysis and Parsing.

(1) What are the rules for the formation of the plural of nouns? Give the plurals of:—solo, staff, crisis, bandit, mongoose, court-martial, Lord-Lieutenant.

(2) Why are the articles classed as adjectives? Write the indefinite article before each of the following words:—honest, history, university, humble, historical.

(3) Define a Pronoun. How is this definition applicable to the word *it* in "It is impossible to finish the poem?" Give all the cases in both numbers of: I, who, she.

(4) Parse each word ending in — *ing* in the following sentence and give reasons. "Though living in this enervating climate, he contrived by attending to his health and by avoiding excesses to spend his time profitably."

(5) Distinguish between transitive and intransitive verbs. Illustrate your answer by reference to the sentences: "He has been deceived." "The tree has fallen." "Lions eat."

(6) Define *subjunctive mood.* Distinguish between "If it is fine, I shall go out," and "If it be fine I shall go out."

(7) Enumerate some of the ways in which the past tense of verbs is formed. Give the 1st person singular, indicative mood, of this tense and the perfect participle of:—lie (to recline), lie (to tell a falsehood), lay, climb, light, weave, shoe, cling, deal, forbear.

(8) Paraphrase:—

As travellers oft look back at eve,
When eastward darkly going,
To gaze upon that light they leave
Still faint behind them glowing,—
So, when the close of pleasure's day
To gloom hath near consigned us,
We turn to catch one fading ray
Of joy that's left behind us.

History of England.

(1399—1455 *A.D.*).

For advice with reference to suitable text-books the reader is referred to p. 28 of the January number. Of course the teacher will read other books than his pupils. Dr. Creighton's monograph on Queen Elizabeth in the "Twelve English Statesmen" series is therefore strongly recommended.

The portion which is necessary for preparation for each paper is evident from the dates prefixed.

(1) Tell the story of the revolt of the Percies. What other revolts were made in the reigns of Henry IV. and V.?

(2) What were the Lollards? Mention the chief events in connection with them.

(3) Over what lands did the Dukes of Burgundy rule? Tell all that they did for or against England.

(4) What were the ambitions of Henry V.? How far did he attain his objects?

(5) Give, with dates, the chief events of the French War in Henry VI.'s reign. Illustrate with a map.

(6) Mention the chief statesmen of Henry VI.'s reign, with a brief account of each.

Geography.

The following books are recommended:

For General Geography, "Longmans' Geography" (1s.). "Gill's Geography" (1s.). Atlas, "Graphic Atlas" (Philip, 1s.). For England and Wales, Lyde's "British Isles" (Black, 1s.). For India, Lyde's "India" (Rivington, 1s.). For Spain there is no handy text-book. The subject may be read up from Gill's "Student's Geography."

The scheme of Tests is as follows: (i.) General. (ii.) England and Wales. (iii.) Spain. (iv.) India. (v.) Revisional.

(Illustrate by sketch maps whenever possible.)

(1) Explain the terms: isothermal lines, nadir, dune, lagoon, Tropic of Cancer, hinterland, atoll, Sargasso Sea.

(2) Draw a sketch map of the Nile, marking the chief places on its banks. Explain the rise and fall of this river.

(3) Describe the Transvaal, noting especially its chief productions.

(4) Where are the following places, and for what are they noteworthy:—Lorenzo Marques, Calgary, Sofia, Stromboli, Lourdes, Vladivostock, Dunedin, Valetta, Lhassa?

(5) What are the chief industries of British Columbia, Jamaica, Switzerland?

(6) Where are the Falls of Foyers? To what use have they been put? Mention any other instances of waterfalls that are made use of for practical purposes.

(7) Describe the overland route to Australia.

(8) Draw a map of South America, marking the boundaries of the chief States, and insert the principal rivers and mountains.

(9) What are the effects of the sea on climate? Illustrate your answer by references to places in Europe. Places on the sea coast and in the same latitude often have different temperatures at the same time of the year. Can you account for this?

(10) What are the chief volcanic regions of the world? Name the principal volcanoes in each.

Latin.

CÆSAR.—BOOK IV.

Before beginning to translate, the pupil should have a clear outline of Cæsar's life up to 55 B.C., and should understand the position of parties at Rome at that time. No more intensely interesting account could be found than that of Mr. Froude in his "Life of Cæsar." Shuckburgh's "History of Rome for Beginners" might also be used. The account given in Green's "Short History of the English People," of their customs and earliest social condition, should be compared with that given by Cæsar of the habits of Germanic tribes on the Rhine.

Of annotated editions, that by Mr. Cl. Bryans (Macmillan, 1s. 6d.), in addition to vocabulary and excellent notes, contains a full translation of the passage relating to the bridge. Used in connection with Mr. Bryan's "Latin Prose Exercises" based upon "Cæsar" (Macmillan, 2s. 6d.), this edition would afford an admirable year's training. It, however, suffers from the want of maps. Another very good edition is that by Mr. J. Brown, assistant to the Professor of Humanity at Glasgow. This contains notes, exercises, vocabularies, maps and illustrations (Blackie, 1s. 6d.). Mr. Peskett's Edition also contains good maps and notes. (Pitt Press). Welch and Duffield's "Invasion of Britain" has an invaluable set of exercises upon the book (Macmillan).

(1) Translate:
Ch. II. Mercatoribus . . . . efficiunt.

(2) Translate:
Ch. VII. Legati ab his venerunt . . . . quem non superare possint.

(3) Translate and carefully explain and discuss, where necessary, the grammatical construction of the italicised words in the following passage:—

Maximam partem laete atque *pecore* vivunt multumque sunt in venationibus: quae res et cibi genere et cotidiana exercitatione et *liberate* vitae, quod a peuris *nullo officio* aut disciplina assuefacti nihil omnino contra voluntatem *faciant* et vires alit et *immani* corporum *magnitudine* homines efficit. Atque in eam se consuetudinem adduxerunt ut *locis frigidissimis* neque *vestitus* praeter pelles haberent quicquam. . . . . et *lavarentur* in fluminibus.

(4) Translate:
(*a*) in vicem; (*b*) ratio atque usus belli; (*c*) ephippiis uti; (*d*) ut est captus Germanorum; (*e*) hos vectigales sibi fecerunt; (*f*) in vestigio; (*g*) ad haec quae visum est Cæsar respondit . . . neque verum esse qui suos fines tueri non potuerint alieno occupare.

(5) Against whom was this campaign conducted? What gave rise to it? In what year did it take place, and who were the consuls for that year?

VIRGIL.—ÆNEID VI.

Before beginning the work of actual translation the teacher would do well to read to the class the chapters on the "Sibyl" and the "Dwellings of the Dead" from the Rev. A. J. Church's "Stories from Virgil," together with portions of Milton's "Paradise Lost," Book ii.

The following annotated editions may be recommended:

Virgil, Æneid, VI., by Mr. T. E. Page. (Macmillan.) With vocab., 1s. 6d. Virgil Æn. V. VI., by Prof. Connington, &c. (Bell & Sons, 1s. 6d.) Virgil Æn. VI., by Mr. Sidgwick. (Pitt Press, 1s. 6d.)

The Introduction to Mr. Page's edition includes a short life of Virgil, together with a summary and appreciation of his works. Both Introduction and Notes continually direct the attention of the pupil to the beauties of the book, and by their suggestiveness must tend to the development of a true taste for literature.

(1) Translate:
(*a*) Ll. 45-53. Ventum erat . . . . ora domus.
(*b*) Ll. 136-148. Accipe, . . . convellere ferro.

(2) Translate the following passages, and explain carefully the construction of the words in italics:
(*a*) tu quoque magnam
partem opere in tanto, *sineret* dolor, Icare *haberes*.
(*b*) . . . pars densa ferarum *tecta* rapit silvas.
(*c*) nunc grege de intacto septem mactare inveneos *praestiterit*
(*d*) hac Troiana tenus *fuerit* fortuna *secuta*.
(*e*) ut *Phœbi* nondum patiens, immanis in antrô
bacchatur vates, magnum si pectore *possit excussisse* deum.
(*f*) unum oro . . .
ire ad conspectum cari genitoris et ora
contingat: doceas iter, et sacra ostia *pandas*.

(3) Translate and explain the allusions:
(*a*) Chalcidicaque levis tandem superadstitit arce.
(*b*) Tum pendere poenas.
Cecropidae iussi,—miserum—septena quotannis
corpora natorum.
(*c*) Dardana qui Paridis directi tela manusque
corpus in Aeacidæ.
(*d*) alius Latio iam partus Achilles.

(4) In what sense are the following words used in this book:
hospita; fundabat: procul: emicat: praetexunt.
Parse: Silicis: praepetibus: ausus: mi: refer.

LATIN PROSE AND GRAMMAR.

The following is a general paper on Prose and Grammar, and is closely modelled on those set at Junior Oxford Local Examinations. Its purpose is to keep fresh in the pupil's memory the more salient points of the work which he has already done. Those who would prefer a more systematic revision are recommended to work through the grammar papers set as tests for candidates for Matriculation in this and in the January number. These papers will be based each month on limited portions of accidence and syntax.

[All candidates aiming at distinction should attempt the continuous Latin Prose in Question I. No candidate will receive marks for more than one of the alternatives in this question.]

(1) Translate into Latin:

(*Either*)

Cæsar remained there several days, and obtained a large supply of corn and other provisions. When the winter was nearly spent he determined to set out towards the enemy to see if he could entice (elicio) them from the marshes and woods. Hearing this, ambassadors came to him to pray him to depart from their country, promising to do everything that he ordered, and to always remain faithful to the Roman people. Cæsar replied that he would do so if they sent him within three days two hundred hostages.

(*Or*)

(*a*) They often leap down (desilio) from their horses to fight on foot.

(*b*) Tell me what you think (sentio) of the republic.

(*c*) He told me that so great a clamour arose that no woman dared approach.

(*d*) He told me what a great shout arose.

(*e*) He was killed by the consul with a sword as he was entering the temple with his brother.

(*f*) Cæsar demands two thousand hostages. Cæsar orders the enemy to send two thousand hostages to him.

(2) Translate into Latin:

(*a*) If he were to leave the city, I should go to Rome.

(*b*) Had he been put to death, the consuls would have been punished.

(*c*) The Britons wait for the Gauls to call back their envoy.

(*d*) The Gauls said that they would not recall a man who had bravely suffered so many dangers.

(3) Give the third person sing. of—the future simple indicative and the present subjunctive of—

volo, hortor, patior, audeo, gero.

(4) Give the genitive cases singular and plural of—

dux, nemus, portus, palus, urbs.

(5) Write out in full the singular of—

vis, domus, respublica, vir, paries.

(6) Give the nominative singular and gender of—

cordis, arbores, segetis, vada, mus.

(7) Give the principal parts of—

reperio, queror, quaero, percurro, colligo.

(8) Parse:

memineris, jusserit, fit, congregentur, moriere.

(9) With what cases are the following used—

licet, fretus, miseret, potior, circumdo.

French.

Set Books:—Halevy's "L'abbé Constantin" (Hachette, 3s. 6d.); or Sand's "La Mare au Diable" (Macmillan, 1s.).

Candidates for the Oxford Junior Examination for 1899 are fortunate in having such charming little stories to read as prepared books. Not wishing to give their young clients a surfeit of literary pleasure, the delegates restrict them to one book only for examination purposes. It will therefore be necessary to make a choice. Georges Sand's delightful idyll of country life will, no doubt, find favour with many teachers, as it is somewhat shorter than "L'abbé Constantin"; still the latter is far more likely to interest pupils, and seems generally the more suitable to be read in schools. It is not necessary that either of the set books should be offered, but in that case a piece of unprepared translation must be done in addition to the piece of sight required from all candidates.

Excellent practice in reading French at sight may be had from Lazare's "Unseen Passages from Modern French Authors" (Hachette, 1s. 6d.). Teachers will find it convenient to have by them the corresponding volume, "Half-hours with Modern French Authors" (Hachette, 2s.), which contains the same passages as the former work, with the addition of a good vocabulary.

Of the many French Grammars on the market the best for this examination seem to be Hunt & Wuillemin's "Oxford and Cambridge French Grammar," Parts I. and II. (Hachette, Part I., 2s.; Part II., 2s. 6d.), and Fasnacht's "French Grammar for Schools" (Macmillan, 2s. 6d.). The first part of the former book deals chiefly with accidence, and the first four terms of that volume should have been mastered before the first test-paper is attempted.

A thorough knowledge of Part I. is quite sufficient for a pass, but those who aim at honours must attempt to translate a piece of continuous prose into French. For practice in this pupils may either proceed to Part II. of the "Oxford and Cambridge French Grammar," which is a syntax and exercise-book combined, or they may prefer Bertenshaw and Janau's "French Composition" (Longmans, 3s. 6d.), a most complete and excellent treatise on the subject, with notes and vocabularies to the exercises. In either case it will be necessary for the teacher to do some weeding, for the prose required is of a very simple and straightforward character. For reference no teacher or senior pupil can well afford to be without the "Wellington College French Grammar" (D. Nutt, 4s.).

A critical study of French Grammar papers of the standard of the Junior Locals impresses one with the idea that the examiners must have great difficulty in introducing any novelty into their questions. Plurals, feminines and verbs must be very strongly in evidence. The teacher cannot give too much drill on these three, and let him not forget, as sometimes happens, that there are regular verbs to be learnt as well as irregular. As for the other grammatical questions, they can almost all be answered by mastering a score of pages published under the title of "Jullien's Memorabilia" (Hachette, 6d.). This excellent little *résumé* contains nearly all the stock questions on which an examiner must fall back for nearly half the paper.

A.

(1) Translate into French:

(*a*) Will you kindly open the door for me?

(*b*) His father and mother gave him a gold watch.

(*c*) The stationer has sent the note-paper; have you seen it?

(*d*) You, John and I will go for a walk.

(2) Translate into French:

An elephant noticed that its keeper used to steal part of the oats intended (destinée) for its dinner, and that he made up for it by mixing in pebbles and earth. It pretended to take no notice, but waited until the man was cooking some meat for his own dinner. Then, in revenge, the elephant dropped a large quantity of cinders into the saucepan.

B.

(1) Translate into English:

J'étais bien aise de quitter Athènes de nuit: j'aurais eu trop de regret de m'éloigner de ses ruines à la lumière du soleil; au moins, comme Agar, je ne voyais point ce que je perdais pour toujours. Je mis la bride sur le cou de mon cheval, et je me laissai aller à mes réflexions; je fus, tout le chemin, occupé d'un rêve assez singulier. Je me figurais qu'on m'avait donné l'Attique en souveraineté. Je faisais publier dans toute l'Europe que quiconque était fatigué de révolutions et désirait trouver la paix, vint se consoler sur les ruines d'Athènes où je promettais repos et sûreté; j'ouvrais des chemins, je bâtissait des auberges, je préparais toutes sortes de commodités pour les voyageurs; j'achetais un port sur le golfe de Lépante, afin de rendre la traversée d'Otrante à Athènes plus courte et plus facile. . . . . En arrivant à Kératia, je sortis de mon songe, et je me retrouvai Gros-Jean comme devant.

(2) Give the feminine of—plein, doux, vieux, pareil, lui; and the plural of—noix, bétail, trou, travail, tout, moi.

(3) Give the French for—80, 206, ½, ¾, Jan. 1st, 1899, and "Vol. I. of Rousseau's Works."

(4) Compare bon, mauvais, mal, long.

(5) Write in full the imperfect indicative and present perfect indicative of "se réjouir."

(6) Give the 2nd singular future, 3rd plural present indicative, 3rd singular imperfect subjunctive and 1st plural preterite of—se tromper, aller, sortir, venir, vouloir.

C.

For those who offer "L'abbé Constantin" (pp. 1—50).

(1) Translate the following passages: (*a*) p. 10, ll. 6-18. (*b*) p. 18, l. 15—p. 19, l. 9. (*c*) p. 42, ll. 8-18.

(2) Write short notes on: vicaire, enchère, une heure de relevée, mise à prix, gentilhomme.

D.

For those who offer "La Mare au Diable" (pp. 1—15).

(1) Translate the following passages: (*a*) p. 2, ll. 12-23. (*b*) p. 9, ll. 16-24. (*c*) p. 12, ll. 24-29.

(2) Write short notes on métairie, à Dieu ne plaise, un peu mon parent, fardeau, lopin.

CORRESPONDENCE.

The Editors do not hold themselves responsible for the opinions expressed in letters which appear in these columns. As a rule, a letter criticising any article or review printed in The School World *will be submitted to the contributor before publication, so that the criticism and reply may appear together.*

The Teaching of History.

Mr. Johnson Evans' article on "The Teaching of History," in the January number of The School World, seems to me a pathetic example of misdirected energy. He is perfectly right in saying that "there is no subject which can more justly claim a due place in the school curriculum than history properly taught." But before any subject can be properly taught it is necessary to have a clear conception of the educational ends which that subject may serve. Mr. Johnson Evans' view of the educational value of history seems strangely "cabined and confined." "The subject of history" he says, "is government," and therefore "constitutional history will be the main subject" taught in our schools. What justification is there for these arbitrary statements? The subject of history is more than "government"; it is concerned with the whole life of a nation—constitutional, intellectual, religious and social. If one of these is to be preferred to the others it is certainly not the first. "Constitutional progress," says the historian of the English people, "is the result of social development," and social and intellectual development proceed "pari passu." It is totally unjustifiable to speak of history as being "mainly" concerned with any one of these. Even Mr. Herbert Spencer, who cannot be accused of undue partiality for the subject, takes a nobler view of history than Mr. Johnson Evans. "The thing it really concerns us to know," he says, "is the natural history of society." That is a great deal more than the history of "government."

But even such a view as Mr. Herbert Spencer's is nothing less than a degradation of one of the noblest subjects in the curricula of our schools. The subject of history is humanity. Only as so regarded can it fulfil its true function, which is to train the judgment of the student and to widen his mental vision. This view of history has been emphasised by far abler pens than mine. "From the study of history," says Bishop Stubbs, "we learn patience, tolerance, respect for conflicting views, equitable consideration for conscientious opposition." "From this study," says the Rev. R. H. Quick, "the pupil learns that there are higher interests in the world than his own business concerns, and nobler men than himself, or the best of his acquaintances." History can do more than "produce a sober-minded electorate"; it teaches its student "to do justly, to love mercy, and to walk humbly with his God." If these objects are to be attained, history must be taught largely as biography, and not by lectures on the growth of the English Constitution. The best history-lesson is concerned not with "shiremoots" and "synods," but with the lives of men and women. Only in this way can Locke's opinion of history be realised: "As nothing teaches, so nothing delights more than history."

If Mr. Johnson Evans' method were to be adopted, history, so far from being made, as he claims, "a more interesting as well as more valuable subject of school-study," would be regarded by the healthy school-boy instinct as a veritable valley of Ezekiel —"which was full of bones, . . . and lo! they were very dry."

Ernest S. Davies.

Grammar School, Cheltenham.
January 19th.

Reducing Mr. Davies' "arguments" to manageable terms, they amount to this: "The subject of history is Humanity, and is concerned with all sides of a nation's life, constitutional, intellectual, religious and social." It is difficult to state definitions of these four sides which shall not show them to overlap. Religion shapes for itself churches, which are States, *i.e.*, groups of men and women existing for the purpose of government. The "social side of a nation's life" is another way of saying its "constitutional life." Its "intellectual" life *as a nation* is absorbed in government. Man's intellect is undoubtedly employed in other subjects, *e.g.*, physical science and the fine arts. These are subjects apart, and should be called by other names than "history." "Biology," *e.g.*, has in these modern days dropped its old title of "natural history." We do not now include blood-showers, or instances of oxen speaking, as Livy did, in our text books of "history."

In so far as Mr. Davies' contention is not one only about names, he seems not to realise what "constitutional history" includes. By this phrase I understand the working out of all the social activities of a nation as such, religious, philanthropic, economic, &c. All these tend to become political, many of them are quite constantly so. Surely there is enough in the study of this, "to train the judgment of the student and to widen his mental vision." Nay, in my opinion, it will go far towards inducing a man to "do justly, to love mercy, and to walk humbly with his God." The bones *may* be dry: for those who can prophesy to the wind, they will live and stand on their feet, an exceeding great army!

Cambridge, January 25th.

A. J. Evans.

PRIZE COMPETITION.

Result of No. 1.—Most Popular Books in School Libraries.

Our first competition has been very successful and interesting. The twelve most popular books, in the order of their popularity, as judged by the number of votes received, are as follows:—

Boys' Books.

	Westward Ho!	Kingsley.
=	Robinson Crusoe	Defoe.
=	Tom Brown's Schooldays	Hughes.
=	Treasure Island	Stevenson.
	Ivanhoe	Scott.
=	King Solomon's Mines	Haggard.
=	Sherlock Holmes	Conan Doyle.
	Robbery Under Arms	Boldrewood.
	Eric, or Little by Little	Farrar.
=	Pickwick Papers	Dickens.
=	St. Winifred's	Farrar.
=	Prisoner of Zenda	Hope.

The five books which come next in order of popularity received the same number of votes; they are—Kingsley's "Hereward the Wake," Henty's "With Clive in India," Weyman's "A Gentleman of France," Kipling's "Jungle Books," and the "Arabian Nights." These are followed by Weyman's "Under the Red Robe," Dickens' "David Copperfield," and "Oliver Twist," Dumas' "The Three Musketeers," Blackmore's "Lorna Doone," Jules Verne's "Twenty thousand Leagues under the Sea," and "Swiss Family Robinson"—all with an equal popularity. Our first prize goes to

Percy S. Winter,
41, Surrey Street,
Norwich,

whose list, printed below, contains nine of the books given in the above result, the named books being in italics.

(1) *Tom Brown's Schooldays.*
(2) *King Solomon's Mines.*
(3) *Westward Ho!*
(4) Hereward the Wake.
(5) *Sherlock Holmes.*
(6) *Robinson Crusoe.*
(7) *St. Winifred's.*
(8) *Eric.*
(9) *Pickwick Papers.*
(10) Facing Death.
(11) The Three Midshipmen.
(12) *Ivanhoe.*

The second prize is divided between :—

J. E. Coates,
Sunny Side,
Oakamoor,
Stoke-on-Trent.

and

A. Fothergill,
New College,
Harrogate.

Each of these competitors named seven of the selected books. Their lists are printed below.

(1) *Treasure Island.*	(1) *Treasure Island.*
(2) *Tom Brown's Schooldays.*	(2) *Sherlock Holmes.*
(3) *Ivanhoe.*	(3) *King Solomon's Mines.*
(4) *Westward Ho!*	(4) Allan Quatermain.
(5) Allan Quatermain.	(5) Coral Island.
(6) *King Solomon's Mines.*	(6) Monte Cristo.
(7) *Robinson Crusoe.*	(7) *Prisoner of Zenda.*
(8) *Pickwick Papers.*	(8) *Westward Ho!*
(9) Boy's Own Paper.	(9) Hereward the Wake.
(10) Uncle Tom's Cabin.	(10) *St. Winifred's.*
(11) The Channings.	(11) With Cochrane, the Dauntless.
(12) Grimm's Fairy Tales.	(12) *Eric.*

Girls' Books.

The twelve books most popular among girls, arranged in the order of their popularity, are shown below. It will be noticed that four of these books also appear in the boys' list.

	Little Women and Good Wives	Alcott.
	Alice in Wonderland	Carroll.
	Little Lord Fauntleroy	Burnett.
=	Wide, Wide World	Wetherell.
=	Ivanhoe	Scott.
	Tom Brown's Schooldays	Hughes.
=	Daisy Chain	Yonge.
=	In the Golden Days	Lyall.
=	Misunderstood	Montgomery.
=	John Halifax	Craik.
=	Westward Ho !	Kingsley.
=	Robinson Crusoe	Defoe.

The books which just miss being placed on the final list, all with the same number of votes, are :—Weyman's "Gentleman of France," Hope's "Prisoner of Zenda," Coolidge's "What Katy did at School," and Stowe's "Uncle Tom's Cabin." These are followed by Ewing's "Story of a Short Life," and "Jackanapes," Stevenson's "Treasure Island," G. Eliot's "Mill on the Floss," Cummins' "Lamplighter," and the fairy-tales of Grimm and Anderson. Our first prize is awarded to

Caroline M. Hubble,
29, Prebend Gardens,
Chiswick,

whose list contains eight selected books, printed below in italics :—

(1) *Little Lord Fauntleroy.*	(7) *Westward Ho!*
(2) *Wide Wide World.*	(8) *Tom Brown's Schooldays.*
(3) *Alice in Wonderland.*	(9) *Robinson Crusoe.*
(4) *Ivanhoe.*	(10) Don Quixote.
(5) Old Curiosity Shop.	(11) Arabian Nights.
(6) *Little Women.*	(12) Treasure Island.

The second prize list contains seven selected books as shown below. This list was sent by

E. M. Baxter,
Mortimer House School,
Clifton,
Bristol.

(1) *Ivanhoe.*	(7) Donovan.
(2) Cranford.	(8) We Two.
(3) *Alice in Wonderland.*	(9) *Little Women.*
(4) Christmas Books.	(10) *John Halifax.*
(5) *In the Golden Days.*	(11) *Misunderstood.*
(6) A World of Girls.	(12) *The Daisy Chain.*

Competition No. 2.

The Most Popular School Subjects.

This month we offer four prizes of books, each of the published price of half-a-guinea, to be chosen from the catalogue of Messrs. Macmillan & Co., Ltd., for lists of the **eight most popular school subjects.** Two of these prizes will be given for lists of subjects most popular with boys, and two for lists of subjects most popular with girls.

Subjects in which distinct lessons are given must be chosen, *e.g.*, Arithmetic and Algebra are to be considered as two subjects, and should not be included under Mathematics; English grammar must not be included with English Literature under the name English; Chemistry, Physics, Botany, &c., should be mentioned separately and not placed together under Science. The same principle must be applied to other subjects. In awarding the prizes the order in which the subjects are named will be taken into account. Those subjects will be judged the most popular which are most frequently named in the replies received.

The list of subjects must be accompanied by the coupon printed on p. iv., and must reach the editors of THE SCHOOL WORLD, St. Martin's Street, London, W.C.. on or before Monday, February 27th, 1899.

OUR CHESS COLUMN.

No. 2.

THE prize for the competition of last month is awarded to

Miss Landon,
The College,
Cleobury Mortimer,
Salop.

The following also sent correct solutions :—H. Anderson, C. J. Barry, F. S. M. Beck, A. P. Candler, A. W. Hubble, F. E. Kendall, W. O'Kuffe, R. Pittman, A. D. Punchard, C. Thomas, E. O. Turner, H. Watkin, F. J. Welsh, and N. P. Wood. Several solutions were wrong owing to what appeared to be mere slips in writing down the moves, *e.g.*, one competitor begins with Kt—K6 (ch), after which he proceeds correctly. The correct solution is as follows (Black cannot mate in less than five moves) :—

WHITE.	BLACK.
1.	1. Kt—K7 (ch.)
2. K—R sq.	2. Kt—Kt6 (ch.)
3. P x Kt	3. R x B (ch.)
4. R x R	4. Q—R3 (ch.)
5. Q—KR5	5. Q x Q mate.
	or
4. K—R2	4. Q—R3 (ch.)
5. Q—KR5	5. Q x Q mate.

A very pretty end-game! A third solution is R x B (ch.), &c.

In the March number I hope to be able to give full particulars about the Inter-School Competition which I mentioned last month. Will secretaries please note that no entries can be received after the 28th inst.? There are, at present, seven entries.

I am frequently asked by young chess enthusiasts to recommend books from which to study the openings (and they must be studied, sooner or later). Before this year there has been no very suitable book for schoolboys, but I have every confidence in recommending one that has just appeared. The "B.C.M. Guide to the Openings" contains 178 games selected and arranged by "Hobart"; they are short, amusing games classified not merely under their different openings, but in an approximately analytical sequence. The price is 2s. 6d., and the publishers are Messrs. Trübner & Co., Charing Cross Road, London. The openings dealt with are:—Guioco Piano, Evans Gambit, Max Lange's Attack, Two Knights' Defence, Ruy Lopez, Scotch, Petroff Defence, Centre Gambit, Vienna, Allgaier, King's Gambit Declined, and French Defence.

Another chess accessory which I can heartily recommend is Messrs. De La Rue's Pocket Chess Board and Men—all made of cardboard, and not so cumbersome as the ordinary pocket chess. For long railway journeys, walks, etc., it is unsurpassable. Boys appreciate its small compass. A friend tells me that he had occasion to purloin one from two misguided Chessites who were utilising it during preparation one evening last term!

For our prize this month, I offer a copy of the "B.C.M. Guide to the Openings." Competitors must play the following game through:—

	White.	Black.
1.	P—K4	P—K3
2.	P—Q4	P—Q4
3.	P x P	P x P
4.	Kt—QB3	Kt—KB3
5.	Kt—B3	B—Q3
6.	B—Q3	Castles
7.	Castles	Kt—B3
8.	B—KKt5	Kt—K2
9.	B x Kt	P x B
10.	Kt—KR4	K—Kt2
11.	Q—R5	R—Rsq
12.	P—B4	P—B3
13.	R—B3	Kt—Kt3
14.	QR—KBsq	Q—B2
15.	Kt—K2	B—Q2
16.	Kt—Kt3	QR—KKtsq

White mates in six.

The prize will go to the boy or girl who points out the best way. No solution will be examined before the 28th inst., and, if several competitors are correct, the one whose postcard is examined first will receive the book.

Rules.

I.—Write on postcards only.
II.—Give name, date, and school address.
III.—Address all communications to

The Chess Editor,
The School World,
Messrs. Macmillan & Co.,
St. Martin's Street,
London, W.C.

CALENDAR.

[*Items for the March number Calendar should be sent in by February 28th.*]

February, 1899.

Saturday, 18th.—The Lord Mayor distributes the prizes of the National Association of French Masters in England.

Tuesday, 21st.—Society of Arts' Elementary Examinations about this time.
Open Competitive Examination for Junior Clerkships in the Ecclesiastical Commission.

Wednesday, 22nd.—Return Forms for 1st and 2nd Public Examinations for Women, Oxford.
Return Forms for General Examination, Society of Arts.

Friday, 24th.—Teachers' Guild, 1, Gordon Square, 8 p.m. Mr. A. T. Pollard on "The Relative Values of External and Internal School Examinations."

Monday, 27th.—Last day for Committees to return Forms for Examination of Society of Arts.

Tuesday, 28th.—Return Forms for Examinations of Irish Intermediate Education Board.
Last day for sending items for Calendar.

[During February the Preliminary Local Examinations of the Associated Board of R.A.M. and R.C.M. take place, and also the examination for Male Telegraph Learners.]

March.

Wednesday, 1st.—Return Forms for Responsions (Examinations for Women), Oxford.
Return Forms for L.L.A., St. Andrews.
Send in names for Entrance Examination, Newnham College, Cambridge.
Return Forms for Final Examination of Law Society.

Tuesday, 7th.—Professional Preliminary Examination, College of Preceptors, begins.

Wednesday, 8th.—External students for Science and Art Department Examinations must apply to Local Secretary.

Thursday, 9th.—Last day for entry for Lancashire County Council Scholarships.

Friday, 10th.—Last day for entrance for scholarships at Somerville College, Oxford.

Saturday, 11th.—Examination for Scholarships, Magdalene College, Cambridge.

Monday, 13th.—Return Forms for Preliminary Examinations and Bursaries, Glasgow University.
Send in names for Schoolmaster's Diploma, Edinburgh University.
Examinations of the Society of Arts begins.

Wednesday, 15th.—March Number of The School World published.

The School World.

A Monthly Magazine of Educational Work and Progress.

Editorial and Publishing Offices:
St. Martin's Street, London, W.C.

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The Editors will be glad to consider suitable articles, which, if not accepted, will be returned when the postage is prepaid.

All contributions must be accompanied by the name and address of the author, though not necessarily for publication.

The School World

A Monthly Magazine of Educational Work and Progress.

No. 3. MARCH, 1899. SIXPENCE.

COMMERCIAL EDUCATION IN SECONDARY SCHOOLS.

By Rev. W. H. Keeling, M.A.,
Head-Master of Bradford Grammar School.

THERE can be no doubt that there is at the present time a real demand for commercial education. From nearly the whole of England, but more particularly from our great centres of industry, the cry ascends continually. The parent who intends his son for a business career, the merchant who is on the look-out for young men of ability, and the Member of Parliament who is for ever anxious to find and to mend the flaws of our national institutions, all unite in a never-ceasing chorus—Give us commercial education.

Foreign Competitors and their Methods.

And what is the reason of this demand? A glance at the first newspaper will tell us. Scan the columns, and you will discover utterances to the effect that England now finds it difficult to compete in trade with her foreign rivals, that we are being undersold in our own colonies, that we are being ousted from the pre-eminent position that the Anglo-Saxon race has always maintained hitherto in the world of commerce. The same newspaper will inform you that our chief rivals are the Germans, and that the ground of their success is to be found in the excellence of their schools. English schools, we are told, are inferior to German schools. The decline of our commerce lies, in fact, at the door of the schoolmaster.

It is true that Mr. Gastrell's recently published report on the development of German trade from 1871 to 1898 hints at other causes of decline, such, for instance, as the superlative trouble taken by the Germans to master all the minutiæ of their businesses, the co-operation among the commercial classes for every kind of mercantile enterprise, and the fostering care of the Government. Many Englishmen would readily admit that these things are true of the Germans, and sadly wanting in England; and then, after the admission, would join once more in the common outcry against the English schoolmaster. It is necessary, then, for the schoolmaster to accept the situation. In his heart of hearts he may believe that the product of our English school system is, as a whole, superior physically, mentally, and morally to the product of the German school system, but it is useless for him to contend against a compact body of public opinion. Further, our commercial pre-eminence is a very vital matter to the nation; for, if England loses her commerce, she loses her financial strength, and, if she loses that, she loses at the same time much of her moral influence on the affairs of the world. It avails little to have a higher ideal of conduct, if we lack the means to enforce that higher ideal upon other nations. In view, then, of all that England may lose in losing her trade, the schoolmaster is bound to accept the decision of his fellow-countrymen, for fear lest, after all, they should turn out to be right, and he by his apathy and indifference should prove no inconsiderable factor in his country's ruin.

Early Examinations in Commercial Subjects.

In point of fact, many schools have for some time been doing their best to establish on sound lines a commercial curriculum. Several of our public examining bodies have also given their help by starting examinations in subjects chiefly commercial. The only examination of this kind of which I am able to speak from personal experience is the Commercial Certificate Examination of the Oxford and Cambridge Joint Board. The subjects, however, which the Board prescribed were too many, and the standard aimed at was too high. The Board seemed to be under the impression that the examination ought to rank for difficulty with the Higher Certificate examination, overlooking the fact that candidates for the latter remain at school till the age of eighteen, while candidates for the former wish to be already employed in business when they are sixteen. Any one who takes into account the probable age of a commercial candidate and then goes over the papers of the Oxford and Cambridge Commercial Certificate will see at once that in the department of language too much was asked for. It was not merely the writing of a simple letter in French and German that was wanted, but a very considerable knowledge of the French and German equivalents for the technical terms used in English warehouses and banks. To this was added French and German conversation. In English, too, the requirements were excessive. Not only was the

correspondence such as would put to the test a clerk of several years' experience, but questions were set which presumed a fair acquaintance with banking business, the operations of the Stock Exchange, shipping transactions, mercantile law, exchanges, and the abbreviations current in particular trades. On the top of this came a play of Shakespeare and a general knowledge of the main facts of English literature. Outside all these subjects stood Science, Mathematics, Geography and Book-keeping. Looking back to the days of that examination, I wonder how we managed to get our boys through. We did manage it, however, and loyally supported the Oxford and Cambridge Board year after year until it became evident from the abstention of nearly all other schools that the examination was a failure—an instrument of torture to masters and boys, and incapable of affording a means of true education. The Board dropped the examination. But their well-meant effort was not without result, inasmuch as it gave us a fair idea of the superior limit of a commercial curriculum, a limit beyond which the average boy of fifteen or sixteen cannot be raised without undue pressure.

Instruction and Education.

Turning to the consideration of the subjects that go to make up commercial education, we discover at once that there is a regular chaos of ideals. Nevertheless, it is agreed that the general education of boys intended for business must not be neglected. We shall do incalculable mischief if we make the boys specialise at too early an age. To me it appears that anything like a specific training in business routine should not be attempted before the age of sixteen, nor indeed am I of opinion that such specific training is one of the functions of a grammar school. And yet I think that a curriculum can be laid down of such a kind as to benefit very greatly a boy who is destined to a commercial career.

We must bear carefully in mind that instruction is not necessarily education, and that a knowledge of commercial technicalities is as nothing compared with high general intelligence. "The Germans," I am quoting from Mr. Bryce's speech at the opening of the Liverpool School of Commerce, "who have probed more deeply than anyone else the question of commercial education, attribute their success in business to their intellectual completeness and their general educational training, and trust more in their secondary schools than in anything else." To the authority of Mr. Bryce let me add that of Professor Jebb. "If there is any lesson which Germany teaches us more forcibly than another, as to this question of commercial and technical education, it is this, that the best expenditure of school time, with a view to a commercial or industrial calling, is to train the intelligence, and that for the training of the intelligence there are no better instruments than the study of languages, and those other literary studies which cultivate the imagination, improve the faculty of expression, and bestow that elasticity of mind by which the special knowledge needed for a special calling can be rapidly built up on the mental soil which has been properly prepared." This is wise counsel, and we must be guided by it in some measure, at any rate, if we wish to rear a new generation of merchants capable of extending and strengthening the commercial relations of England with the rest of the world.

What are Commercial Subjects?

My own feeling is that we must satisfy the popular outcry by introducing into our curriculum subjects that have a commercial bearing, and at the same time endeavour to teach them in such a way that they shall be really educative. In short, commercial instruction and general education must be blended as far as possible.

Languages.

French and German, and perhaps Spanish and Italian, should be taught. I do not mean, of course, that every boy should attempt the four languages. For the average boy under sixteen two of them would be work enough, but boys of exceptional ability might take them all. The grounding in these languages should be exceptionally sound. The grammar ought to be insisted on, for it must be remembered that many of the boys will have to converse and write in these languages. Pronunciation should be strictly attended to, and conversation practised. Commercial correspondence might be attempted, but not in such a way as to overtax the pupil. English originals might be given for translation into the foreign language, but the originals should be simple in expression, not overstrewn with technical phrases. Above all things, books should be read, so that the boys may be brought into touch with non-English ways of thinking, and discover that other nations beside our own have high ideals and generous feelings.

Geography and History.

Of the importance of geography there can be no doubt. It is highly useful to the man of business, and at the same time can be made a sound educative instrument. In close conjunction with geography stands history. The teaching of the two should be in continual sympathy. The *habitats* and the characteristics of the chief races of mankind, the physical conditions of all countries, their products and their needs, the famous centres of manufacture and distribution, the trade-routes of the world, the beginning and growth of European colonisation, the leading qualities and methods of our great commercial rivals—all these topics, and, I dare say, many others, should fall under the combined head of Geography and History. Nor would I omit the history of our native land, though I would have it taught in broad outline only, except when the relations between labour and capital come into question. The history of these relations should, I think, be treated in some detail,

though I cannot follow Mr. Bryce in recommending the study of economics. But doubtless he was referring to boys of a more advanced age than those I am considering.

ELEMENTARY SCIENCE.

Some elementary science must be included, not only as practically serviceable in many trades, but as training the mind to close and patient observation, as a constant object lesson in the connexion of cause and effect, and, above all, as arousing a spirit of wonder and enquiry. Its educative value disappears if it is regarded as the fashionable subject of the day, or the one sure road to fortune. It must be looked on as the "open sesame" of further knowledge, not as a magnet attracting gold.

MATHEMATICS.

Of the value, commercial and educative, of arithmetic, algebra, and Euclid there is no question, though two books of Euclid may be considered enough for a commercial pupil under sixteen. These will suffice to teach him how to state the facts of a case in consecutive order, and then draw the necessary conclusion.

OTHER SUBJECTS.

Shorthand should be taught, because it may prove of great use to a boy almost as soon as he leaves school. For the same reason I would admit Book-keeping, but only in an elementary form. It is waste of time to teach it in elaborate detail, as the majority of business houses employ methods peculiar to themselves.

Drawing and manual training should go together. They both educate the hand and the eye. Drawing, too, has a distinct value as an aid to a written explanation, while manual training enables a man to understand the work of a certain section of his *employés*, and, taken in conjunction with the superiority of his general education, puts him in a position to give sound advice to those *employés*, and to some extent protect his own interests when confided to their charge.

EDUCATIONAL VALUE OF ENGLISH.

So far, I have said nothing of English. I have reserved it for almost the last place, because I wish to insist upon its great educative benefit, and the necessity of keeping it purely educational. Here there must be no cramming—I had almost said, no examination. Let good books be read with a good teacher solely for the delight of reading them. Let the great masterpieces of our literature sink into the boys' minds, and charm, and purify, and ennoble them. In competent hands this is one way of making good men—men of lofty character and broad charity. Such men will not make bad clerks, manufacturers, and merchants.

Essay writing will be included. The subjects chosen must be well within the boys' grasp; a little attention will be necessary to get them to arrange their ideas in good order, but fluency of expression may be left to take care of itself, if only English literature is freely read.

With regard to commercial correspondence, I take the same ground here as in foreign languages. A little training in epistolary form may be given, but business terms should be sparingly introduced. They are not educative, and they are not necessary to boys under sixteen. Boys who leave school at that age do not go forth to conduct either the English or foreign correspondence of our mercantile houses. Some time must elapse before they rise to that. If they have ambition, they must educate themselves in this matter till their promotion comes. In the atmosphere of a commercial establishment they will easily correct any errors that such self-education may lead them into. It must be remembered, too, that there is an abundance of capital text-books on the subject.

GENERAL KNOWLEDGE.

There is a very desirable branch of commercial education which our schools can scarcely be expected to supply. I mean a general knowledge of our chief English manufactures. Here local manufacturers should come to our assistance, and afford ample opportunities for parties of schoolboys to inspect under competent guidance some of the processes used in their factories. Nor should the trades of the locality only be inspected. Boys should be taken to towns engaged in manufactures which they themselves are not likely to enter. Our future manufacturers will be all the better for knowing the methods, the difficulties, and the wants of their fellows. They will see opportunities of mutual assistance and co-operation, and discover many new possibilities of employing their own products.

Municipalities might also be asked to form trade-museums, the specimens in which might be lent to the local schools.

In conclusion, I should recommend strongly that all commercial boys go in for athletics, either in the form of cricket and football or gymnastics. Health and strength, a well-knit frame and a bright face, are no mean assistants in the struggle for existence.

Such is my idea of a commercial curriculum for boys under sixteen. There is little that is novel in it, much that I believe to be sound. Commercial instruction *per se* is not to be attempted up to the age specified, but commercial instruction, so far as it can be made auxiliary to a good general education, may be readily admitted.

Commercial Education in Belgium.—From the report of Mr. Raikes, the Secretary to H.M. Legation at Brussels, it appears that the Belgian Government has been taking active steps to promote commercial education in Belgium, with the result that in nearly all the principal cities in Belgium commercial schools have been founded. Four new professorships have also been created at the State universities of Ghent and Liège.

RE-CLASSIFICATION.

By F. E. Kitchener, M.A.,
Late Head-Master of the High School, Newcastle-under-Lyme.

By re-classification in this article is meant that modification of the old form system by which in a large school blocks of forms in which the boys are arranged according to proficiency in one subject, say Classics, are re-classified into sets according to proficiency in some other subject, say Mathematics. The necessity of its introduction into the smaller secondary schools has been of late brought into prominence by the increasing number of scholarships, offered both by governing bodies and County Councils, out of the elementary into secondary schools. The great difference between the subjects taught in primary and secondary schools produces a dislocation to which the elementary scholar, well prepared in some branches and entirely unprepared in others, must be sacrificed, unless he can be ranked in his new school according to his proficiency in each subject; and this can only be effected by a well-considered scheme of re-classification, the difficulty of which increases with the smallness of the school.

I propose to show how the "set" system was grafted on the old "form" system; to discuss its difficulties, and to conclude by describing a system of re-classification which I have myself found adaptable to a small school.

The relation between a boy and his form-master is one of supreme importance, not only to his growth in mind but in character. A form-master who does his work well becomes acquainted not only with his pupil's capacity and progress in the subjects he actually instructs him in, but he judges of his character, and he takes an all-round view of what he is fit for, balancing his capacity in one direction with his weakness in another.

In the old days, when positively only Latin and Greek were taught, the form system had its full chance; the boy was delivered over body and soul to the master whom he happened to be "up to," to use the old phrase. Of course there was a certain danger in the fact that a boy came in contact with one master and one only; all his eggs, so to speak, were in one basket; and if he and his master did not suit, no matter which was in fault, the boy's time for a year at least would infallibly be wasted. Hence in some measure arose the old "tutor" system, so that a boy might have two strings to his bow, and if he were doing nothing in school, he might find more congenial teaching in the pupil-room. As soon, however, as other subjects began to be treated as of importance, two difficulties came in; first, that the new master could not perhaps teach the new subjects, and had to import a stranger, and, secondly, that the boys, classified for the staple teaching of Classics, were of all capacities and incapacities in Mathematics, Modern Languages, &c.

Dr. Arnold it was who sought to incorporate at Rugby these subjects into the work of the school, an attempt which Dean Stanley characterises as "the first of its kind." He did his utmost to keep up the form system by getting these subjects taught by the regular form-masters; indeed, in the exceptional case where a master could not teach the subsidiary subject, he had to provide his substitute and pay him out of his own pocket. Doubtless the subject was taught less well by the classic than it would be now by a specialist, and Dr. Arnold soon saw that his plan was at best "the least bad." Discipline was not injured, even if the results of the teaching were poor.

The subordinate position these subjects took, when first they were tolerated, prevented the possibility of anything like re-classification being contemplated; but the motley proficiency of the large form of forty boys common to those days must have puzzled the teacher, whether he was form-master or foreigner.

In later days, to deal with the first of these difficulties, the specialist master was invented. To deal with the second, large blocks of four or more forms were redivided into sets or divisions for special subjects, and these sets handed over to specialists.

In the ideal arrangement, there must be as many specialists as sets in each subject, and the larger the block the more thorough the re-classification. If only two or three forms go to a block, then the highest and lowest sets must necessarily consist of boys of very varied attainments.

Hence such an arrangement can only be thoroughly carried out in large schools; and in the majority of schools, where the numbers lie between 50 and 150, the problem how far to re-classify is one of the most difficult for a head-master. In a small school there is probably only one specialist in each subject; if the school is *not* re-classified, it will be possible to make the specialist take successive forms in successive school periods in his own subject. Here, however, we have presumably the best teaching spoilt by the inequality of the form; but, on the other hand, if the school is re-classified, only one set of those taught contemporaneously can have the specialist, and the rest are dealt with by the ordinary master. The young principal will find himself sorely perplexed to say which of these two is the lesser evil, the inequality of the form or the want of speciality in the teacher.

Nor is this the only crux. The redivision of the block of boys into sets prevents any one set of boys having the form feeling which, however unequal, they would have so long as the same boys compose the set in each subject. Every new subject added to the curriculum has increased the danger of losing the old relation of boy and form-master; and form-masters are heard to declare that the arbitrariness of time-table prevents their ever seeing their boys. On the other hand, the eggs are no longer in one basket, and a cleverish boy, "mis-understood," or fancying himself so, in his form, is not wrecked altogether, and finds a temporary haven of appreciation with his mathematical or his science master.

Another difficulty is that we find the form itself no longer homogeneous; the intruding subjects have claimed a share in the mark system proportional to the time allowed to them; and the great differences between the boys in the same form in their non-form subjects gives them an influence in promotion out of all proportion to the value of the subject. Hence the right boys do not get taught together even in the staple subject of the school.

How can we reconcile these opposing forces? How can we avoid the Scylla of inequality without falling into the Charybdis of inferior teaching? How can we give set subjects their due value in raising a boy up the school without making the forms themselves unequal? If boys are to be promoted in forms by form-subjects only, how can we make boys believe that set subjects are worth working at? And how can we redistribute our boys to specialists without weakening the grip of the form-master on the boys?

It is in the compromising of these contending claims that the genius of the head-master is shown. Which is the less of two evils will depend on the circumstances of the case, and more than all on the personality of each member of the staff. There are men who can be safely trusted to teach all but the highest sets of a subject not specially their own, and teach it well. Thus, one of the best teachers of elementary mathematics I ever knew had taken no degree in mathematics; while there are other men excellent in their own subject who cannot go out of it without egregious failure. Each head-master must cut his classification according to the cloth of his staff.

Again, the circumstances of a school may make some system of re-classification a vital necessity.

The majority of fairly clever boys with scholarships out of the Elementary into the Secondary school naturally introduce a fresh problem. The new-comers are good at arithmetic, perhaps English, but ignorant of the rudiments of any other language. How are they to be assimilated in the new system? If the new school is ideally re-classified, it will be possible for them to enter in the lowest sets in each language, while still being placed on their merits in English and mathematics. Hence a school which depends to any considerable extent on such boys will find re-classification more vitally necessary than a similar school which depends entirely on secondary preparatory schools for its sources of supply.

We must, then, leave to each head-master to reclassify as much or as little as the size and circumstances of his school permit. No system will be ideally perfect; and, dissatisfied with the results of the time table which after weary hours he has produced, the head-master may often wish himself back in the præ-arnoldian days, when there was only one thing to teach, one master to teach it, and one invariable form to learn it.

I may, however, venture to suggest for criticism a system that I found possible in a school of say 150 boys, for which I claim that in all but the two highest forms (1) a new boy could be placed on entrance in a suitable set in each subject; (2) that the status of the form and the relation of boy and form-master was retained; (3) that promotion in each subject was independent even in form subjects.

The school consisted of seven forms. The boys in the lower five forms were re-classified for six different groups of subjects; each subject being taught as far as possible contemporaneously in the five or six sets of that subject.

Hence there were six different ladders up the school, one in each group, up to the top of this block of forms. A new boy could therefore be placed anywhere in each of these groups irrespective of the others. In one of the groups, the English and allied subjects, the set was dignified with the title of "form," and to the form-master was entrusted all the charges, independent of teaching, in relation to the boys in his form.

The combined marks of the various subjects were added together to form a Roll Order. This order had no effect on promotions except that the promotions into the upper school were determined by it. It may be thought that no attention would have been paid to the Roll Order by the boys, seeing that it was a merely paper order, not affecting the sets at all. On the contrary, I found there was considerable rivalry in roll order; and roll order was brought into prominence wherever practicable in the arrangement of forms, sets and in calling-over lists.

The combination of marks when a boy hailed from such varied sets seemed an almost insoluble problem; but I found the following plan brought out fairly satisfactory results. A certain number of marks were assigned to each set in the ordinary way; then, in calculating roll order, each group of subjects was marked from the bottom; the lowest or first set marks remained unchanged; the marks of the lowest boy but one of the second set were equated to the marks of the highest but one of the first set—and so on all the way up. In this way the marks of all the groups were determined, and finally all added together to form the Roll Order.

The calculation was a little complicated; but, as it was very instructive in bringing before me the progress of each boy in each group, I did not think it waste of time to personally work it out with a secretary's help. I must admit that none of the boys, and indeed few of the masters, knew how the result was got at, but the boys had the most loyal confidence in the correctness of my arithmetic. I never allowed it to be overhauled, and thus its infallibility was established, for it was never *known* to be wrong.

The boys in the Upper School, consisting of two forms only, were re-classified on the same principle with two or three sets in each group, and a similar roll order made out. The novelty in this system was the largeness of the block dealt with in proportion to the size of the School, and the stimulus of a Roll Order which hardly affected promotions at all, but yet showed plainly for "character" purposes whether a boy was holding his own with others, or going up or going down.

The difficulty of the system was, of course, that of providing sufficient numbers of men to take all the sets contemporaneously in such subjects as French or mathematics. Each set, at any rate, was level, and required no subdivision into divisions; hence there was every chance for a good teacher. As, however, so many shared the teaching in each subject, it was all the more necessary for meetings from time to time of the teachers in each group to modify the standards attainable in each set, and to prevent the creeping in of a diversity of method likely to produce confusion and delay progress.

I should be interested to hear whether the same plan has been tried elsewhere, and, if so, with what results.

THE SCHOOLS OF PUBLIC MEN.

II.—Dignitaries of the Church.

THE present investigation is concerned only with ecclesiastical dignitaries properly so called, viz., those holding rank above that of canon or priest. Consequently, clergymen of eminence in academic, literary and other departments are outside our immediate scope. Any classification beyond these bounds promises to prove arbitrary, and hence unsatisfactory. Our field is therefore more restricted than when in a former article we considered what were the schools which had the largest share in educating the members of our House of Commons. Nevertheless, we are at once impressed by discovering how large and representative is the number of schools which have given us our Church leaders. There is scarcely a county but contributes its quota. Of 181 dignitaries, the schools of 117, or roughly two-thirds, have been ascertained. These 117 represent as many as 52 different schools. Yet Eton, Winchester, and Rugby supplied more than a fourth of the whole.

Eton is again *facile princeps* with a contribution of 14. Seven of these are Bishops or Suffragans, viz., Bath and Wells, Chichester, Colchester, Guildford, Lichfield, Liverpool, Marlborough. A school which gives us impartially his lordship of Lichfield (Dr. Legge) and his lordship of Liverpool (Dr. Ryle) can scarcely be accused of supplying the world with stereotyped wares. Eton is responsible for at least 12 per cent. of the occupants of the episcopal bench. Foremost in the State, Eton is also foremost in the Church. *Floreat Etona.*

Winchester and **Rugby** come next with 9 names each. The former furnishes 5 bishops, the latter 3. Winchester's bishops are their lordships of Newcastle, Salisbury, Southwark, Southwell, and Truro. Bishop Yeatman-Biggs (Southwark) played in the Winchester football six for the commoners, and shot two years in the eleven at Wimbledon. Bishop Ridding (Southwell) was a distinguished Head-master of his old school from 1868-84. To Rugby we are indebted for the Bishops of Chester (Dr. Jayne), Derby, and Shrewsbury. Thence also comes Dean Bradley, of Westminster, for ever associated, we trust not unprofitably, with the intricacies of Latin prose.

Five schools have a close run for the fourth place. **Charterhouse** and **Cheltenham** are equal with 6 names each. Then follow—**Harrow** (5), **Marlborough** (4), **Shrewsbury** (4). These five and the preceding three — eight great public schools in all—furnish half the total of 117. Cheltenham and Charterhouse are each represented by one bishop. The Bishops of Peterborough and Winchester are old Harrovians. The Suffragans of Richmond and Stepney are old Marlburians. We look in vain for Shrewsbury's episcopal representative.

There are three Church Dignitaries to each of the three Schools—St. Paul's, Manchester Grammar School, and King William's College, Isle of Man.

The distinguished *alumni* of this last are Archdeacons Gill and Wilson, and—most distinguished of all perhaps—Dean Farrar, of Canterbury. The contribution of King William's is especially noteworthy in view of its position of comparative isolation.

The following are represented by two names each :—Durham Grammar School; Magdalen College School, Oxford; Merchant Taylors'; Oakham Grammar School; Repton; Ripon Grammar School; Royal Institution School, Liverpool; St. Peter's School, York. Archdeacon Sinclair, of London, is an *alumnus* of Repton. The Bishop of Oxford and the late Dean Pigou, of Bristol, were educated at Ripon Grammar School.

Among over 30 schools contributing but one name each we notice with some surprise Westminster, City of London, and Christ's Hospital. We are even more surprised at the entire absence from our list of University College School. Does this indicate that in the matter of supplying men the metropolis is scarcely a bulwark of the Church?

To Durham Grammar School we owe the Bishop of London (Dr. Creighton), to Appleby Grammar School the Bishop of Hereford, to Richmond School (Yorks) the Bishop of Wakefield, to Norwich Grammar School the Bishop of Worcester, to Newark Grammar School Dean Hole, to St. Michael-le-Pole School, Dublin, Dean Lefroy. We are particularly impressed by the services rendered to the Church by the northern Grammar Schools.

There is a consideration or two necessary if we would preserve the balance of our judgment and save it from the seductive evils of hasty generalisations drawn from statistics. For instance, Blundell's School, Tiverton, provides us with but one Church dignitary—but then he is Dr. Temple and His Grace the Archbishop of Canterbury. Again, from a school in Edinburgh—the name is not given—we are furnished with Dr. Maclagan, Archbishop of York. It is significant that neither of our primates is a product of our greater public schools.

ON THE EARLY TEACHING OF FRENCH.

By PROFESSOR WALTER RIPPMANN, M.A.

THE CHOICE OF A VOCABULARY FOR YOUNG BEGINNERS.

V.

THOSE writers of "First French Books" who follow the grammatical method have, as a rule, given very little attention to the vocabulary with which a beginner should be furnished. They have allowed the rules which they wanted to impress to suggest the words supplied in any particular "exercise"; a word might be very rare, still if it was an "exception" the children had to learn it there and then. In the natural course of events they would have forgotten such words almost immediately; but they were warned that *œils de bœuf*, *travails*, *hébraïque*, *coite*, and the rest would appear in examination papers —if nowhere else. And so this "drill" has gone on, year after year; the children degraded to machines, the teacher to an instructor.

In a few books of this kind we find the attempt made to introduce some sort of classification (articles of clothing, animals, etc.); but the words appear in lists, and are not introduced naturally.

There is one teacher who has given very great attention to the question, and has attacked the problem with a thoroughness which will always render his name remarkable in the history of modern-language teaching: I mean François Gouin. It is not my intention to give an account of his work and to point out its merits; that has been admirably done by my friend Dr. Kron.[1] I shall content myself with saying that no teacher can read Gouin's book[2] without feeling a debt of gratitude for a number of valuable suggestions, and without admiration for his skill and industry. For years he remained unknown in England; it was mainly the *Review of Reviews* which introduced his work among us. The series system has been developed by Messrs. Bétis and Swan; they call theirs the "psychological method," and an explanation of it appears in the first volume of their English series ("Children's Life").

Now there are many points in which their "instructions" call for criticism; thus the section on "pronunciation" is hopelessly wrong, and the exclusion of pictures in favour of "visualisation" is unfortunate; but I shall confine myself to the fundamental fallacy which vitiates the method of Gouin as well as that of his successors.

The series system is emphatically *not* "psychological."[3] The arrangement of objects in nature is not the same as their association in the human mind. Gouin classifies all things; he photographs the world, and sets down every detail with the most painstaking accuracy; by means of "*actions*" he then forms them into series. That is the way to compile an encyclopædia; very different from the manner in which a human being acquires a language. Gouin regards the mind as a blank tablet, on which the series are inscribed; or as a huge set of pigeon-holes which he proceeds to fill one after the other.

But the mind is a living thing, ever developing; with a world of ideas grouped in many ways. It is perilous to ignore what already lies there; profitable to connect the new with the old. Moreover, in order to make the connection lasting, it does not suffice to make it once only. We have at our command only those departments of our knowledge in which we are at home. If we visit them rarely, they become vague and indistinct; they may disappear altogether.

This at once shows the danger of wishing to furnish the beginner with an exhaustive vocabulary. The poor child is taken into the garden; it would be quite content to know the foreign names of the flowers with which it has long been familiar. The relentless instructor comes and supplies four times as many names; some the child may have heard of in its mother tongue, many are quite new, and call up no associations in the mind. The memory is unduly strained for the time being; in the end the words fade away, for lack of repeated impressions. The effort has been wasted, and the little learner wearied and discouraged; for he ascribes to his "bad memory" what is really due to faulty teaching.

VI.

There is no royal road to the acquisition of a good vocabulary; it must be a slow progress. But the above considerations will suggest two means that will help us on the way: the association of ideas and the repetition of impressions.

The second of these simply requires perseverance on the part of the teacher; he must introduce the same words again and again, but at the same time avoid monotony. When a new word appears, he will not let it stand by itself, but immediately enable the children to associate it with what has gone before, whether it be by leading them to notice similarity of meaning, or of form, or both.

In what way should the vocabulary be taught? We have seen that we must not endeavour to make it exhaustive; what principle is to guide us in our selection of words? We must have constant association of ideas; how is this to be achieved?

Here I must remind my readers that we are dealing neither with the teaching of adults, nor with the teaching of individual children.

The adult is bored by what will deeply interest a child. When we have to teach one who has a fully developed mind, we may very well adopt the plan of introducing him at once to the life and ways of the foreign nation whose language he is learning. The path along which we may then proceed has to some extent been mapped out; for

[1] Die Methode Gouin oder das Seriensystem in Theorie und Praxis. (Marburg: Elwert, 1896.) Price 2 m.
[2] "L'art d'Enseigner et d'Etudier les Langues." Paris. 1880.
[3] Compare Sallwurk's excellent book: "Funf Kapitel vom Erlernen fremder Sprachen," pp. 38 and foll. Berlin. 1898.

instance, by Dr. Findlay[1] and by Professor Spencer.[2]

In dealing with a single child we can adopt what is really the ideal method: to let everything centre round the child itself. We can supply it with the words it immediately requires; we can study its individuality, and arrange our materials accordingly. Our success will be rapid, if sympathy unites the teacher and the taught; but how to succeed cannot be suggested by "instructions," for the road taken will depend on the nature of the child.

The problem becomes more difficult when the teacher has to deal with a class. Here it is impossible to favour one particular child, or to set him before the others as typical. We have to develope the personality of every child without distinction.

What we have to teach first is the common words of every-day life. Healthy children in simple families are very much the same throughout the civilised world; they get up and go to bed at the same time, eat the same food, play the same games, and have the same joys and sorrows. Tell them a tale of child-life, with not a single incident that would arouse their attention if they were ten years older; they will listen intently, and their eyes, now sparkling, now sad, will show how eagerly they are following the ups and downs of the little people in your simple story.

And if we teach these common words, not mentioning each on one occasion only, but by dint of varied repetition giving the children a strong grip of them, we shall prepare our pupils in the speediest way not only for ordinary conversation, but for the reading of books. Take the child that is just beginning to read books in its mother tongue; ascertain how many words it knows. You will be amazed how few they are. Does it throw aside its books, hopeless at seeing so many new words? No, it reads on, and the new words give but little trouble. Most of them are explained by the context when they first appear, some become clear when they have occurred two or three times, and occasionally mother will be asked to say what it means. Now I do not for a moment wish to imply that a foreign language could or should be learnt in exactly the same way as the mother tongue; the idea of a "natural" method has led to many an absurdity. What I do desire to point out is the importance of a ready command of the common words of every-day life.

Let no other consideration make us uncertain in the selection of a suitable vocabulary for the young beginner. It has been suggested, for instance, that it would be a help to begin with words which are alike in form in the mother tongue and in the foreign language. It is obvious that this would be possible in teaching German; for our common words are largely Teutonic. If, however, we take French, it would be hard to carry out this suggestion; for—again speaking roughly—the words taken from the Romance languages denote abstract ideas, at any rate not common things. There is a further objection: we have to teach a good pronunciation at the very beginning; and where the sounds of words are similar, there is a great danger of their becoming identical, the foreign word being made to correspond to the English one.

Having determined which kind of vocabulary it is best to teach, we look about for the most convenient way of supplying it. Here we may best be guided by the experience of continental teachers, who have recognised the value of pictures for the first instruction in modern languages. Some of these teachers have no doubt gone too far, and unduly postponed the reading of fairy tales, fables, &c.; but almost all are agreed that pictures are singularly suited for class-work. There would be little gain if I enumerated here all the books and pamphlets which support this view; but they would give sufficient evidence for my opinion that, of the many pictures which have been used for this purpose, the series issued by Hölzel (Vienna)[1] is the most suitable.

We shall consider, in the following articles, how these are to be used, so that the children may take a real interest in them; how we can build up a simple vocabulary, and how the simple rules of grammar are to be taught.

From the numerous letters which have been sent me, I single out a few points of general interest.

I have been asked whether it is possible to effect a compromise—viz., to teach according to the method here described at first, then to revert to the translation method, and then again to take up the New Method with an advanced class of boys intended for a commercial career. Undoubtedly this is perfectly feasible; indeed, it is the only course that can be recommended, as long as young pupils are prepared for public examinations and these examinations retain their present form. But adopt the New Method at least for the first two years; no child ought to be harassed with examinations at this early stage. Then pass over to the translation method; have the courage to select unseen translation rather than a set book, where you have the choice, and you will be surprised how much less trouble the children will experience than after two years of the grammatical method.

M. Petilleau has very kindly sent me a copy of *Le Français*, containing an amusing article by him on "Les écoles non-préparatoires." He complains that nine-tenths of the boys, from thirteen to fifteen years of age, admitted to our public schools are incapable of conjugating the French auxiliary verbs, and have a shocking pronunciation. He sees the reason of this in the very small number of Frenchmen teaching in the preparatory schools. I have already stated what position I take up in

[1] "Preparations for Instruction in English on a Direct Method." (Marburg: Elwert. 1893.)

[2] "Chapters on the Aims and Practice of Teaching." (Cambridge University Press. 1897.)

[1] The London agents for the sale of these pictures are Messrs. Hachette & Co., from whom prospectuses can be obtained. They can be had in two sizes.

this matter. I do not consider that a man must needs be a competent teacher of English children because he knows his own language, nor do I doubt that there are, or soon will be, plenty of English teachers able to teach French and German with good results. The reason is to be sought elsewhere: it is the dry-as-dust method which has robbed the early teaching of French of all interest for master as well as for pupil, until both have come to regard it as drudgery. But that method will be retained as long as the examination papers for entrance into our public schools encourage it. When these have made a definite change of front, the preparatory schools will follow suit; it will be possible to introduce better methods. The results will be more satisfactory, and the teaching in our public schools will rest on a sound basis.

It has been said that the New Method involves excessive strain on the teacher. No doubt it is easier to pursue the beaten track of the conventional methods; but no teacher who has made an honest attempt to teach on the new lines is likely to regret the old days, when he sees the change that has come over his classes. It is hard work, but it is stimulating and fruitful.

THE TEACHING OF ALGEBRA.

By G. B. MATHEWS, M.A., F.R.S.

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A SYLLABUS OF ELEMENTARY ALGEBRA.

III.

IT was the intention of my last article to show, by a typical case, how the laws of arithmetic may be generalised into the laws of algebra. I shall not go any further in this direction, because the space at my disposal is limited, and it is possible to refer to Professor Chrystal's recently-published "Introduction to Algebra," which is undoubtedly the best elementary text-book that has yet appeared in English. I propose now to give a syllabus of the subjects which I think ought to make up an elementary course, followed by a few remarks about the inclusion or exclusion of particular items.

(i.) The rudiments of symbolical notation, illustrated by the construction and use of formulæ in mensuration, physics, &c.

(ii). Linear equations in one or more variables with rational numerical coefficients, and problems leading to them.

(iii.) The fundamental laws of operation, with proofs of the arithmetical cases. Sign. The use of sign to indicate "sense," or polarity, of steps (that is, displacements or vectors), angles, areas, forces, couples, and other concrete quantities. Rectangular co-ordinates. The graphical representation of rational functions of one variable.

(iv.) The elementary theory of whole functions of one variable, that is, expressions of the form $f(x) = a + bx + \ldots + lx^n$, when $a, b \ldots l$ are whole numbers, and n is a positive integer. This includes (1) the notion of degree; (2) the resolution (by inspection or trial) of functions such as $f(x)$ into the product of irreducible whole factors; (3) the solution of quadratic (or higher) equations with rational roots; (4) the use of "division" to establish the identity $mF(x) = f(x)\phi(x) + \chi(x)$, where $F(x), f(x)$ are given whole functions, such that the degree of $f(x)$ does not exceed that of $F(x)$, and the degree of $\chi(x)$ is to be less than that of $f(x)$ (m is an integer); (5) the "remainder theorem," which is a particular case of the last; (6) the construction of a table for the coefficients of $(1 + x)^n$ where n is a positive integer; (7) extension of the whole theory to homogeneous functions of two variables such as $ax^n + bx^{n-1}y + cx^{n-2}y^2 + \ldots + kxy^{n-1} + ly^n$.

(v.) Method of detached coefficients. Approximations; and, in particular, the theorem that if $y^n = (1 + x)^m$ and x is a small proper fraction, then $y = 1 + \frac{m}{n}x$ nearly. Scales of notation.

(vi.) Rules for finding the whole function of highest degree which is a factor common to two given whole functions $f(x)$, $F(x)$. Least common multiple (in a similar sense.)

(vii.) Rational functions of one variable with rational numerical co-efficients. Reduction of any such function to the standard form $mf(x)/nF(x)$ where m,n are whole numbers, $f(x),F(x)$ are whole functions, and $mf(x)$ is prime to $nF(x)$. Elementary theory of partial fractions. Extension to homogeneous functions in two variables.

(viii.) Outline of the theory of whole and rational functions of two variables, and of similar homogeneous functions of three variables, with selected illustrations. Notions of dimension, symmetry, cyclical order. Rudiments of the theory of symmetric functions of two or more quantities.

(ix.) Determinants of the second and third orders, with applications.

(x.) General resolution of $ax^2 + bx + c$ and $ax^2 + bxy + cy^2$ into linear factors. This leads to the two next items.

(xi.) Arithmetical theory of real quadratic surds. Theory of the numbers $x + y\sqrt{\theta}$ where x,y are rational and $\sqrt{\theta}$ is a given quadratic surd.

(xii.) Elementary theory of complex numbers ($x+yi$, with $i^2=-1$, and x,y real). Argand's diagram. Definition of norm, modulus, argument, and the theorems connected with them. Geometrical applications.

(xiii.) Quadratic equations in one variable. System of a linear equation and a quadratic equation in two variables. Easy numerical cases of two simultaneous quadratics. Outlines of the theory of sets of simultaneous equations, mainly consisting of illustrations. Equations with literal coefficients.

To these may be added

(α) Arithmetical progression.

(β) Geometrical progression for a finite number of terms.

(γ) The elementary theory of permutations and combinations.

Of these (β) properly comes under (iv.); (α) belongs more to arithmetic than algebra; (γ) is not algebra at all. But the three items have this in common, that they practise a boy in what may be called generalised counting, and give him very valuable illustrations of inductive methods.

Such is, in brief, my notion of a course in elementary algebra "up to quadratic equations." It is somewhat revolutionary, and I do not suppose that it is at all likely to be adopted straightway. On the one hand, it includes complex numbers and determinants; on the other, it excludes the general theory of surds and indices, infinite series, finite summations (with two exceptions), and the theory of logarithms. Such things as ratio, proportion, and variation may, of course, be inserted in the scheme, and I do not wish to exclude them; but they are mere matters of detail, and do not require special enumeration. Again, a boy should be taught how to use a four-figure table of logarithms, and if possible a sliding-rule as well; but there is no need to make a premature attempt to teach him the theory of either.

Under (iv.) in the syllabus I have tried to indicate the right way of regarding "division" and "factors." The object of division, in algebra, is that stated, and by no means (as too often said) to find out "how many times" one expression goes into another. Again, to factorise an expression has no definite meaning whatever unless a proper restriction is put upon the nature of the factors. On these points Professor Chrystal's book may be consulted: if occasion offers I may perhaps return to them again, as well as to the important idea of "rationality," about which little or nothing is said in the books.

(viii.) is, of course, capable of indefinite enlargement, and the teacher must decide for himself how far he is to go. The books, as a rule, give *no* theory, and include in their examples things of no real value. For instance, there is that venerable antique $a^3+b^3+c^3-3abc$. This has been a godsend to examiners, but what is its real interest? So far as I know, it is in relation to the theory of cubic curves, and (in a less degree) in relation to the theory of numbers. Neither subject appeals to the elementary student, and in each case the interest lies in the fact that $a^3+b^3+c^3-3abc$ is resolvable into three linear factors, involving complex cube roots of unity.

To (iii.) might very well be added the elementary algebra of vectors, which is by no means a difficult subject to teach; and (ix.) might also include the rudiments of Grassmann's alternate algebra. In each case an English book is available (Kelland and Tait's "Elements of Quaternions," and R. F. Scott's "Treatise on Determinants"), and only one copy (for the teacher's use) is necessary.

The items of the syllabus have been arranged in what seems to me to be their natural order; it is not necessary or desirable to exhaust each before going on to the next. Every teacher must be aware of the advantage of regular repetition, adding a little from time to time on the lines of what has been already done.

In my next, and (I hope) concluding paper I shall put together, for the consideration of my readers, a few general remarks on method.

ON THE TEACHING OF HISTORY.

By A. Johnson Evans, M.A.

III.—Normans and Angevins.

MOST text-books adopt the chronological order of events. Perhaps, on the whole, in mere collections of facts, this is best. But the teacher of children should not be content to follow this order in class. It makes the task of committing the facts to memory much more difficult than it need be. *Separate separables.* Divide the matter topically.

For example, take the 12th century in English history. We have at least four distinct topics. Firstly, and least important, is the purely **family history of the kings** who ruled this country. Their home was abroad, either in Normandy or Anjou. Their quarrels make a simple story well within the understanding of school children. Study historical maps, and remember that the then kings of the French were but humble folk.

Secondly, there are the attempts, more or less fitful, of our foreign kings to **obtain control over the whole island and its western neighbour.** Tell pupils to write down what they can find about (*a*) Wales, (*b*) Scotland, (*c*) Ireland. The information thus grouped will serve as introduction to later developments.

These minor matters being cleared away, we are prepared to study English history properly so called. There are no wars. *England* was never at war with any country till the reign of Edward III.

We have, therefore, thirdly, the constitutional history of the time. We may summarise that history thus: William I. strengthened and modified the previous form of government. William II. abused the system of his father. Henry I. restored his father's methods. Stephen let all go. Henry II. built up again, and carried the development some stages further.

What is a jury? What happens now-a-days between the committal of a burglar to the assizes and the well-known trial before judge and jury? What is an assize? Such are some of the questions which it would be well to have clearly answered in the mind before introducing Henry II.'s reforms to a class of boys or girls.

There is such a mass of information to be given *àpropos* of the Angevin constitution that it would be well to group it. I know no better method than to think of a shire-moot, its presi-

dents, its functions as a court, as an army, as an instrument of taxation, and to group the facts about these as nuclei.

A formula which serves to define the importance of the Angevin period is this: The old English system was strong in **local** government, the Norman in **central** government; the Angevin coupled the central government of the Norman with the local government of the old English. Out of the union developed the Angevin shire-moot, with its itinerant justice, its great lords and its *representatives* of the districts. Think of the importance of the last word italicised, and thus see in this shire-moot the germ of the later Parliaments.

Fourthly, when we have understood the new developments of the **Common law** under Henry II., and see something of their working in his reign and that of Richard I.'s, when we have realised the strong royal justice which had begun to be administered throughout the realm, then we are in a position to understand the conflict which this system maintained with its rival the **Canon law**, or law-system of the Christian Church.

In pre-Norman days, Church and State had worked harmoniously together, unaware of the radical opposition between their principles and claims. Like the parties to the Chancery suit of "Bleak House," they ignored the rivalries which were supposed to exist between them.

But the Hildebrandine movement had waked the Church from its slumber, and when the reforming ideas had reached England with the Normans, Church courts must needs be erected where Canon law was administered, leaving Common law to be administered in the shire-moots.

Both Church and State made universal claims on the obedience of their subjects. Before long, conflict must needs break out between the rival claimants. No man can serve two masters. Our English quarrels are but pale reflections of the warfare in Germany and Italy, where Popes and Emperors were deposing one another. Read the story in Milman's "Latin Christianity" (but neglect the bias of the writer), or in Bryce's "Holy Roman Empire," or in the volumes by Stephens and Balzani in Messrs. Longmans' "Epochs of Church History" series.

The best way to introduce the subject to boys and girls is the biographical. Get them to have clear notions of Lanfranc, Anselm, Theobald, and Thomas Becket, archbishops of Canterbury—so clear, that is, that they cannot possibly be confused.

Lanfranc, the personal friend of the Conqueror, therefore no quarrel in his days. The problems that must needs arise are postponed. Anselm, the old sheep, coupled with the young bull, William II., till he went to Rome for consolation and quiet. Then the new Anselm, converted to high Hildebrandism, astonishing his would-be friend, Henry I., with views which almost make Church and State incompatible, but finally compromising the "quarrel of investitures."

Theobald, archbishop in Stephen's reign, under whom the clergy had to keep what order they could, for there was no State, only anarchy.

Becket, Henry II.'s chancellor, head of the lay adminstration, seeing clearly the inherent rivalry of the two systems, and therefore warning his master of the hatred that was to come. Henry II. would not heed, and the quarrel arose on the question of jurisdiction over criminous clerks. Dr. Maitland has been teaching us lately (in the *English Historical Review*) what was the exact point over which king and archbishop quarrelled. Note the difficulty of the crisis. When Church and State quarrel in the persons of their respective chiefs, who or what is to decide? In days before men have learned to legislate, when law is "what lies," not what is "laid down," the appeal is to what "was said by them of old time." Hence the Constitutions of Clarendon, a report of a royal commission, as we should say, as to the "customs of the realm." When Becket refused to assent to these, the quarrel loses its constitutional interest, and for six years (1164-70) becomes merged in the history of the royal family and the quarrels with the King of France.

But Becket was no "turbulent priest," any more than his mother was a Saracen, or his father a Crusader. He and Henry were but the incarnations of two hostile systems whose conflicts are not yet at an end. Which things are Cæsar's, which are God's?

Thomas of Canterbury was canonised shortly after his death. The story is told that when Henry VIII. was breaking the English clergy into submission, S. Thomas was summoned to appear before a court for having broken the Statute of Præmunire, and was condemned—to lose his Saintship. His shrine was disestablished and disendowed among many other things at that time.

Keep in mind that all the relations of Church and State between the Norman Conquest and Henry VIII.'s breach with Rome form but one continuous story, and, for older scholars at least, should be treated together.

The Modern Language Teacher. — The Modern Language teacher must not only be a well-trained scholar, but in addition something of an artist and of a man of the world. He must have the power of speech, an easy mastery of the foreign idiom, and the gift of drawing out his pupils, and of making them speak, one and all, the shy ones no less than the others, at every lesson. He must have—more, I think, than any other master—the great gift of readily imparting his knowledge, of really interesting his pupils in using the foreign idiom, and in studying foreign life and thought, and of enabling them not only to *speak*, but to *think* in the foreign language. I fully agree with Dr. Münch, who, at the general meeting of German Modern Language teachers held at Hamburg in 1896, insisted that "a teacher should have a certain amount of natural eloquence, quickness of perception, and appreciation of foreign character, as well as an interest in all that concerns modern life."—Dr. Karl Breul, Cambridge University Lecturer in German. "The Teaching of Modern Foreign Languages" (Cambridge University Press).

PHYSIOGNOMICAL SIGNS, INDICATING NORMAL OR SUB-NORMAL DEVELOPMENT IN BOYS AND GIRLS.

By Francis Warner, M.D. (Lond.), F.R.C.P.

III.

Physiognomy. Having described in former articles certain general characters in movement and points for observation indicating the brain condition of boys and girls, it may be useful to consider the relation of physiognomy to the brain state of the individual.

Lavater's works are well known to all. In looking through the literature of the older writers on physiognomy and expression, it is not surprising to find that they failed to appreciate the causal connection between their observations and co-existing mental status. Sir Charles Bell, in his "Anatomy and Philosophy of Expression," marks the epoch (1844) when an intelligent knowledge of physiology afforded explanation that the central nerve-system—the brain—is the physiological seat of expression, of mental action and of all co-ordinated movement. Charles Darwin's later book on "Expression in Man and Animals" is one of the most interesting and lucid works on the subject from the point of view of evolution. Earlier writers appear to have apprehended some dim connection between physiognomy and expression: this is seen in John Bulwer's "Natural Language of the Hand," 1644; while authors on Art have described the body and expression as they saw them, without co-relating such points and mental status. I shall refer to the connection between physiognomical signs and the status of the child in dealing with problems concerning childhood in the next article.

Physiognomy depends upon proportion in individual parts of the body and separate features, and on their relations to one another. It will be shown that a well-proportioned child generally has a well-balanced nerve-system, good in movement and in mental action; while the child, especially a girl, who has ill-proportioned head and features is apt to acquire sub-normal nerve-signs and low health.

The observation of a child's head includes its size or volume, its form and to some extent the condition of the bones of the skull. The head may be observed full face by carrying your eyes from one ear over the top of the head to the other ear, noting its outline; then look across the head and face, from one cheek-bone to the other: next, take a profile view, carrying your eyes from the bridge of the nose up the forehead, over the top of the head and down to the neck. The circumference at the largest part may be taken with a measuring tape, or by practice a very fair estimate is made by placing your open hand on the head, with the fingers spread, and feeling it. Volume or contents of the head is the character of chief importance, and is more generally indicative than form only. In healthy, well-made children the circumference at birth is about 13·5 inches, at nine months 17½, at twelve months 19, and at seven years 20-21 inches. After this age growth of the head, at least as measured by circumference, is much slower, and 22 inches is rather a large measurement in any school-child. A head of 19 inches circumference at seven years is small. In form the greatest transverse diameter is a little behind the ears, but at a higher level; from the base at the level of the ears it expands laterally as you look upwards, and the top is domed; the forehead should neither bulge forward nor recede from the vertical plane, and this with a sufficient width indicates the normal form of the bulwark of the brain, while the form of the head as a whole with an ample outline is not inaptly compared by Oliver Wendel Holmes to that of a three-decker. A little practice, especially if you record your observations, will soon give sufficient experience to enable you to detect by sight any head with size and form below the average.

Most forms of **ill-shapen heads**, as well as other defects in development, are more frequent among boys; an exception is the **small head**, which is far more common among girls, who then often tend to be delicate, though of average mental power. Were I speaking of physiology, it might be shown that a great function of the brain is to give vitality to the child, and power of resistance to an adverse environment. The volume of the head should be estimated as normal or otherwise in relation to the age of the child, as apart from his height: a small child with a good-sized head is better fitted for the work of life than with a small head proportioned to the body.

The bones of the skull may present bosses, lumps, or protuberances, most commonly on either side of the forehead; there may be a vertical ridge seen and felt running up the mid-line of the forehead; all these defective points are much more common among boys. The forehead may be narrow, ridged and small; this is often seen in the small heads of defective children.

The features should be well-moulded individually, and proportioned to one another. In place of this they may be coarse, or while no one feature is ill-formed in its parts they may be disproportioned, the nose small, but the face large and rounded. The parts of each feature and their proportions should be observed; in particular the absence of any normal part should be noted—as is so common in the ears.

Looking at the face, observe each feature separately; compare bilateral parts, looking for symmetry of development. Carry your eyes to each ear in turn; they should be of similar size and form, with the margin slightly curved over and the pleat of the ear (antehelix) projecting in front of the rim well developed, causing the ear to lie flat against the head in its proper position. The pleat of the ear may be absent, or the rim may be imperfectly developed, the whole ear being large, outstanding, concave in form, and red or bluish; this is common among boys, much less frequent in girls; the defect is not associated with dull hearing.

The nose is seldom quite symmetrical; its bone bridge has no forward growth in infancy, but develops out later, say by seven years; it may remain broad, flat and thick in growth, with tipping of the end of the nose upwards, the nostrils perhaps being small. Such children are apt to be "mouth breathers." The nasal passages and the mouth may both be small; this may lead to acquired causes of deafness.

The mouth in quiescence should be of good size; it is seldom too large; the common reference to a large mouth is due to the frequency of grinning, which widens the mouth in action, accompanying brain deficiency. A small mouth, though the feature may be admired as artistic, is a subnormal condition frequently associated with a narrow palate and with small eye-openings.

The eye openings (palpebral fissures). The openings between the lids—where the eyeballs are seen—should be sufficiently large in proportion to the other features, and the axis drawn from the inner to the outer angle should be horizontal. These openings may be narrow or too small; the transverse axis may slope downwards, as in Polynesians and other tribes. Small eye-openings accompanied by a small mouth produce a blank, featureless physiognomy.

The palate. If you look at the roof of the mouth, you see the bony palate; its size and form are important indications of the developmental constitution of the individual, second in importance only to the head or cranium. There should be sufficient width or space between the teeth, rounded in front; while in the vertical direction (vertical plane) it is bowed rather than a Gothic arch. The palate may be narrow or contracted laterally, and more or less sharply pointed anteriorly; it may also be highly arched or vaulted in the vertical plane: each of these deviations in form is subnormal. If the palate is narrow, the teeth are usually crowded in front. All forms of defect in the form of the palate (except when fissured or cleft) are consistent with fair speech.

The Growth of the child may be measured by his height, and compared with the normal for the age as shown in standard tables;[1] the weight of the body may usefully be added to the description. There appears to be a larger proportion of small girls than boys; the same rule applies to children under weight.

In all these physiognomical signs it is the proportioning in growth that indicates a part of the body as normal or subnormal; this may occur in one feature only, or in the head and several features together. A single point of disproportion, say one ear or even two or more points, does not necessarily indicate anything further as wrong with the child, who may remain bright and well; still such points are noteworthy and have their significance. Facts demonstrated by the observation of large numbers of children show that the number of those with "sub-normal nerve signs" is larger in our schools than those with conditions of low development; the two classes of signs often co-exist, and the child with a poorly-made head and features frequently presents some awkwardness or disorderliness in movement and action, each depending upon effects of inheritance impressed in his constitution. If a child is known to be delicate, you prevent him from sitting in a draught at a school that he may not catch cold; if a child seems rather poorly developed in body, take extra care in your training that he shall not acquire "nerve-signs"; the children will follow their school training, and you will know how to watch and guard each. You cannot remove developmental defects in the body, but you can do much to improve the brain condition in movement, expression and mental control. The child with any defective development tends under adverse circumstances to become pale, thin and delicate, with a low power of resistance. The girl who has—say a small head—if left untrained will probably acquire some nervous, irregular habits in movement and response, but little mental culture; if as time passes anæmia (paleness) with feeble health supervene, the elements exist for an unhappy life. Under observant care, good training and education might have prevented the brain disorderliness.

"The Child in Being" is what you want to study and understand, mind and body. You may say that I put before you the child's body and brain only—the contents of his head, not of his mind. That is my present purpose, but such study will enable you to gain experience and to overcome practical difficulties with individual pupils. Dr. Stanley Hall and other leaders in child-study have urged that children should be observed and described after the methods of Natural History; to this you may add the contents of their minds in each case, and thus obtain a fuller knowledge of the mental action accompanying what you see and hear. The child in mind and body is a part of Nature's work.[1]

It will be seen that, while the observer must learn to see and record single points, he should also learn how to classify them. Further, for educational purposes we need to arrange groups of cases and groups of children for study. A basis has now been prepared for the consideration of problems concerning childhood, which will be the subject of my next article.

The following description indicates the physiognomy and developmental conditions of the body as well as the nerve-signs.

Low development of body and of the brain in both motor and mental power. Girl aged 14 years.

DEVELOPMENTAL SIGNS.

Head small, circumference 19½ inches, forehead narrow and shallow.

Face. Openings for the eyes and the mouth small. Ears well made. Nose small, the bony bridge rather wide.

[1] See op cit., p. 30.

[1] See author's "Mental Faculty," chap. i. (Cambridge University Press.)

Palate narrow, teeth in front crowded and projecting.

Growth. Short for her age; height 55 inches (average for age 5 feet). Looks pale. Weight 86lb. (average for age 100lb.).

Nerve-Signs.

General balance of body. Stands straight, but motionless, with no signs of spontaneity. Head generally somewhat drooped.

Expression. Distinctly dull, wanting in animation. Forehead often with horizontal creases, especially when unoccupied. Some fulness under the eyes.

Eye Movements. Has not learnt to move her eyes when looking at objects, or in reading, but turns her head towards what she looks at; so also in looking around her, she looks at the teacher when demonstrating, rather than at the blackboard.

The Hands. The arms when held out are not horizontal, the elbows bent. Hands balance in "the weak-posture," the wrist and fingers drooping and the left lower. As the hands are held forward the shoulders fall back, increasing the curve of the spine at the loins (lordosis).

Speech is slow, articulation indistinct, with interval between question and answer. Her hands are held out after the other children have dropped theirs, and she looks to see what they are doing.

THE TEACHING OF ENGLISH LITERATURE.

By Walter H. Weedon,
English Master in Richmond County School;
Late "Inglis" Scholar of King's College, London.

Some Suggestions.

THERE are at the present time very strong indications that educational theories are in a state of transition. The past few years have witnessed an unusual activity in the promotion of science teaching in secondary schools. It is, however, to be regretted that in many quarters scientific teaching has been limited to the teaching of science. There is need, a growing need, for the careful teaching of English literature in our schools, as a means of imparting culture, and of stirring those nobler and finer emotions which a commercial education ignores.

It is with these ideas in view that I have ventured, not without considerable hesitation, to bring forward a scheme for the teaching of English literature. Such a course must necessarily be of quite a tentative character. It would be difficult, and unwise, to attempt to frame a course for general use. The best system would probably be the outcome of the teaching experience of many men, and the purpose of this article will be achieved if it draws attention to, amongst other things, the possibilities of imparting culture in secondary schools by means of *systematic* teaching of English literature.

If this scheme prove to have any merit, it will be due to the fact that in framing the course I have been guided by the excellent suggestions given in "Longer English Poems," by my late teacher, Prof. J. W. Hales.

Syllabus.

Form I.

(1) *Prose.* Examples of the simple prose narrative.
{"Robinson Crusoe"—(Lower).
{"Rip Van Winkle"—(Upper).

(2) *Poetry.* The simple ballad.
"John Gilpin."

(3) Oral composition. Simple descriptions, oral and written, of common objects and pictures. Oral reproductions of narratives.

(4) Some elementary notions of rhyme and metre.

Form II.

(1) *Prose.* The narrative.
"Gulliver's Travels"—(Lower).
"Sir Roger de Coverley"—(Upper).

(2) *Poetry.* "The Pied Piper."

(3) Oral composition as in Form I.

(4) Alliteration.

Form III.

(1) *Prose.*
{"Ivanhoe" (as type of the historical novel)—(Lower).
{"David Copperfield" (Selections)—(Upper).

(2) *Poetry.* The historical ballad.
"The Armada," "The Lays of Ancient Rome," The "Revenge."

(3) Some knowledge of the early ballads. Metre.

(4) Oral and written composition.

Form IV.

(1) *Prose.*
{"The Wanderings of Ulysses" (Lamb)—(Lower).
{"The Essays of Lamb and Sir Arthur Helps"—(Upper).

(2) Shakspere. "Henry V." (as type of the historical play). The Dramatic form and structure of a play.

(3) Written compositions on the subjects of the above essays. Some elementary notions of *style.*

(4) Lyric Poems (selected). Golden Treasury Series.

Form V.

(1) *Prose.*
{"Essays of Leigh Hunt"—(Lower).
{"Silas Marner" (as illustrating *development* of character in novel).

(2) Shakspere. "Merchant of Venice" (type of comedy)—with special reference to the weaving of *plot* and *underplot*, Nemesis, and study of character.

(3) "Lycidas," "L'Allegro" and "Il Penseroso."

(4) Oral and written compositions. Imitations of the styles of various writers. Examination of the use and meaning of the commoner figures of speech.

Form VI.

The literary subjects prescribed by the various examining boards.

Notes on the Method of Teaching.

I think it will be seen that in the above course all the important forms of literature are brought

under the notice of the pupil. From the simple prose narrative we proceed to the historical novel, then to the historical play, and lastly, to the study of plot and character in the drama and in the novel. So also from the simple ballad we go on to the lyric and more advanced forms of verse.

As to the general methods of teaching, some suggestions may perhaps be made. The selected work, in the case of short stories and poems, ought always to be read through by the teacher to the boys, in order that they may form some idea of the work as a whole. The teacher might also with advantage, either before the reading or after, chat about the story or poem in question, remembering that the purely literary point of view does not appeal very much to boys. *Pictorial Illustrations* should not be despised. Back numbers of the *Graphic*, &c., contain many excellent illustrations of Shakspere's plays. Reproductions of celebrated historical pictures, such as, for example, "The Armada in Sight," and portraits of authors, will be of great value. Indeed, with little boys, pictures afford a most excellent means of beginning English composition. Having procured, for example, "The Death of Sir Richard Grenville," the boys are asked to say what they can see in the picture. One by one each detail will be noticed, and it is really surprising what a lot can be learnt from a good picture of this description. Each boy frames his answer *into a sentence*, and after some minutes of this the class is set to write an account of the picture. Nothing affords better practice in short terse sentences, and a few lessons of this kind will do much to clear the way for more formal instruction in composition.

Advantage should be taken of the opportunities offered by each work for interesting the pupils in the author's times, contemporaries and literary productions. Other books of a similar literary form may be discussed. Thus "Ivanhoe" can be the means by which some information is gained of the "Historical Novel," and "Silas Marner" will afford an excuse for conversations on the development of character in novels.

Some ideas of Historical English Grammar can be easily and naturally given in connection with the reading lessons. Thus, for example, attention may be drawn to the "old-fashioned" meanings attached to certain words (*e.g.*, *discover* in "Robinson Crusoe," *cheer* in "As You Like It"). This will lead to an appreciation of the changes in meaning and spelling that words undergo. The rhyming of *survey* and *sea* or *tea* could be used to shew that the two latter words have changed in pronunciation.

The consideration of such words as *man—many*, *Jane—Jenny*, will enable the teacher to explain Umlaut and the existence of mutation plurals. The story of Sir Walter Raleigh and the introduction of the potato offers an opportunity for showing how our vocabulary has been enriched by loan words from other languages. So, incidentally, the way may be prepared for the systematic study of the Principles of English Etymology.

ELEMENTARY EXPERIMENTAL SCIENCE.

BY PROFESSOR R. A. GREGORY and A. T. SIMMONS, B.Sc., Associate of Royal College of Science, London.

TO meet a desire which has been expressed that these papers may be as useful as possible to teachers, it is proposed for the future to omit the "Lesson given to the Class" and to give only the "Practical Work," so that more of the subject may be dealt with in each number. It is assumed that, since introducing the ideas of mass and weight to the class, the teacher has explained the principle of the balance, and given the pupils simple, practical exercises in its use. Taking these points for granted, some exercises and questions arising out of a consideration of "Density" will now be described.

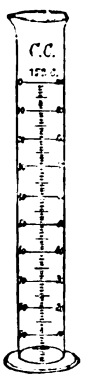


FIG. 1.—Measuring jar divided in cubic centimetres.

VI.—DENSITY.

1st Lesson.

Things required. — Cubic centimetres of oak, lead, cork, marble, and wax. Two 4-oz. flasks or small bottles of the same size. Balance and box of weights. Graduated glass jar, marked in cubic centimetre divisions (Fig 1.), pipette, small beaker.

Practical Work for the Class.—Determine, by means of a balance, the mass of each of the cubic centimetres supplied, and record the results thus:

		Grams.
Mass of the cubic centimetre of cork	=	$\frac{6}{25}$ = ·24
,, ,, ,, wood (oak)	=	$\frac{17}{20}$ = ·82
,, ,, ,, marble	=	$2\frac{21}{25}$ = 2·84
,, ,, ,, lead	=	$11\frac{7}{20}$ = 11·35

Since the volumes are the same, it is quite clear that the thing with the greatest mass is the densest, and that which has the smallest mass is the least dense, so that we can compare the densities of these things by their masses. The densities of things having the same size are in the same proportion as their masses.

Counterpoise two small bottles of the same size. Fill one with water and the other with methylated spirit. Notice that the bottle of water is heavier than the bottle of spirit, though the volume of each liquid is the same. (Fig. 2.)

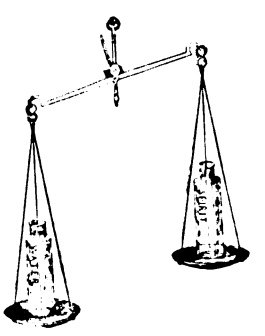


FIG. 2.—A bottle of water is heavier than a bottle of spirit of the same size.

Place a glass vessel in one pan of the balance, and counterpoise it with shot or small nails in the other. Measure out 100 cubic centimetres of water into the glass vessel, and find the mass of the water in grams. Determine the mass of one cubic centimetre by dividing this number by 100.

It will be found that the mass of one cubic centimetre is one gram very nearly. It would be exactly if the water were at a certain temperature.

The mass of one cubic centimetre of water at 4° C. is one gram, and its density is taken as the standard of density, and is called 1. Similarly, a substance, the mass of a cubic centimetre of which is two grams, would be said to have a density of 2, for it must contain twice as much matter as water does, packed into one cubic centimetre.

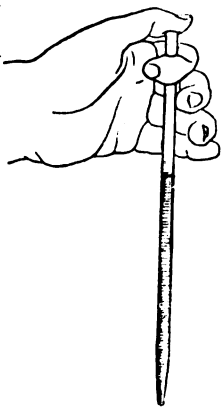


Fig. 3.—A Simple Pipette.

A convenient way to add or take away small quantities of liquid is by means of a pipette, used as shown in Fig. 3.

Counterpoise a pint measure or bottle with some sheet lead. Fill the bottle with water, and place iron weights in the opposite pan to balance it. Notice that the size of the iron is much less than the size of the pint of water. (Fig. 4.)

2nd Lesson.

Things required.—Small bottle or medicine phial with glass stopper having a groove upon the part which fits into the bottle (Fig. 5), made by means of a file; also a bottle with a file mark across it near the top. Balance and a box of weights. Small nails for counterpoising.

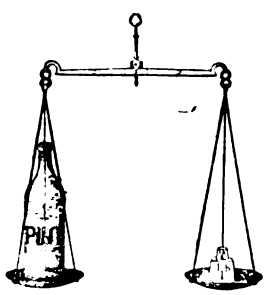


Fig. 4.—A pint of water has a mass of a pound and a quarter. Notice the piece of lead under the weights to counterpoise the empty bottle.

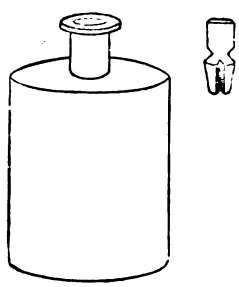


Fig. 5.—A bottle with a groove in the stopper, for determining relative density.

Practical Work for the Class.— Clean and dry the bottle having a mark across it. Counterpoise the bottle with a pill box containing very small nails or lead clippings. Now fill the bottle with water up to the mark, and find, by weighing, the mass of the water. Empty out the water and fill up to the mark with the liquid the density of which is required, such as methylated spirit or milk. As before, find, by weighing, the mass of spirit or milk in the bottle. The masses of equal volumes of the two liquids are thus obtained.

Explain the use of the grooved stopper in the second bottle, and use the bottle to determine the relative masses of two different liquids.

Density of substance =

$$\frac{\text{mass of substance}}{\text{mass of equal volume of water.}}$$

3rd Lesson.

Things required.—U-tube mounted upon a strip of board. This U-tube can be made by bending a piece of glass tubing, or by connecting two pieces of tubing of equal bore with a piece of india-rubber. Quicksilver, milk, vinegar, and similar common liquids.

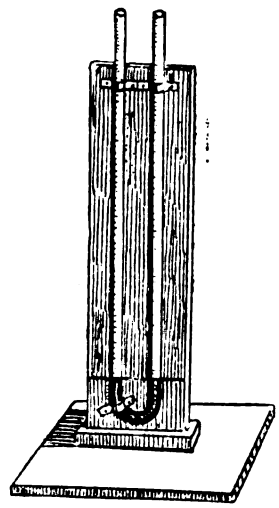


Fig. 6.—An arrangement for balancing columns of liquid. Mercury is in the bend of the tube, up to the line on the upright board.

Practical Work for the Class.—Pour quicksilver into one of the branches of the U-tube until it reaches a horizontal line drawn on the board (Fig. 6). Now introduce water into one of the tubes, and notice that the mercury on which the water rests is pushed down; afterwards introduce enough water into the other tube to bring the mercury back to its original level. By measuring you find the length of each column of water is the same. Repeat the experiment with different quantities of water.

Remove the water and dry the tubes, and see that the mercury is up to the mark. Nearly fill one of the tubes with some liquid, such as methylated spirit, and balance it with water introduced into the other tube. Measure the lengths of the columns of liquid.

$$\text{Density of spirit} = \frac{\text{length of water column}}{\text{length of spirit column}}.$$

This is a very good way to compare the densities of liquids.

VII.—Things which (1) Sink, (2) Float in Water.

1st Lesson.

Things required.—A fish-globe, such as are sold to keep gold fish in, or a large, clear-glass finger-bowl, pieces of lead, iron, oak, pine, cork. Glass cylinder divided into cubic centimetres. Irregular solid, such as a glass stopper or a pebble. Mercury in a saucer or tumbler.

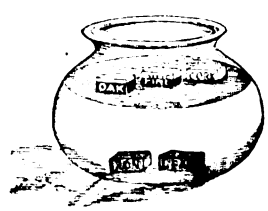


Fig. 7.—Some things sink, and others float, in water.

Practical Work for the Class.—Fill the fish-globe or finger-bowl with water, and carefully place lumps of different things, one after another, into the water, *e.g.*, pieces of lead, iron, oak, pine, and cork (Fig. 7). Observe that (1) some sink and others float, (2) of those which float some sink further into the water than others.

Take the objects which sink in water, and place them in mercury. Notice that they float.

Partly fill a glass cylinder, divided into cubic centimetres, and record the level of the water therein, drop in one of the cubic centimetre solids which sink, and again read the level of the water, put the others in in order, recording the level of the water after each such addition. It will be found that the level increases by one cubic centimetre division in each case.

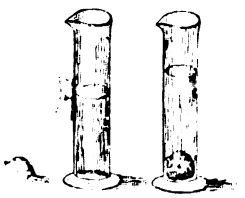


FIG. 8.—The rise of level of the water when the stone is put in shows the volume of the stone.

Take any solid, such as a glass stopper or a marble, and drop it into water contained in the graduated glass cylinder. (Fig. 8.) Read the level of the water before and after dropping it in, and the difference between these readings will give you the volume of the solid in cubic centimetres.

2nd Lesson.

Things required.—Rectangular rod of wood, 1 square cm. in section and about 15 cm. long, with lines around it 1 cm. apart from one end. A small piece of the wood is gouged out of this end, and lead is put into the hole. The end is then made flat by filling in with wax. Graduated jar. A lactometer. Narrow test tube with mercury or shot in it. Balance and box of weights.

Practical Work for the Class.—Put some water in the graduated jar, and notice the level. Find the mass of the rectangular rod, and then place it in the jar with the leaded end downwards (Fig. 9). Notice how many cubic centimetres of the rod are immersed, and also how many cubic centimetres of water are displaced. Since the mass of 1 cub. cm. of water is 1 gram, the number of cubic centimetres of water displaced is also the mass in grams of the water displaced. This mass will be found equal to the mass of the whole rod.

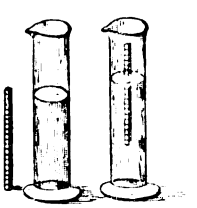


FIG. 9.—The number of cubic centimetres of the part of the rod under water is equal to the number of cubic centimetres in the water displaced.

Fill the divided glass cylinder with water up to a certain mark. Notice the level of the water.

Make a mark across a test-tube about two-thirds of the distance from the bottom of the test-tube. Float the test-tube in the water and put mercury or shot into it until the mark upon it is on a level with the surface of the water. Notice the number of cubic centimetres of water displaced when the test-tube is thus immersed (Fig. 10).

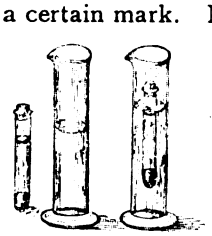


FIG. 10.—The mass of the test-tube and contents is equal to the mass of water displaced.

Then take out the test-tube, dry it, and determine its mass together with the mercury it contains. The total mass of the test-tube and contents will be found equal to the mass, shown by the number of cubic centimetres of water, displaced. Repeat the experiment with the test-tube immersed to a different mark.

Float the test-tube in spirits of wine and milk in succession. Notice that in the former case it sinks deeper than the mark, while in the other not so deep.

Place a lactometer (1) in milk, (2) in water, (3) in a mixture of milk and water. Observe the depth to which it sinks in each case.

COMMERCIAL EDUCATION IN LONDON.

Special Sub-Committee.

A SPECIAL Sub-Committee on Commercial Education was appointed by the Technical Education Board of the London County Council, on May 17th, 1897, to "consider and report upon the special agencies which exist within the County of London for giving 'commercial education,' and to suggest plans for establishing other agencies and increasing the efficiency of those already in existence."

The sub-committee included gentlemen possessing an intimate knowledge of the work of the various educational institutions in London, as well as those well informed of the needs of business men, and in touch with every branch of commercial activity. This committee has held 11 meetings and has interviewed 12 persons engaged in business or connected with institutions in which education is given in commercial subjects. The services of Mr. E. H. Fishbourne, M.A., Barrister-at-law, late of Jesus College, Cambridge, were secured for six weeks in June and July last, and he prepared for the committee a valuable *précis* of the reports of several continental schools and also interviewed 42 representative business men, from whom he obtained an expression of opinion of their views on the subject of commercial education.

The report of this special sub-committee was adopted by the Technical Education Board on February 20th last and has now been issued. It will prove of great assistance to technical instruction committees, governors of secondary schools, and school boards, in formulating schemes of commercial education in the schools under their charge. The following are some of the results at which the sub-committee has arrived:—

Different Views of Commercial Education.

There is a considerable variety of opinion upon the subject of commercial education. On the one side, some commercial men maintain that the only commercial education worth anything is the practical experience of work to be obtained in a business house. Specialisation should commence on leaving the elementary school, and the words "commercial education" should give place to the term "business routine." On the other hand, some hold that the only proper training that can be given for business is that afforded by a general education, and that business itself cannot be taught. It appears to the committee that, among those who regard the matter from either of the above points of view, the disbelief in commercial education arises partly from devoting the attention mainly to one particular section of commercial life, and failing to realise the great varieties of interests involved; and partly from giving too narrow a definition of commercial education, and not appreciating how

many branches of study the term should imply, and the thoroughly educational manner in which commercial education may be taught.

Functions of Commercial Education.

Different grades of workers must be recognised in the commercial world. The workers in each department have their own particular functions, which education should fit them to discharge.

(1) For those who commence work in the lower branches, such as office boys, junior clerks, shorthand clerks, copyists, typists, junior book-keepers, etc., what is most needed is a good grounding in the elements of knowledge, supplemented by one or two special acquirements such as shorthand, type-writing, or book-keeping. For this class a continued education in evening classes is needed to reveal to them the principles that underlie their work, and to fit them to undertake higher work when opportunity offers.

(2) For those who commence work in more responsible positions, such as senior clerks, correspondence clerks, managers of departments, agents, dealers and travellers, a fuller course of training adapted to their special requirements is desirable. The mind should in the first place be trained in habits of accuracy, power of calculation and breadth of view, while clearness of expression both in speech and writing should be cultivated. Side by side with the mental development should go an acquisition of one or more foreign languages, which should be so taught that they could be readily used in every-day life. At the same time an insight should be obtained into the general principles of political economy, which underlie all commercial relations.

(3) For those who are destined to take the positions of captains of industry or leaders in commercial life opportunities should be given for acquiring a still deeper training. Not only should foreign languages be studied, but a thorough knowledge should be obtained of foreign systems of industry and the laws of international exchange, as well as of the principles of political economy and of commercial and maritime law.

General and Special Education.

It would be futile to suppose that it would be either possible or desirable to separate from the commencement the boys destined for each particular branch of commercial life and give them a distinct education from the start. There comes a point where it is desirable that education should be somewhat differentiated according to the general nature of the work which is likely to form the pupil's life-work; but such differentiation should be at first little more than differentiation of type, and it is only at the final stage that detailed specialisation should be permitted. Commercial education must be regarded as covering a considerable part of the field of what is usually known as "general education." It does not follow that such general education will not be coloured by the direction in which the final development will proceed. In fact, general education should not be always of one type. The term "general education" has too long been usurped by the supporters of the classical system, who have been apt to think that any subjects outside those of the old grammar-school *régime* should be branded as "specialisation." It should be possible to give a good general education by means of different combinations of subjects. In one combination the "tone" may be given by ancient languages, in another combination by "modern languages," in another by science; but there is no reason why each combination, whatever the predominant note may be, should not form a good general education.

The Kind of Education Needed.

One of the principal needs at the present time is the extension of a type of education which will supply that training and disciplining which it is the function of a general education to impart, but which should receive its colouring from the realities of actual life. Such a system should receive its full development in London in the more specialised work of higher schools and institutions, which should be in close touch with a new economic and commercial faculty of the University on the one hand and with the business and commercial world on the other.

How Elementary Education can be Improved.

There should be no specialisation in the elementary day-school. Every one of its boys should receive as broad a foundation as it is possible to give. The teaching in elementary schools may be made both more interesting and more useful by bringing it more into relation with actual every-day life. Arithmetic will be more real to a boy, and therefore will train his mind better, if the sums presented to him introduce problems that might arise in his own home life rather than problems which live only in that isolated portion of his brain to which he usually relegates all questions relating to "sums." It is also very desirable that boys should be encouraged to calculate areas and volumes from linear measurements made by themselves, and thus be brought at a very early stage face to face with actual and practical problems.

History will assume a new meaning in the pupil's eyes if he connects it rather with familiar objects, such as the soldier and policeman, the store and the docks, than with names of kings and dates of battle. Similarly, geography will assume a new meaning to him if he is made to realise that he may one day have to depend for his existence upon whether he or his comrades can induce the inhabitants of certain distant spots to buy certain articles which he and others have helped to make. The reality of a boy's studies may be brought to his mind in a very forcible way by organising visits to works, manufactories, warehouses, docks, &c. The weakest point in our school system is the isolation from everything of a practical nature in which both teachers and scholars are generally educated.

Perhaps the most important detailed point to insist upon at the present time for increasing the connection between the elementary schools and commercial life is the *universal teaching of the decimal system* in its application to all branches of calculation, especially money, and of the *metric system* in its relation to weights and measures.

In connection with the elementary schools there should be organised *higher-grade or higher primary departments* which would give a more specialised training to *those boys who intend to enter business at about the age of* 14. Such schools could perform an extremely useful work by continuing the general education given in the primary schools, and at the same time preparing boys more specially for commercial life by giving regular instruction in subjects specially required, such as hand-writing and précis-writing, French, shorthand, type-writing, and the elements of book-keeping. Many girls as well as boys would no doubt take advantage of the opportunities offered by such continuation schools, as the number of posts open to women shorthand writers and typists is daily increasing. Schools of this type have already been established in several districts by the London School Board, but considering the very large number of boys who every year are entering commercial life at the age of 13 or 14, there is room for an increased systematic development of this type of school.

Commercial Education in the Secondary School.

Commercial education of the secondary grade is already provided in London to a considerable and an increasing extent. It is not perhaps sufficiently realised how much excellent training for commercial life is already being given in the public secondary schools. In London there are no fewer than 46 public secondary schools for boys and 46 for girls providing education in all cases up to the age of 16, and in some cases of 18 or 19. Of these schools 49 are receiving aid from the Technical Education Board towards the development of science and technical teaching. Many have developed their foreign language teaching to a considerable degree; all include the teaching of French in their curricula; about 30 teach German, and at least three teach Spanish.

Secondary schools which aim at preparing their pupils for business life naturally fall into two classes—

(*a*) Second-grade secondary schools, or those at which the pupils usually leave about the age of 16.

(*b*) First-grade secondary schools, or those at which many of the pupils stay on to the age of 18 or 19.

The second-grade schools will serve mainly for the training of commercial travellers, agents, managers of departments, and correspondence clerks, from whom it must not be forgotten the highest grades are to a great extent eventually recruited. The first-grade schools will form the special training-ground for the superior commercial traveller whose business it is to open up foreign markets, for those who are to hold the most responsible positions in banks, insurance offices, and mercantile houses carrying on a foreign trade, as well as for chartered accountants, actuaries, solicitors and other professional men, while it may be hoped that those who are to occupy the positions of heads of large firms and the higher divisions of the Government, municipal and consular service, will receive still further training in institutions of university rank.

Curriculum of a Second-Grade School.

The principal elements in the curriculum of a second-grade school would be modern languages, mathematics and science, besides the indispensable subjects, English literature, history and geography. Latin need not form a compulsory part of the work of these schools. An equally efficient training for boys destined for commercial life can be given by modern languages, if taught on right principles. There would, moreover, be considerable advantage if the exercises and themes for translation were taken less exclusively from the masterpieces of French and German literature. Pupils who have been trained entirely in translating Schiller or Molière into English, or Sir Walter Scott into German or French, find themselves seriously at a loss when they have to write a business letter, or to translate a bill of lading. Whatever may be said as to style, the actual vocabulary of modern business life forms as essential a part of the language as the terms and phrases used by the classic authors of a bygone generation—forms, too, just that part of the language which the business man requires. The pupils should, moreover, be made thoroughly familiar with the foreign language, not merely as spoken by business men on business matters and as printed in books, but also as written. The higher classes, at any rate, should be practised in reading foreign handwriting, and even in writing a foreign letter. Modern languages should be taught, as far as possible, as *spoken* languages. The present method of confining the attention mainly to grammar rules and written translation should be supplemented and to a large extent superseded by a large amount of oral teaching, in which the languages should be, as far as possible, brought home to the actual life of the scholar. It is significant that in Germany French lessons are given in French and English lessons in English, and pupils are encouraged to write original compositions rather than translations. A similar practice should be introduced into these schools, so that the pupils should have an opportunity of hearing and speaking a foreign language every day. A boy on leaving one of these schools at 16 years of age ought to have a practical knowledge of French and German, or French and Spanish, or of any two foreign languages (including Spanish, Russian, Italian and Portuguese) sufficient to enable him (*a*) to understand an ordinary conversation, (*b*) to conduct an ordinary conversation, (*c*) to write a well expressed letter—not necessarily a purely business letter, but showing some knowledge of commercial terms, (*d*) to read an ordinary book or newspaper, (*e*) to decipher easily a letter in ordinary foreign handwriting.

In the teaching of history and geography some insight should be given into the complex organisation of our imperial, municipal, and economic life. The geography and history of other countries should be similarly treated. The greatest defect in the ordinary Englishman's knowledge of these subjects is insularity.

Mathematics and science should not be restricted to calculations and operations directly bearing upon commercial life, but instruction of this nature should be included in the more general teaching of these subjects. For instance, practice in international exchanges and problems connected with freight and shipping should be introduced into the mathematical course, while in science (in which the metric system of measurement should be used) some attention might well be devoted to the chemical and physical properties of the commoner substances. In short, the teaching, while conducted on general lines, should at the same time have a commercial bias.

The secondary school of a commercial type should not be dominated by any external examination other than one definitely framed upon its curriculum. What is wanted is an examination adapted to the work of the commercial school, and this might be grafted on the University Local Examinations in which the Examinations of the Chamber of Commerce might then be merged. The London University Matriculation Examination, being the leaving examination of so many schools, might well be modified accordingly.

Curriculum of a First-Grade School.

The first-grade schools, where the pupils stay to the age of 18 or 19, would devote more time to the study of the general structure and formation of languages. Their teaching must be so directed as to combine mental discipline with the imparting of a familiar acquaintance with the language as a living tongue. The instruction should be from the first as far as possible oral, and should be in the hands of teachers who have a thorough first-hand acquaintance with foreign life at the current time. Such teachers should preferably be Englishmen who have spent a considerable time abroad and who have seen something of business life on the Continent.

It is most important for the pupil to gain a thorough all-round acquaintance with at least two foreign languages, a knowledge which places him *au courant* with all the phases of life of the day. Familiarity with the terms of the commercial and business world would necessarily be included in such a wide knowledge, and some amount of specialisation in this branch would perhaps usefully, in the last year, be taken as an alternative to a course in elementary economics and the rudiments of law. Reality might well be imparted to this more specialised branch of study by visits to commercial museums, commercial warehouses and similar places, under the guidance of the language teacher, who would find the assistance of such object-lessons invaluable.

Instead of any mechanical anticipation of the realities of business operations, the time of the student should be devoted to studying both British and foreign history and geography with special reference to the growth and organisation of international trade. Some time should also be given to political economy and to acquiring a knowledge of the principles of international and commercial law, though these subjects could only be fully dealt with in the institution of university rank.

Throughout the course mathematics should form an important item in the curriculum, and a thorough foundation should thus be laid for the subsequent study of statistics. At the same time a graduated course in experimental science would serve to develop the pupils' powers of observation and cultivate powers of exact reasoning.

The only examination towards which a school of this type should lead up should be the examination for admission to the higher institution where further specialised instruction would be given in connection with the university. Such an examination should be largely oral and should be so framed as to fetter the teaching of the school as little as possible.

How to Develop Satisfactory Commercial Education in Schools.

A scheme of commercial education, as described above, may be introduced either by the establishment of entirely new schools or by the development of commercial "sides" in existing schools. The latter is the preferable policy. Among the most important points to secure for bringing about such development would be :—

(*a*) The co-operation and interest of commercial men in the school so as to insure that the school should be in touch with the commercial world ;

(*b*) The training of teachers, especially modern language teachers, to carry out the instruction on the lines indicated.

This training might be partially secured by offering travelling scholarships tenable for two or three years on the Continent, the holders being required to mix in the commercial world, and also to study the methods of foreign commercial teaching. A beginning has been made in this direction.

Evening Schools and Classes.

The work of evening schools and classes would be mainly supplementary to the course of day commercial instruction sketched above. It is important for the community that the ladder of commercial success should be accessible to all, and it will be through evening classes that the means of rising will be most readily provided. So important is a well-organised system of evening instruction that some are disposed to regard it as the only type of commercial instruction that need be provided. But no amount of supplementary work acquired in later life in spare time can fully make up for the lack of a thorough continuous training given all through the period of youth. The two systems most usefully supplement one another. The office-boy who commences work at 14 and the clerk who begins work a year or two later should be able to find opportunities in evening courses to supplement their business training by continuous study, and so to qualify themselves for higher positions. Much is already being done in this direction in the evening continuation schools, polytechnics and other institutions and classes. At present, however, the work is mainly confined to certain specialised subjects, such as shorthand, type-writing, book-keeping and French. The range of subjects requires to be widened, and the instruction in different institutions requires to be co-ordinated and directed not to the passing of outside examinations but to the actual requirements of commercial life.

COMMERCIAL EDUCATION IN GERMANY.

An interesting *brochure* recently published by the Foreign Office on "Commercial Education in Germany"[1] should prove of the greatest value to British schoolmasters. It is a Report by Mr. Consul Powell, and contains, in addition to an introductory sketch, a detailed account of all the commercial schools of importance in Germany, with a description in many cases of the construction of the working time-table. It would appear that the great success which has attended German trade since 1873, but more especially during the last ten years, has been frequently attributed in Great Britain to the superiority of commercial and technical education in Germany. This is not the view taken by those best able to judge of the facts by close acquaintance with them in Germany; they are rather of the opinion that this success is due less to superior commercial education than to the high state of general education that Germany has enjoyed for many years, and which was formerly lacking, and is even now lacking in several essential points in Great Britain. Moreover, the British estimation of commercial education in Germany has been somewhat over-rated; not at the present time, because that would be to convey a false estimate of the wonderful strides that commercial education has taken in this country during the last few years. The commercial success of the German nation is not the outcome of commercial education ; the latter is rather itself the offspring of that success, which has opened the eyes of the Chambers of Commerce and municipalities, and latterly of the Imperial Government, to the immense value of commercial education for a commercial people. Therefore the wonderful increase of commercial schools is a result and not one of the causes of the trade successes of Germany.

It would be quite wrong to speak of an organised scheme of commercial education even at the present date in Germany, although things are moving in that direction, and we may expect to see the Government take it up as a State question before many years are past, but up to the present such a system has never existed.

Commercial School in Leipzig.

The Public Commercial School at Leipzig is one of the oldest and most important of the German commercial schools. It has three divisions to meet various requirements, but all devoted to imparting a thoroughly sound and practical commercial education :—

Division I.—For young clerks already employed at commercial establishments in Leipzig, in order that they may continue and increase their mercantile knowledge.

Division II.—Is a preparatory course for lads who intend to enter business and have finished their schooling.

This division undertakes to give a similar education to that of other public schools (especially the "Realschulen") without classics, but with a larger scope in commercial subjects. On passing out of Division II. the student receives the certificate for one year's military service. He enjoys, therefore, the same privilege as a boy in Class II. at the ordinary public schools.

The second division has three classes, and instruction is given in the subjects set forth in the following table.

This division is largely attended by foreigners, who receive beforehand a preparatory education in German.

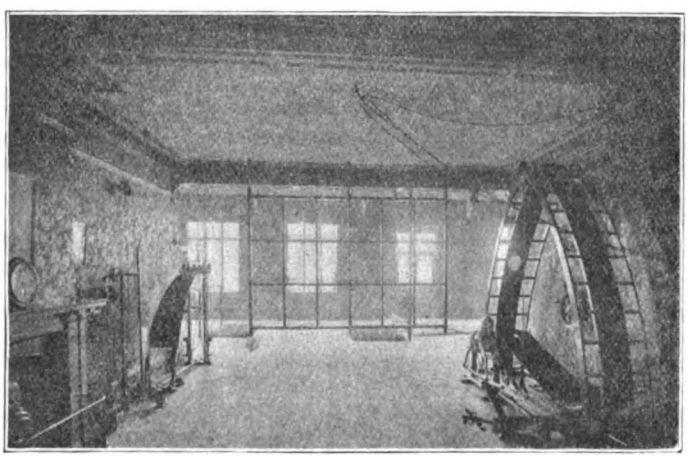
Both of these divisions have a course of three years, Division I. having 10 hours study per week, and Division II. 32 to 36 hours per week. The special courses in Spanish and Italian are not compulsory in Class II. The English and French languages are regular subjects, and are taught by masters of the respective nationalities. Boys to be admitted must be 14 years of age.

[1] "Diplomatic and Consular Reports," No. 483, Miscellaneous Series.

DIVISION II.

Subject.	Number of Hours per Week.		
	Class III.	Class II.	Class I.
German	4	3	3
English	5	4	4
French	5	4	4
Mathematics	3	3	4
Natural Science (Physics) ...	3	2	—
Mechanic Technology	—	—	2
Chemistry	—	2	2
Knowledge of Articles of Merchandise (Waarenkunde) ...	—	—	1
Geography...	2	2	2
History	2	2	2
Commercial Information... ...	—	2	—
,, and Maritime Law ...	—	—	1
Office Work	—	2	—
Correspondence	—	—	2
Book-keeping	—	—	3
National Economy	—	—	2
Caligraphy	3	2	—
Drawing	2	2	—
Gymnastics	2	2	2
Total	31	32	34

Division III. aims at a higher development of commercial education, and receives youths who, having gone through an ordinary course of education and having left with a military certificate for one year, wish to devote themselves to a business career. It offers to such lads ample opportunity of studying modern languages to a higher degree than they would otherwise obtain, as well as commercial subjects in advance of the usual curriculum, and gives them a more direct preparation for a commercial career, so that when they enter business their apprenticeship is shortened and their progress rendered easy. The reports received from many merchants, and letters from the young students themselves, all go to show how successful this institute has proved itself to be. These students are spread all over the world, and are heads of firms, agents, bankers, and, indeed, are filling every branch of commercial life.



THE GYMNASIUM OF THE SOUTHPORT PHYSICAL TRAINING COLLEGE.

DIVISION III. (1).

Subject.	Number of Hours per Week.
English	5
French	5
Spanish	2
Commercial Arithmetic...	4
,, Law...	2
Book-keeping	5
Correspondence...	2
Political Economy and Commercial Knowledge (Handelskunde)	3
History of Trade	2
Knowledge of Articles of Merchandise in general (Waarenkunde)	2
Caligraphy	2
Total	34

Division III. has two classes—(1) A pupil class with 34 hours of school work a week. (2) An apprentice class with 10 hours a week. The course of both classes is one year. The pupil class comprises the subjects tabulated.

There is a common course of Italian for both classes.

The fee for the pupil class is 240 marks (about £12) a year, for foreigners 360 marks (about £18). Sons of former members of the guild pay 180 marks (about £9).

The second class—apprentice class—receives any apprentice to a Leipzig business firm and teaches—

DIVISION III. (2).

Subject.	Number of Hours per Week.
English Correspondence	2
French ,, ...	2
Commercial Arithmetic...	2
,, Law	1
Book-keeping	2
Political and Commercial Economy	1
Total	10

The classes are held from seven to nine in the morning, except on Saturdays, when there is no school.

A NEW PROFESSION FOR WOMEN.

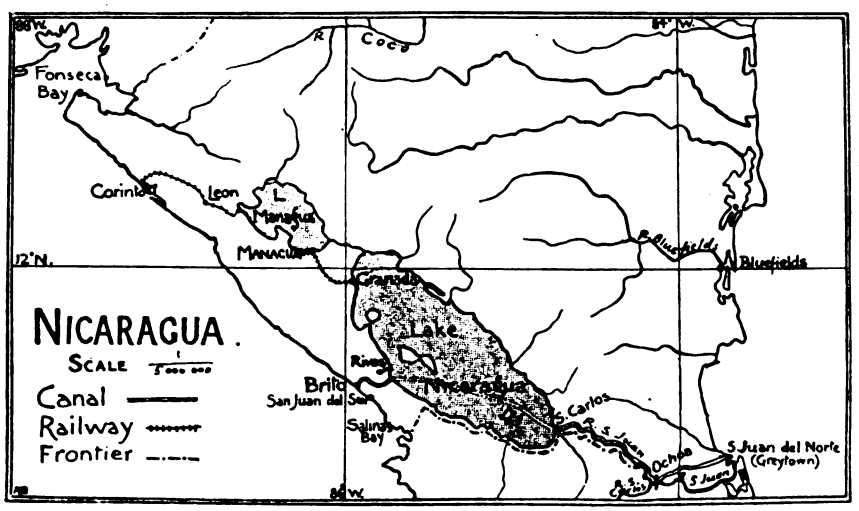
THE inauguration of the Southport Physical Training College must be regarded not only as a satisfactory sign of the times, but as a healthy turn in the education of our boys and girls. Its primary object is to instruct women in all branches of physical training, and in the accompanying sciences of physiology, anatomy, hygiene, sick nursing and ambulance, so that they may be fitted for health teachers in our public schools and other educational establishments. That there is a demand for teachers of this description is apparent from the fact that the promoters of the College have this year supplied the three principal ladies' colleges in England with teachers, and have at times found it difficult to fill the demand for mistresses of this kind.

Sensible parents who have the future of their daughters before them will do well to make a note of this, and the natural demand that will arise from this branch of education. What pleases us most in the project is the certainty of increased health and strength to the student-teacher in her vocation, as well as for her future pupils. The scheme has the support and approval of many leading educationists, among them being Lord Meath, Miss Helen Gladstone, as well as several of the Chairmen of our School Boards, as at Leeds, Liverpool, and elsewhere.

Mr. A. Alexander, F.R.G.S., for many years Director of the Liverpool Gymnasium and author of more than one work upon Physical Education, is at the head of the teaching staff, which includes lady assistants and science lecturers.

The College is situated at Birkdale, Southport, and is well fitted with all the requirements for physical development. Not only is the physical training of girls in normal health provided for, but there are special and ingenious appliances

collected from all parts of the Continent and America to make the weak strong, the bent figure straight, and to afford certain relief for sufferers from spinal complaints. Southport has thus added another important institution for health purposes to its numerous resources, and one that will not fail to make its mark in educational circles.



CURRENT GEOGRAPHICAL TOPICS.

By A. J. Herbertson, F.R.G.S.

I.—The Nicaragua Canal and Nicaragua.

Southern Nicaragua is one of three comparatively low and narrow parts of Central America. Two great lakes, Managua and Nicaragua, the surface of the latter 110 feet above sea level, are drained to the Atlantic by the San Juan river, 118 miles long. Lake Nicaragua is little more than a dozen miles from the Pacific, and the ridge at one place is only 43 feet above the level of the lake, so that by cutting 73 feet deep a canal 30 feet deep could be made with locks lowering it 110 feet to the sea level on east and west.

The canal will start at Brito on the Pacific, and in the first 3 miles will rise to the lake level by three locks. Then there will be 5½ miles to the cutting through the ridge just mentioned, and 9 miles to the lake by the river Lajas—17½ miles of canal in all. The western side of the lake is deep, but 14 miles of dredging is necessary to deepen the south-eastern bottom to 30 feet. Thence the river bed must be hollowed for about 28 miles, although a great dam is to be made at Ochoa, below the confluence of the San Carlos, which will raise the water to very nearly the lake level. This point is 64½ miles from the lake. The river will be left here, and a 3-mile cutting 141 feet deep will carry it through low hills, down whose sides it will sink in three locks to the swampy delta plain of the San Juan and enter the sea at San Juan del Norte (San Juan de Nicaragua or Greytown), more than 9 miles distant.

The length of cuttings will therefore be 30 miles, of which over three is through high land, the deepening of lake and river bottom will amount to 42 miles, and open navigation on Lake Nicaragua 56½ miles, on the San Juan river 36½ miles—a total of 169 miles. Great harbour works will be necessary at both ports, and to avoid this on the Pacific, the Bay of Salinas has been suggested instead of Brito. The cost is variously estimated from 13 to 26 million pounds. The lakes regulate the San Juan river and prevent great floods, but there is a possibility of floods on the western slopes, and earthquakes are another possible source of danger. A number of volcanic cones, mainly quiescent, is found along the depression in which the lakes lie.

This canal will reduce the distance to San Francisco from New York by sea by 10,000 and from Liverpool by 7,000 miles; and the distance from London to Melbourne by 1,500 miles.[1]

At present Bluefields is the chief port in the east of Nicaragua, and exports valuable timber, dyewoods, gums, rubber, and bananas. The virgin forests on the wet eastern slopes of Nicaragua, whose distribution is indicated by the eastward flowing rivers on the map, are still little known. They contain mahogany, ironwood, the even harder tree with the expressive name "break axe," and many other valuable timber trees. The drier western slopes are those that are cultivated, and here most of the farms and towns are situated. Coffee is the most important product, and most of it goes to Germany. Sugar, cacao, fruits of all kinds, are also grown. Cattle rearing is an important occupation. Gold is found in considerable quantities. At present the outlet for this rich region is by the lakes and the railway which unites them, and connects Lake Managua with the Pacific at Corinto. The opening of the canal will bring Managua, the capital, and the other towns, much nearer their markets, and, while its international will far transcend its local importance, the latter should not be altogether lost to sight.[2]

II.—The Grouping of German Mountains.

Many teachers find it difficult to give a clear and simple picture of the numerous mountains and rivers of Central Europe. This is admirably done by a master hand in Professor Ratzel's little book on Germany which has just appeared,[3] on which the following notes are based.

There is no central point in Germany, and the first glance at a physical map gives the impression of there being no rule in the disposition of mountain and valley. A closer inspection, however, shows that nearly all the natural features follow two well-marked directions, one from S.W. to N.E., which Ratzel calls the Rhenish, because it is that of the Rhine Highlands, and the other from S.E. to N.W., which is called the Hercynian or Sudetic. The S.E. to N.W. direction is the more important, and can be traced directly across the country from Linz to Osnabrück along the Bohemian, Thuringian and Teutoburg Hills. It is also found in the various groups that make up the Sudetic Mountains and determines the middle course of all the great rivers—Rhine, Weser, Elbe, Oder and Vistula. Some of the great routes of Central Europe naturally follow it, and hence we find bands of denser population along these rivers with sparser peopled districts between. This S.E.-N.W. trend dominates North and East Germany. The S.W.-N.E. trend is characteristic of the West, especially of the Rhine Schist

[1] See *Board of Trade Journal*, January, 1899. *Scottish Geographical Magazine*, May, 1897.

[2] See *Journal of School Geography*, December, 1897.

[3] *Deutschland: Einführung in die Heimatkunde.* Leipzig: Grunow. 1898.

Highlands—Eifel and Westerwald, Hunsrück and Taunus. It meets the other in the Hessian Heights, and can even be traced in some parts of the Harz. It is found in the Juras—Swiss, Swabian and Franconian. The latter curve round towards the N.W., where they approach the Bohemian Forest. In the Fichtelberg the two trends cross, and the Rhine type is found in the Ore mountains, which form the N.W. boundary of Bohemia. This is the oldest direction of earth folding or faulting in Germany, the S.E.-N.W. came later, and the youngest of all is the N.-S. trend, in the great rift valley of the middle Rhine between the Vosges and the Black Forest, the Hart and the Odenwald.

The mountains may be grouped in another way. (1) The Rhine group, which is attached to the Jura in the south of the Vosges by the Burgundian Gate, whose importance every student of history appreciates, and in the south of the Black Forest where the Rhine tumbles over the rocky ledge at Schaffhausen. (2) The Elbe group, whose outliers are attached to the Alps beyond the confluence of the Inn and the Danube at Passau, and to the Carpathians (Beskiden) at the Moravian Gate, the col between the March and the headwaters of the Oder. (3) The Weser group, which rises out of the plain. The Rhine trend characterises the first group, the Hercynian trend the second, and the third is more or less a meeting place of both.

ITEMS OF INTEREST.

AN interesting letter in *Nature* of February 16th, by Prof. G. M. Minchin, F.R.S., on "Geometry *versus* Euclid," should be read by every teacher of mathematics in the country. From the numerous suggestive paragraphs we select the following, in the hope that the letter itself may be referred to:—"There is absolutely nothing in the first twelve propositions that could not be taught far more effectively to a boy of ordinary intelligence in a few days, if only a rational style of teaching geometry were adopted; but if the exact language and pedantic professionalism of the school Euclids must be followed, to the weariness of the boy's mind and the quenching of his interest, it becomes a very long process indeed—ending, in the case of a large number, in utter failure . . . . The plea that Euclid's book is unrivalled as an exposition of clear logical method and arrangement, and, as such, must be the foundation on which to build geometry, is vain—for the simple reason that it is not in England (where Euclid is worshipped), but in France and Germany (where Euclid is unknown as a text-book), that the great discoverers in geometry have been produced."

A MEETING was held on February 14th for the promotion of the training of teachers for secondary schools at St. Mary's College, Paddington. Canon Lyttelton, headmaster of Haileybury, presided. Prof. Jebb, in addressing the meeting, said there were two dangers incident to the attempt to train teachers systematically. One was that the time demanded from the young student of the art of teaching might be so great as to interfere with his or her general education, for it should be borne in mind that the general education of the teacher himself was the primary and essential condition of success in the work of communicating knowledge to others and of drawing out their powers. The second danger was that too much attention might be paid to the theoretical part of teaching.

AT a meeting of the Bibliographical Society on February 20th the Rev. A. E. Shaw, of Pembroke College, Oxford, read a most amusing and instructive paper on "The Earliest Latin Grammars in English." Teachers may be thankful that they have more efficient tools than the pedagogues of pre-renaissance times possessed, whose stock-in-trade consisted mainly of mnemonics in bad Latin verse and a birch! That this instrument was in demand may be inferred from the fact that in the grammars of the 15th century there were no less than *seven* genders. One of the first Latin grammars in English was written in 1527 by Colet, who founded St. Paul's School, that boys might be taught without being subjected to the brutal flogging of the time. In his grammar the following question and answer occur:—

"*Q.* How do you render English into Latin?

"*A.* First, I read the English once, twice and thrice.

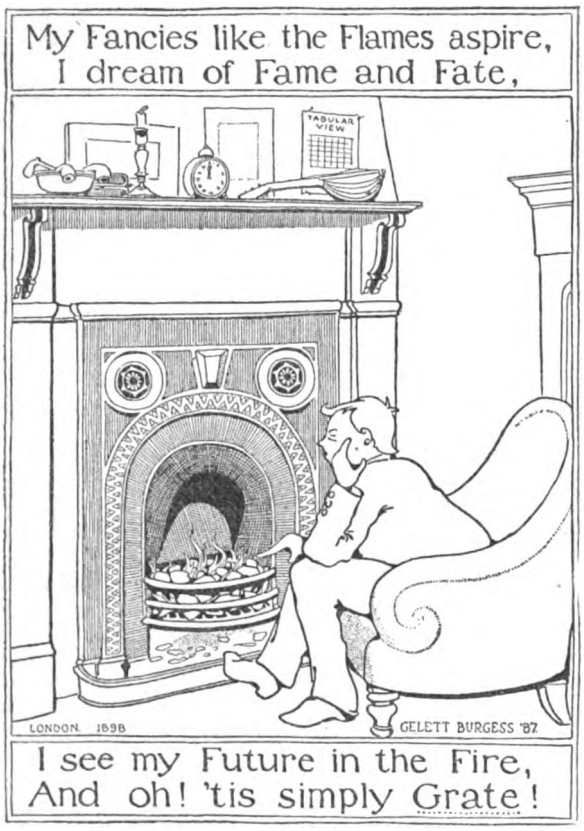
"Then I find the principal (verb) and ask the question Who? or What?"

This sounds very familiar. The Bibliographical Society is to be congratulated on securing Mr. Shaw's paper.

AN inspection of the pass list of the London Matriculation Examination of January last shows that of the successful candidates 26 were prepared at the University Tutorial College, while 9 came from the City of London School. Alleyn's School, Dulwich, and the Higher Grade School, Cardiff, are each credited with 6 passes. Borough Road College, Carlyon College, Nottingham High School, St. Paul's School, Tollington Park College and University College School passed 5 candidates each. Epsom College, Harrogate College, Leicester Wyggeston School, Oundle School, Plymouth Mannamead College, Southampton King Edward's Grammar School, Woodhouse Grove School, and in London—King's College, School for the Sons of Missionaries, Streatham Hill School and University College each sent in 4 candidates whose names appear on the list. The names of eighteen schools each occur three times, viz.—Batley Grammar School, Berkhamsted School, Bristol Merchant Venturers' College, Catford St. Dunstan's College, Colwyn Bay Rydal Mount School, Clifton College, Dover College, Dulwich College, Middlesborough High School, Portsmouth Grammar School, Rugby School, Sutton High School, Wellington College (Shropshire), and in London—Bedford College, Birkbeck Institute, Clyde Street, Deptford, P. T. centre, and the Royal College of Science. Fourty-four other schools have two passes each and 185 schools are mentioned once only. We learn from the *University Correspondent* that the University Correspondence College is to be credited with 142 successful candidates.

ONE of the specific recommendations of the recent report prepared by the sub-committee appointed to enquire into the facilities for Commercial Education, by the London Technical Education Board, will prove of exceptional interest to many of our readers. The recommendation to which we refer states:—"That it is desirable that full and express recognition should be given to higher commercial education in the reorganisation of London University; and that it be referred to the special sub-committee of the Board, dealing with the university, to consider whether it would not be wise to urge upon the commissioners the establishment, from the first, of a separate faculty of economic and commercial science; the provision of endowed professorships in the various subjects of higher commercial education; and such arrangements as will facilitate and encourage those designed for or engaged in the higher ranks of business to take advantage of university teaching."

THE *Technological Review* is a new quarterly magazine relating to the Massachusetts Institute of Technology, one of the best institutions for the study of applied science in the United States. It contains 142 pp. of well-printed matter of an interesting kind, and is finely illustrated. We have reproduced from



the new magazine, with Mr. Gelett Burgess' permission, his quaint picture "Reverie," which will serve to remind many a schoolmaster of the dreams of his youth, and set him comparing his actual accomplishments with the rosy fancies of his undergraduate days.

The Education Department have just issued a circular addressed to training schools of cookery informing them that arrangements are now being made for the examination by the Department of candidates for cookery diplomas. It is proposed that in future the requirements shall be as follows:—1. (*a*) Twenty hours a week for 42 weeks for a cookery diploma; (*b*) 16 hours a week for 32 weeks for a laundry work diploma. 2. Only 80 hours may be deducted out of the *minimum* number of hours in each case for attendance at science lectures. 3. All examinations by the training-school authorities in cookery or laundry work must be conducted by expert examiners approved by the Department. They must not be on the committee of the training school, or in any way connected with the training of the candidates. These new conditions would apply to all candidates who begin their training after August 31st, 1899.

The scheme of Commercial Education jointly formulated by the Halifax Incorporated Chamber of Commerce and the Governors of the Halifax Technical School should be widely studied. It makes provision for the special education of youths destined to commercial pursuits. The complete course of evening instruction will extend over at least four years, during each of which the student will attend three evenings per week for thirty weeks. The work of successive years will be as follows:—1st year: Book-keeping, 1½ hrs. per week; office work, 1 hr.; commercial arithmetic, 1½ hrs.; one language 1½ hrs.; commercial science, 1 hr.; commercial geography and history, 1 hr.; physical science (optional), 1 hr. During the second year the time given to office work is increased, and that given to commercial arithmetic diminished; with this difference the course of study is a continuation of the elementary work. A second language is commenced in the third year, and to it is given the time previously devoted to arithmetic, while less time is devoted to office work and more to commercial geography and history. Book-keeping, office work and commercial history are dropped during the fourth year, and languages and commercial science receive greater attention, the latter is now chiefly concerned with the economics of the industry in which the student is engaged. A pamphlet, which the authorities in Halifax have published, contains detailed syllabuses of each subject and the parts to be studied during each of the four years.

A few days ago, in glancing through an old-fashioned "Course of Mathematics," by Peter Nicholson, published in 1822, we lighted upon some amusing problems set in rhyme, and they reminded us of the remark made by Prof. Mathews, in his first article on "The Teaching of Algebra," with regard to some fascinating questions in Hutton's "Mathematics" which first aroused his interest in problems. The remark induces us to print Mr. Nicholson's attempts at verse; and we trust that they will be used to show pupils who dislike problems that the search for solutions of mathematical questions is as interesting as solving puzzles or finding missing words. The rhymes are as follows:—

Ye who can, by the power of mystic lore,
The unknown depths of algebra explore,
And, by new methods, wondrously impart
The hidden truths of that mysterious art;
From the equations[1] by a method true,
The values find of x and w;
Their product just a lady's age will show.

A lady, wealthy, kind, and fair,
Your aid, dear sirs, wou'd gladly share,
In finding of a plot of ground
Which three right lines exactly bound:
The spaces and ambit (that you're told)
Both the same figure just unfold;
The sides (more data to supply—
Your skill she'd not severely try)
Are in an arithmetic train,
And a right angle two contain.
Now, sure, this fair you may relieve
And show what science can achieve.

Mrs. I. White Wallis has recently published two papers dealing with School Hygiene[2] which would be read with advantage by all whose work lies in the schoolroom. In the course of her contributions she remarks that public opinion "still allows teachers to be entrusted with the lives and physical well-being of the nation, before they have comprehended the application of the most elementary ideas of sanitation of buildings to the health of the child-life that is to occupy them." We think that Mrs. Wallis has formed too narrow an opinion of the knowledge of these vital questions possessed by most schoolmasters and schoolmistresses, and that in those cases where such ignorance does exist the deficiency of equipment will be at once made good by careful study and observation on the part of the teachers concerned.

Cornell University, the first college to admit women in co-education with men, has now been obliged to add a medical department to allow the sexes to study together. The professors, it is stated, were at first opposed to receiving the young women in the same medical classes with the young men; but the charter of the institution having been granted for co-

[1] Given $\sqrt[3]{(w^2)} \times \sqrt{(x^3)} = 2x^2$: $\sqrt{(2xw)} = x \times \sqrt[3]{(w)}$.

[2] (i.) *Journal of The Sanitary Institute*, January, 1899, pp. 575-80; (ii.) *The Humanitarian*, February, 1899, pp. 101-104.

education, it was not possible to close any department to either sex. The example of the medical department of the University of Buffalo, which admitted women in 1875 on the same basis as men, is thus followed. Nineteen young women are enrolled among the medical students at Cornell.

THE Fifteenth Annual Report issued by the Association of University Women Teachers shows considerable increase in the work done during the past year. The total number of members is 534, of whom 164 have joined since December, 1897. The financial position of the Association is sound, the statement of accounts showing a balance of over £181. An important side of the work is the registry, which has filled 88 posts during the year. Unlike other registries, no percentage is charged on the earnings of teachers. The working expenses are met by members' subscriptions and employers' fees, the underlying principle being one of co-operation. The work is carried on by a committee, an hon. secretary and a paid secretary, all being women teachers of university standing.

THE recent address of Dr. Clement Dukes, Physician to Rugby School, on "Remedies for the Needless Injury to Children involved in the present System of School Education," delivered before the Incorporated Association of Head-masters at their annual general meeting, has just been published by Messrs. Rivingtons, and deserves the closest attention from all school teachers. Referring to the proper number of hours to be devoted to work and sleep, Dr. Dukes says :—"In my judgment, the scale should be so adjusted that at the youngest age, of five to six, the hours of work per week should be six, and the hours of sleep per night thirteen and a half; during the intermediate ages, up to nineteen, the scale should increase per age by three hours up to age nine, and by five hours thereafter up to age nineteen; while the hours of sleep should concurrently be reduced by half an hour per age throughout, so that at the age of seventeen to nineteen the hours of weekly work would be fifty, and the hours of sleep eight and a half."

THE following table, which has been drawn up by Dr. Dukes, summarises in a useful way his dicta on this important question :—

AS WORK AND SLEEP SHOULD BE ALLOTTED.

Age.	Hours of work per week.	Hours of sleep per night.
Children between 5 and 6 ...	6	13½
,, ,, 6 ,, 7 ...	9	13
,, ,, 7 ,, 8 ...	12	12½
,, ,, 8 ,, 9 ...	15	12
Pupils ,, 9 ,, 10 ...	20	11½
,, ,, 10 ,, 11 ...	25	11
,, ,, 11 ,, 12 ...	30	10½
,, ,, 12 ,, 14 ...	35	10
,, ,, 14 ,, 15 ...	40	9½
,, ,, 15 ,, 17 ...	45	9
,, ,, 17 ,, 19 ...	50	8½

THE case of Hollebone *v.* Adams, recently tried in the Queen's Bench, is of some importance to head-masters of boarding schools. The plaintiff's son was a boy at the school over which the defendant presides. The father wanted the boy to return home during term for a family gathering of some sort, and the head-master would not at first permit it. As the father insisted, the boy eventually went home, but the school-master refused to have him back. The father then brought an action for damages for breach of contract. The jury, however, decided that the head-master was entitled to maintain discipline, and the Lord Chief Justice gave judgment for the defendant.

FOREIGN NOTES.

AN objective measure for the amount of fatigue attending the exercise of the various mental faculties has long been desired for educational purposes. In the *Deutsche Blätter* Marx Lobsien enumerates the various expedients proposed, and criticises their respective merits. A purely physical method has been worked out by Professors Mosso and Keller. The pupil is made to read ordinary print as quickly as he can for a certain period. Then he is made to lift a weight repeatedly with his middle finger until it is thoroughly fatigued. The results of alternate experiments show that after a little reading work the muscular power shows an increase to double its former amount. But after fifty minutes fatigue sets in. This is called the ergograph method. Griesbach uses his æsthesiometer, a simple pair of compasses, which is applied to a selected portion of the skin. Fatigue shows itself by inability to distinguish the two points separately, even when the points are separated by a distance which sufficed before fatigue set in.

SUCH more or less mechanical methods only give very rough-and-ready results. Professor Burgerstein, of Vienna, used arithmetical problems for testing fatigue, examining both the quantity of work turned out in a given time and its correctness. He noticed an increasing quantity and a deteriorating quality as fatigue set in. Herr Lobsien himself prefers a psycho-physical method involving the reading of letters indiscriminately mixed up, and thus forming a "homogeneous object." This should furnish more uniform results than the other methods. Generally speaking, such researches are quite as important as they are difficult. Education is largely a psycho-physical problem, in which the store of nerve energy possessed by the pupil must be directed and utilised to the best possible advantage. Investigations such as these will, no doubt, in the somewhat remote future, be carried out for the solution of social and labour problems.

THE instructions to be issued to the German school physicians are being discussed with a view towards making them a sufficient safeguard against infection, and a guarantee that the children's faculties shall be in no way impaired. The Teachers' Association for School Hygiene recommends that the school physician shall have a seat and vote on every school board. Every school shall have its own physician, who is to examine all children first presented as to medical fitness, with especial reference to defects of the sense organs. In case any child should be absent through indisposition, the doctor is to be prepared to examine it if the head-master should think it desirable. In any case of sickness in school the physician is to be called in at once, or the child sent to his house. But the physician shall in no case superintend the instruction of the classes. The rules proposed do not include a periodical examination of the sanitary state of the school itself, which would be a grave omission.

FOR the last two years a unique educational experiment has been going on in Chicago. It is Dr. John Dewey's University Elementary School. The school takes children at the very beginning of their school career, and all their training steers directly for their subsequent university life. The method by which this idea is carried out is distinctly novel. No text-books are used, and there are no set lessons to learn and recite in spelling, arithmetic, geography, grammar, history, or anything else; still there is a constant course marked out, into which all these things enter as accessories, and are mastered as they come up. The carpenter's shop, the cooking class, the making and working of simple machinery, furnish constant occasion for the

use of numbers. Geography comes in everywhere, as the constituents of everything used are traced back to their original habitat, while in history the map is constantly in use.

The guiding idea of this experimental school is "to keep alive and direct the active inquiring attitude of the child, and to subordinate the amassing of facts and principles to the development of intellectual self-control." The five regular teachers are young women, college graduates, and specialists in their departments. Considerable liberty of conversation and motion is allowed in the classes, and manual training and experimental work abounds. The school at present contains about sixty pupils, boys and girls, ranging from five to thirteen years of age, and is a branch of the University. The results are said to be very excellent. But then we must remember that the children are mostly those of professors and teachers, and the enthusiastic staff of the little school is not hampered by examinations, and can devote all its energies towards the highest forms of education. The eventual outcome of the experiment should be looked for with keen interest.

The German Consulate at Buda-Pesth is said to have requested the Hungarian Education Department to establish a German intermediate school in the capital. This request has met with violent opposition from the ultra-Hungarian nationalists. The latter quite recently succeeded in reducing the number of hours per week during which German is taught in the elementary schools from 3 to 1. The difficulties attending a monoglot Hungarian education were strikingly shown during the manœuvres of 1896, when the Hungarian officers failed to understand a German command, and were found, in consequence, to have marched their troops against their own associates instead of against the enemy. As long as there is a united Austro-Hungarian army, and as long as German is the official language of that army, a bilingual education will be an essential part of the Hungarian officer's equipment.

In honour of the centenary of the establishment of the Physical and Agricultural Society of Königsberg, Dr. Walter Simon has given the society the sum of £200 to be offered as a prize for a work on the subject of Plant or Animal Electricity presenting either fundamentally new aspects or dealing with the physical cause of organic electricity and its importance for life in general or for special functions. The works presented may be printed or written in German, French, English or Italian, and must be sent in before December 31st, 1900. Further information may be obtained of the President or Secretary of the Physikalisch-Ökonomische Gesellschaft, Königsberg. Competitors will probably find it necessary to read up Du Bois Reymond, Wundt, and other works, and to have a well-equipped laboratory at their disposal. On the other hand, animal electricity is a field in which there is plenty of room for pioneers yet.

Professor Le Baron R. Briggs, Dean of Harvard College, in the *Atlantic Monthly*, treats in a frank paper the relations between parents, their sons, and college authorities; and the influence of parents upon the character and behaviour of their sons, for which the college authorities are usually held responsible. Home influences and home training are responsible for much of the misbehaviour of students. Too many wilful sons are only what their fathers have made them, and too many fathers exhibit a disingenuousness toward their sons, and an underhand dealing with the college authorities, which produce the saddest results. Professor Briggs does not assume a college or university to be meant for good scholars alone—for many students of low standing on the class list still receive incalculable benefit—but it is no place for the dawdler, the idler, the dissipated man, or the man who is kept there only because his parents do not know what else to do with him.

THE SCHOOL PULPIT.

Notable Passages from Sermons Preached in Public Schools.

True and False Standards of Character.[1]

I will take three things in which the world at large and you here at school are very blind, and in which you *like* to have blind guides, and are persuaded that they see very well, and are quite fit to lead you.

The first thing shall be one in which you are misled, but not so much misled as the world outside is. The other two shall be things in which you are very much more misled than the world is; things with regard to which the world of elder persons looks at you with kindliness, and knows you will think differently by-and-by.

The first thing is the Love of Riches, and here perhaps you may be much startled to think that I should accuse you of that in any form. You would think me much more likely to accuse you of Waste. And of course there can be here no sordid pursuit of wealth such as is to the young often revolting. Often it is the vice of those who have been wasteful in youth, but it is an elderly, not a boyish vice. However, I infer from this that wastefulness is not so very remote from that same pursuit of wealth. Pursuit of wealth is but the love of those means which wastefulness also loves, grown more cool and calculating. There is a most true sense in which Waste is a part of the Love of Riches. But I mean a little more than this. I mean that, taking boys who in all other points are equal, the rich boy, or the boy who is injudiciously supplied with money, finds *that* a means of getting more comfort and more consideration. The fact that he is better dressed, that he has showier books, more expensive articles, that you gather from the hints which escape him that he lives in more expensive ways at home than you do, and is allowed to do things which you are not allowed to do, does, to our shame, attract you to him. I put these things boldly, and draw the lines rather broadly. You get to be friends with him; when you are friends you almost forget how much you like the sunshiny nature of his life; you mix it up with the view of his character. You allow him, even if he is in other respects inferior to you, to be upon a footing with you, which ought not to be earned except by merit and real sympathy. It is understood that his "inferiors" will be more deferential to him, that they will take care of his comforts when they will let others care for their own. All this comes in so quietly, so insidiously, that even to evince the least fretfulness under it is held to be an unfavourable symptom in a schoolfellow's character. Happier certainly is he who, left to his devices, finds out his own powers, without experiencing any pangs; for he is walking on the sound ground of simplicity and energy, while the boy who makes a foolish use of his money, and those who admire him, have already their foot on the edge of the pitfall.

. . . . . .

The second point—and this is one in which you are less wise than your elders, and less wise than you will be—is in the false opinion you have of the comparative value of bodily prowess and skill. Let it by all means be cultivated. The more you cultivate all powers the fuller will be your being. But do not take so false a view of the comparative value of them. The perishable body and the immortal mind are things of infinitely different value: to sacrifice mental gifts and cultivated, widely-expanded intellect to bodily exercise is a spending of the glorious years of boyhood, bitterly to be rued in after life. The world does not make this mistake. It gives its money and its smiles

[1] From a sermon on "Leaders Astray," given to the boys at Wellington College by the late Archbishop Benson, when Headmaster of the school. The sermon is printed in full in "Boy Life." (Macmillan.)

and its applause to those who amuse it, but it does not make them its examples or its influential men. Do what you will you can never equal those whose profession or whose trade lies in the development of strength or swiftness; and if honour is to be paid to these things, it cannot be fully paid to those who are but second in the rank. You can obtain nothing but this—that, considering your position and considering your other duties, you have reached a high mark. But what has happened meantime to your position and your duties? Will you take a higher place than your father left you? Have you done all those greater duties to perfection? Have you gained in thought, in wisdom, in influence? Alas! no. Yet all your days at school you were by those passing things gaining an influence which you did not turn to any purpose whatsoever, and those who praised you and watched you with admiring eyes are no better than if they had never known you.

Compare one who takes his own soul in his hand, and says to it, "I will discipline you and make you strong, and teach you not to think base thoughts, but to love what is beautiful and noble; and I will make you do your duties to others, and help them out of their difficulties and out of their sins; and if they will not forsake their sins, I will make you set yourself against them, whether you like it or no, and you *shall* try to do them good." Take one, I say, who talks thus to his own soul, and take another boy who does not speak to his soul at all, but who says to his body, "I prefer you; and I will feed you with what you like, and I will exercise you till you are very strong, and can run and leap and fight better than others, and you shall be made healthy and stout, and you shall not be troubled by anybody's cares or anybody's sorrows, or any work which makes head or heart ache, and you shall only be good enough not to vex those who are not good, or to interfere with your own comfort."

Take, I say, such two boys talking thus to their souls and to their bodies, *practically*, though not in words; *and*, though the world judges right enough here, I say it with shame, and I say it with trembling, the one boy will go away and be forgotten of you, and the other will be popular among you, and you will keep his image among the treasures of your hearts, and all your life long you will say, "What a nice fellow he was!"

That is being Blind and taking to Blind Guides.

Well, now, I will take a third case, and that is the blindness of False Honour and False Chivalry. To hold to a bad promise; to become false for another in order to turn aside the law of discipline, which alone has in it virtue to heal or to warn; to be recognised as obedient amid secret disobedience; to be a destroyer of time and its uses; to be too good-natured to tell a friend some plain truth about his friends or his ways; to be excessively resentful at the least affront, these are the deceptive wares which lie about among you ticketed with the names of friendship, kindness, and honour.

They were blind men who ticketed them so, years ago, and they are blind men who are still imposed on by them.

But this world is not made for the lasting convenience of the good-natured. It is not made for the lasting advantage of those who wish to get its good things by stealth, or by acting a part, or by enacting laws to suit themselves. It was constructed on a different principle. This world was not made even for those who are naturally deficient—not made for the blind. The blind suffer in it, and must suffer. It is not made for the comfort of the ignorant. It is constructed on a different principle again from that. It is not made for the conceited, who say, "we see."

All these, the good-natured, the blind, the ignorant, the conceited, will at last find themselves badly off in it, and for this reason, that they have no right to be any of the things they are.

LONDON MATRICULATION, JUNE, 1899.

Guide and Monthly Test Papers.—No. III.

I.—Latin.

GRAMMAR AND COMPOSITION.

(1) Give, when found, the dative singular, genitive plural ablative plural, gender of—tribus, veru, res, quercus, acies, domus, artus.

(2) Give the meanings and nominative singular of—Quivis, quisquis, uterque, quinam, quidam, quisque, uter, quisquam, ipse, iste.

(3) Give the comparative and superlative of—frugi, infra, ultra, malevolus, prae.

(4) Give the Latin for—8th, 10 each, 20 times, 21st, 1,000 men, 11,000 men, 90, 900.

(5) Give the 3rd person plural perfect indicative active and 1st. person plural perfect indicative passive of—farcio, fodio, haurio, iacio, ordior.

(6) Put into Latin:

(*a*) Hortensius used to speak better than he has written.

(*b*) If I order you to be arrested someone will say I have acted cruelly.

(*c*) Do whatever you like. I mean to give you no more.

(*d*) Even if death had to be met, I should have preferred meeting it at home and in my country than in strange places abroad.

(*e*) If you do this, you see me to-day for the last time.

(*f*) If I were to say that I am moved by no regret for Scipio, I should tell a lie.

CICERO. PRO MARCELLO.

CH. VII., VIII.

I. Translate:

(*a*) Ch. VII., § 21. Tua enim cautio . . . . sint amicissimi.

(*b*) Ch. VIII., § 26. Parumne igitur . . . . meritorum.

II. Translate with notes on the construction of italicised words:

(*a*) Quis est omnium tam ignarus rerum, qui non intellegat tua salute contineri suam et *unius tua vita* pendere omnium—quote a similar example from In Catilinam I.

(*b*) Si vero ad humanos casus incertosque motus valetudinis *sceleris* etiam accedit *insidiarumque consensio*, quem deum, *si cupiat*, posse opitulari reipublicae *credamus*.

(*c*) Saepe venit ad aures meas . . . . Credo: sed tum id audirem si tibi soli *viveres*.

III. Give the meanings of—dumtaxat; omnia sunt excitanda tibi; togatus; mederi; modum vitae tuae aequitate animi definies.

CICERO. IN CATILINAM I.

Ch. VIII., IX., X.

I. Translate:

(*a*) Ch. VIII., § 20. Non referam . . . . manus intulliset.

(*b*) Ch. IX., § 22. Quamquam . . . . in posteritatem impendeat.

(*c*) Ch. X., § 26. Habes . . . . nominaretur.

II. Translate, adding notes where necessary:

(*a*) Quid, quod tu te ipse in custodiam dedisti? Quod vitandae suspicionis causa ad M'. Lepidum te habitare velle dixisti?

(*b*) . . . a quo etiam aquilam illam argenteam . . . cui domi tuae sacrarium scelerum constitutum fuit, sciam esse praemissam.

(*c*) Nunquam tu non modo otium sed ne bellum quidem nisi nefarium concupisti.

(*d*) Ad huius vitae studium meditati illi sunt qui feruntur labores.

III. Translate and explain the construction of italicised words:

(*a*) Quamquam quid ego to *invitem*, a quo iam *sciam* esse praemissos, qui tibi ad Forum Aurelium *praestolarentur* armati.

(*b*) Hic tu *qua laetitia* perfruere! quanta in voluptate bacchabere!

(*c* Sed est *tanti* dum modo ista *sit* privata calamitas.

IV. (*a*) What is the difference between paries, moenia, murus.

(*b*) Explain the form "duint."

(*c*) Give the meanings of—importunus, invidia, fortissimus, temporibus reipublicae, iam pridem studes, latrocinio.

II.—English.

Language and Literature.

Modern English Grammar.—Syntax.

(1) What does the subjunctive mood express? Give instances of the use of (*a*) the indicative, (*b*) the subjunctive, after the words *if* and *though*.

(2) Correct the syntax of the following, and give your reasons:

(*a*) I heard of your application being successful.

(*b*) He was one of those who thought that the Cretan trouble is ended.

(*c*) We do not doubt but that he is here.

(*d*) He wants his hair cutting.

(*e*) Is it raining? I do not think so.

(*f*) Whether we shall win or no depends upon ourselves.

(3) What are the correct uses of *shall* and *will* in asking questions?

(4) What prepositions should be used after (1) different, (2) compare, (3) prevail, (4) accompanied. Give examples.

(5) Explain and illustrate the following terms: Complement, complex object, nominative absolute.

(6) Discuss the forms in italics:

(1) The custom *obtains* here.

(2) He *dare* not escape.

(3) *Methinks* you are right.

(4) The city *of* London.

(5) I will try *and* learn the lesson.

(7) Analyse the following:

There is a flower, the lesser Celandine,
That shrinks like many more from cold and rain,
And the first moment that the sun may shine,
Bright as the sun himself, 'tis out again.

(8) Parse:

Milton! thou should'st be living at this hour;
England hath need of thee.

(9) Explain: Attraction. ellipsis, solecism, tautology, synonym, metaphor.

(10) Write an essay on one of the following subjects:

(1) The use and abuse of athletics.

(2) Diplomacy.

(3) The value of personality.

History of England, with Geography relating thereto.

(1500-1629 *A.D.*)

Ten questions to be answered.

(1) What were the reasons for the Tudor "despotism"? By what machinery was it exercised?

(2) What efforts were made in these years to effect a union between England and Scotland? What were the prospects in 1558 and in 1605 of this being effected? What is the bearing of "Calvin's case"?

(3) Describe Wolsey's policy (*a*) abroad, (*b*) at home in lay matters, (*c*) in ecclesiastical.

(4) State exactly what was done 1529-36 against the English clergy, regular and secular, and against the Pope? How was it effected in each case?

(5) Tell the story of Henry VIII.'s marriages as illustrating the history of the time.

(6) What persons were put to death by Henry VIII.? Give the reasons, the circumstances, and the legal process in each case.

(7) Describe the social grievances of Edward VI.'s reign. In what sense may they be attributed to the dissolution of the monasteries?

(8) Give carefully with dates the religious changes of 1536-58. How far were they due to "foreign influences"?

(9) What was Elizabeth's ecclesiastical position? Explain the principles of the various parties who opposed her rule.

(10) Give an account of Elizabeth's courtships. Why would she never marry?

(11) How did Elizabeth oppose Spain before 1588? and after?

(12) Give a general account of the economic changes of Elizabeth's reign, introducing the Statute of Apprentices, the Poor Law, the "monopolies," and the East India Charter.

(13) Date the various Parliaments and their sessions 1603-29. Summarise the work of each.

(14) Carefully distinguish the opposition of Wentworth and Eliot to Buckingham.

(15) Summarise the Petition of Right; discuss its clauses, specially that which concerns imprisonment.

III.—Mathematics.

Arithmetic and Algebra.

This paper includes, in Arithmetic, Interest and Discount, and, in Algebra, Miscellaneous Fractions. Read:

Arithmetic:—Pendlebury, chaps. xxix.-xxxi. Loney, chaps. xix.-xxi. Lock, chap. xii. Hamblin Smith, chaps. xxi.-xxiii.

Algebra:—Hall and Knight, chap. xxii. Hamblin Smith, chap. xiv. C. Smith, chap. xii. Todhunter and Loney, chap. xvi.

(1) A and B together can do a piece of work in 3 hours, B and C together in 6 hours, C and A together in 4 hours; if they all start together and A leaves off at the end of two hours and B an hour later, how long will it take C to finish it?

(2) Find, to the nearest penny, the Compound Interest on £4,150 for $2\frac{1}{2}$ years at 4 per cent. per annum.

(3) What is the difference between "true" and "mercantile" discount? Show that the difference between the mercantile and true discount on any bill due 5 years hence at 5 per cent. simple interest is always one-fourth of the true discount.

(4) Divide $a^3 + b^3 - 1 + 3ab$ by $a + b - 1$.

Find the value of $\dfrac{a + \sqrt{x^2 - a^2}}{\sqrt{a^2x^2 + 4b^4} - b^2}$ when $x = \sqrt{a^2 + 4b^2}$

(5) Simplify the expressions:—

(i.) $\dfrac{a}{(a-b)(a-c)} + \dfrac{b}{(b-c)(b-a)} + \dfrac{c}{(c-a)(c-b)}$;

(ii.) $\dfrac{2x^2 + 11x + 12}{x^2 + 2x - 8} \times \dfrac{x^2 - 4}{x^3 + 8} \div \dfrac{(x+3)^2 - x^2}{(x-1)^2 + 3}$.

(6) Find the product of the sum of

$$\frac{(x+1)^2 + \frac{2}{y} - (x-1)^2}{(x^2+1)^2 - \frac{1}{y^2} - (x^2-1)^2} \text{ and } \frac{2y + \frac{1}{x}}{4x^2 - \frac{1}{y^2}},$$

and the difference of

$$\frac{(x+1)^2 + (x-1)^2}{2x+y} \text{ and } \frac{\frac{x}{y} - 2\left(\frac{x}{y} - 1\right)^2}{4x.\frac{x}{y} - y}$$

(7) Solve the equations:—

(i.) $7 + \dfrac{3x-8}{16} = \frac{1}{3}\left(x + \dfrac{13x+35}{48}\right)$;

(ii.) $x - 2y = 2(3y - z) = 4z - 3x = 4$.

(8) The distance between two seaport towns is 75 miles by land and twice that distance by sea. A torpedo boat travelling at three-quarter speed takes $3\frac{3}{4}$ hours longer than an express train to get from one town to the other; if it, however, has two hours and five minutes start and travels at full speed, it can just arrive at the same time as an ordinary passenger train whose average velocity is three-fourths that of the express. Find the velocities of the torpedo boat and the express train.

Answers.

1. 2 hrs. 2. £428 8s. 3d. 4. $a^2 - ab + b^2 + a + b + 1$; $\dfrac{a+2b}{a^2+b^2}$. 5. (i.) 0; (ii.) $\frac{1}{3}$. 6. $\dfrac{2xy+1}{2xy-1}$.
7. (i.) $26\frac{1}{2}$; (ii.) $x = 12$, $y = 4$, $z = 10$. 8. Torpedo boat, 40 miles an hour; express train, 60 miles an hour.

GEOMETRY.

Euclid, Books I., II. and III. 1-25.

(1) Through a given point draw a straight line making equal angles with two given straight lines.

(2) Equal triangles on the same base and on the same side of it, are between the same parallels.

Prove also the converse of this proposition.

ACB, ADB, AEB are triangles on the same base AB and between the same parallels AB and CE; AD and BC intersect in F and AE and BD in G; show that FG is parallel to AB when the triangle ACF equals the triangle BEG.

(3) If a straight line be divided into any two parts, the square on the whole line is equal to the sum of the squares on the two parts together with twice the rectangle contained by the two parts.

(4) In any triangle the square on the side subtending an acute angle is less than the sum of the squares on the other two sides by twice the rectangle contained by either of these sides and the straight line intercepted between the perpendicular let fall on it from the opposite angle, and the acute angle.

BDC and BEC are right-angled triangles with the same hypotenuse BC, but described on opposite sides of it; if BD and EC produced meet in P, show that the rectangle contained by PB, PD equals the rectangle contained by PE, PC.

(5) If two circles touch one another, either externally or internally, the straight line joining their centres, or this straight line produced, passes through their point of contact.

(6) Equal chords in a circle are equidistant from the centre.

Through a given point within a given circle draw a chord of the circle such that its middle point may be equidistant from the given point and from the centre.

(7) In a quadrilateral inscribed in a circle the opposite angles are together equal to two right angles,

(8) Show that the perpendiculars of a triangle bisect the angles of the triangle formed by joining the feet of the perpendiculars.

IV.—General Elementary Science.

For this month, Chaps. vii.-ix. (inclusive) and xviii. and xix. of "Elementary General Science," by A. T. Simmons and L. M. Jones, should be studied. As before, great attention will with advantage be given to the experimental work.

Chap. VII.—Be sure that you understand the "Principle of Archimedes" and what is meant by "relative density." Work all the numerical examples at the end of the chapter.

Chap. VIII.—In learning Boyle's Law make the definition on p. 114 read "when the temperature remains the same, the volume of a *given mass of* gas varies inversely as its pressure." Perform Experiment 110 with great care.

Chap. IX.—The definitions of "work" and "energy" are of the greatest importance, and the expression for the energy of a moving body on p. 122 must be learnt by employing it to solve the problems on pp. 131-2.

Chap. XVIII.—The examination and collection of "salt-gas" is not only an interesting practical exercise, but a good example of a simple research on the properties of common salt and the products to be obtained from it. Be sure you grasp the second paragraph on p. 266.

Chap. XIX.—Is a difficult chapter for the beginner, and will require real work to thoroughly master it. Do not rest satisfied when you have simply learnt the definitions by heart; they require thinking about.

(1) Describe a simple series of experiments to prove that the force by which a liquid floats up a body depends only on the volume of the part of the body immersed and on the density of the liquid.

(2) A ball weighing 50 lbs. is rolled along a length of 6 feet up an inclined plane sloping at 30° to the level. Calculate (*a*) the height through which the ball has been thereby raised, (*b*) the work done in raising it.

(3) If you ascended to the height of 3½ miles in a balloon, carrying a barometer, state—(*a*) The indication which would be given by the barometer, (*b*) your explanation of this.

(4) When a brake is applied to a wheel of a rapidly moving train red-hot sparks are seen. What are these sparks, what is the source of their heat, and why do they soon disappear?

(5) Indicate the argument which leads chemists to state that hydrochloric acid gas contains hydrogen united with another gas, and state how this second gas may be obtained from the acid.

(6) By what experiments and reasoning would you show that hydrochloric acid gas should be represented by the formula HCl?

(7) What is an eudiometer? Give a sketch of one and explain for what purposes it may be used.

(8) Describe the properties of chlorine and state under what circumstances it unites with (*a*) hydrogen, (*b*) phosphorus, (*c*) sodium?

V.—French.

I. Translate into English:

(*a*) Un jour je passais, à la nuit tombante, dans l'avenue de *Palace-Gardens*, lorsque je m'entendis appeler par mon nom. Un homme d'une très haute taille, que l'obscurité m'empêcha d'abord de reconnaître, était au seuil d'une belle maison à briques rouges, nouvellement construite dans le style du temps de la reine Anne. Dès que je fus auprès de lui, il me tendit cordialement la main, et me pria d'entrer. La maison n'était pas encore meublée. Il me la fit parcourir dans tous les sens, et après s'être bien assuré que je la trouvais fort habitable: "Eh bien," me dit-il, "cette maison que je viens de faire bâtir, et qui m'a coûté plus de 7,000 livres sterling, c'est le prix de la dernière nouvelle que j'ai publiée dans le *Cornhill Magazine*."

(*b*) Nous l'avions quittée par un soir magnifique. D'aimables Siciliens nous avaient conduits jusqu'au steamer que les vagues legères balançaient dans la rade. Palerme s'allongeait devant nous, avec ses monuments que nous tâchions de reconnaitre. Les montagnes bleuissaient dans le crépuscle, dont les ombres enveloppaient les orangers de la conque d'or. Et nous ne pouvions nous lasser de contempler la belle ligne pure du Mont Pellegrino. Nos amis, cependant, nous disaient "au revoir." Nous leur répondions par la même parole — et qui sait si nous reverrons jamais ce merveilleux coin du monde? Mais les mots ont du bon: par les promesses et les espoirs qu'ils contiennent, ils consolent souvent des éternels changements qui nous emportent. Et puis, me disait un jour un ami très voyageur, le monde est si desolément petit, qu'on finit toujours par revenir aux lieux où l'on est allé, par revoir ce qu'on a revu. Il ajoutait, ce sage:—Seulement, ce n'est plus la même chose; et si l'on avait le souci de ménager ses plaisirs, on resterait toujours sur sa première impression.

II:

(1) Give the plurals of—bijou, évantail, chou-fleur, arc-en-ciel; and the two plural forms and meanings of—aïeul, ciel, appât, travail.

(2) Write down the feminines and meanings of—doux, jaloux, grec, coi, bœuf; and the masculine forms corresponding to—bru, brebis, chèvre, guenon.

(3) What are the rules as to the relative positions of pronouns used objectively?

Translate: (*a*) He will give it to me; (*b*) He will give some to them; (*c*) He will show it to him; (*d*) Send them to him; (*e*) Take us there.

(4) Write the past participle and the 3rd person singular of the present indicative, preterite, conditional, and present subjunctive of—avoir, juger, falloir, mettre, connaître, and courir.

(5) Explain, with examples, the use of *a*, *dans* and *en* before names of places. What is the difference between "En huit jours" and "Dans huit jours"?

III. Translate into French:

Tom Jones, when very young, had presented Sophia with a little bird, which he had taken from the nest and taught to sing. Of this bird, Sophia, then about thirteen years old, was so extremely fond, that her chief business was to feed it and her chief pleasure to play with it. By these means Tommy (for so the bird was called) was become so tame that it would feed out of the hand of its mistress, and perch upon her finger. She always, however, kept a small string about its leg and would never trust it with the liberty of flying away.

HERBART AS TUTOR AND PROFESSOR.[1]

The influence which Herbart has exerted upon education throughout this century ensures a respectful reception for any book concerned either with his system or with anything which assists to a clearer conception of his personality—more especially since in every country the number of teachers calling themselves Herbartians seems every year to increase. There is, however, a peculiar interest attached to the present volume apart from these general considerations. We have here, bound together in a convenient compass, an expression of the principles which guided Herbart in his work as a young tutor of twenty-two, side by side with the riper opinions formed only after a long and arduous life spent in the active work of education.

It will be convenient to refer first of all to Herbart the Tutor. The circumstances of his position were briefly these. He had left the University of Jena early in 1797 before his course was completed, intending to reserve his concluding years of study there till he was more matured. In May of the same year he became tutor to the three sons of Herr von Steiger-Reggisberg, Governor of Interlaken. These sons were Ludwig, aged fourteen; Karl, aged ten; and Rudolf, aged eight. The letters which are here translated by Mr. and Mrs. Felkin are the only five surviving out of 24 educational reports sent by Herbart every two months to the father of his pupils. The predominant impression left after a perusal of these letters is, we must admit, one of commiseration both for Herbart and for the Governor of Interlaken—for the former that he should have had to set down such minute particulars, for the latter that he should have considered it necessary to receive such dissertations on the why and wherefore of the plans adopted with each of his sons.

Herbart gives his impressions of these pupils in a letter to a friend, dated June, 1797: "The piece of land given me to till (Ludwig Steiger must pardon me the comparison, for up to the present he has really belonged more to the world of matter than of mind) has not been neglected by nature, though it has lain fallow terribly long, has become hard and stiff, and must be thoroughly dug over before anything can be sown in it."

But Herbart was not a young man to be daunted by adverse conditions. Speaking of these tutorial experiences some twelve years later, he writes: "To him who hears the true artist's call to education, the small dull space in which he at first perhaps feels himself confined soon becomes so bright and large that he discovers the whole of education therein, with all its motives and needs, the satisfaction of which is truly a work immeasurable."

So much has been written upon the importance attached by Herbart to the cultivation of interest, as the most powerful and necessary adjunct to successful teaching, that it will not be out of place to call attention to his evident desire not to do this by shirking difficulties. Thus in his fourth letter to Herr Steiger, he says: "The chief advantage of instruction is not, I believe, to find a mode of teaching which makes it artificially easier and eludes difficulties. This does not cultivate true reflection, nor able men. I have always allowed Karl and Rudolph to discover for themselves a remedy for the weariness which too great difficulties cause, *i.e.*, the joy of success won by redoubled effort." There is a danger, too, lest many young disciples of Herbart, in their indiscriminate advocacy of their master's theory of interest, may forget the commonly existing conditions of teaching when he commenced his career. As Montaigne expresses these, "Instead of tempting and alluring children to letters by apt and gentle ways, our pedants do in truth present nothing but rods, ferules, horrors and cruelty."

No reader can help being impressed by Herbart's patient and scientific plan of trying method after method to overcome the obstacles which presented themselves in his work of fashioning his pupils on the model of the perfect man. And the interest attached to tracing back the formally expressed results of his life's work, which make up the lectures, to their early beginnings as found in the letters makes the perusal of this book both fascinating and tonic.

The lectures were written six years before Herbart's death in 1841. They are, it is true, given in a very fragmentary form, and their study is a matter of close reading, but the earnest teacher, anxious to learn the ideas of a master in his art, will be amply repaid if he sets to work earnestly and sympathetically. Herbart finds the foundations of education in philosophy and psychology, and as he said about his own knowledge of the latter science, it "was originated, worked out, and written down, during many years' practical educational work."

Every branch of the many-sided business of the schoolmaster is dealt with, and he must be a careless reader and indifferent teacher who is unable to get assistance from these lectures. We only have space to refer to one or two of Herbart's opinions. Hear him on *Corporal Punishment*, for example: "It will be in vain to try and do entirely without corporal punishments, which usually come in when reproofs are of no further use. They ought to be so rare, however, that they are feared as something in the distance rather than as actually carried into effect."

The man "on duty" who looks up *Supervision* will find "The usual result is, that we try to make supervision as strict as possible. But in so doing we run the danger of entirely losing voluntary obedience, and of stimulating the children to emulate each other in cunning. . . . . Supervision is always an evil when it shows unnecessary suspicion." There seems, indeed, no question on which some guidance cannot be found. Herbart had views on the *value of examinations*: "Deterioration takes place when knowledge is used for purposes of ostentation, and for gaining external advantages—the harmful side of many public examinations. Schools should not be compelled to show all they can accomplish." Or, again, on the question of *manual training* Herbart has come to a conclusion: "Middle-class schools should have classes for manual training attached to them, though these need not be quite the same thing as technical schools. Every human being, in fact, should learn to use his hands; for the hand has its own place of honour beside the tongue in raising man above the brutes."

Enough has been written to show that every teacher unfamiliar with Herbart's teachings should study his works. No mention has been made in this short notice of the relative value which Herbart attached to different subjects studied in schools, though it will all be found in Mr. and Mrs. Felkin's accurate and careful translation, to which we cordially invite attention.

[1] "Letters and Lectures on Education." By Johann Friedrich Herbart. Translated and edited by Henry and Emmie Felkin. Preface by Oscar Browning, M.A. (London: Swan Sonnenschein & Co. Ltd. 1898.)

AFTER MANY DAYS.[1]

This is a delightful book—a book which the young or enthusiastic teacher will read at a sitting, with alternately a chuckle of enjoyment and acquiescence, and a pause for a moment's self-searching and reflection; yet one by which the correct upholder of tradition will, if such literature ever meets his superior eye, be little moved.

As Professor D'Arcy Thompson warns us in his preface, it was originally published thirty or forty years ago in his early manhood, when, as he unnecessarily and somewhat discouragingly adds, his knowledge of the world was small. Much of what he has written on Philology, he confesses, he is afraid to reperuse, and many of the innovations he proposes are now

[1] "Day Dreams of a Schoolmaster." By Professor D'Arcy W. Thompson. 328 pp. (Isbister.)

currently accepted. Nevertheless, our progress has not been sufficiently rapid to make the book appear out of date, and, though Professor Thompson has the satisfaction of seeing that there is an undoubted tendency towards the changes he advocates, still the tendency cannot yet be said to be general. Its republication, therefore, at a time when the attention of the public is being so much directed to educational matters and, more particularly, to the newer methods of teaching modern languages, is most opportune. It is as well that we should be reminded that these same methods may be applied in some degree to the teaching of Classics.

The book is written in the lightest and most interesting style, in a spirit of lively badinage, as if a conscious protest against the pedantry and insularity of the run of pedagogic literature.

The author, as he vividly describes his own schooldays, attacks the wooden system of beginning the study of Latin and Greek by painfully learning by rote page after page of dry grammar; rules of gender, in which "not one word of an exceptionable nature had escaped the diabolical ken of the compiler"; rules of Greek and Latin syntax, written in the latter language, when, as yet, it was unintelligible; all this, revised time after time for the space of five years.

The teaching of Translation was equally monotonous. "The attention of the class was rivetted exclusively on its daily lesson—on its daily square-yard of Latin. This would have first to be tortured into villainous English, then parsed word by wŏrd, the nouns all declined, the verbs all conjugated," and so on.

This is the picture drawn by Mr. Thompson of the teaching of Classics fifty years ago. Many of us will recognise in it the picture of our own school-life. How far have we ourselves progressed? At times, we must confess, we drift into the same rut, and even, with shame be it said, defend the system as "excellent mental gymnastic."

As a substitute for all this routine the author gives the outline of a system based on "the adoption of a *viva voce* conversational method in elementary classes" whereby the pupil will get a "natural, unconscious grip" of the language. Side by side with this there would be a certain amount of grammar which would have to be learnt by rote, "but," he asserts, "a good Latin Grammar might be limited to twenty-four pages, and sold with a large profit for sixpence." The terminology—and here he anticipates the Parallel Grammar Series of Professor Sonnenschein—should be as simple as possible and alike for each language. In translation he would discard annotated editions and make as little use of the dictionary as possible. The following extract will then explain his system:—

"I have read through the whole Aeneid with a not very advanced class in one year. For every twenty lines they had construed, parsed and scanned, and said by heart, I read them a hundred lines in current English."

These are certainly not the methods adopted in English public schools. Nevertheless we are strongly in sympathy with them, and feel that they would not only show better results, but also be far more educative. Indeed, we would go further, and even devote one hour a week to the reading and discussion of ancient literature from English translations without reference to the original.

But Professor D'Arcy Thompson does not confine himself to the exposition of a method of teaching Classics. He treats, in a delightfully tender and playful vein, of the boy's journey from nursery to university, driven through gerund-grinding by tawse and birch or led by love through fields of pleasant work; of the education of women, from the boarding-school miss to Lady Jane Grey; of the schoolmaster, from subdued usher to prospective Bishop; and of schools, from the Grammar School of St. Edward's to the "Schola in nubibus."

HISTORY OF ENGLISH LITERATURE.[1]

THE teachers of English History to our boys and girls will be glad of an introduction to these two books. Mr. Stopford Brooke's contains, besides other excellencies, capital translations into modern English of some of our earliest national poems. Mr. Saintsbury directs them to the latest editions of all our great classics.

Indeed it is time that more use should be made of the aid which our literature affords to lighten the task of those who are learning the elements of history. We English are by no means lacking in a national literature, much of which directly, and all of which indirectly, illustrates our political history. Omitting the beautiful Biblical poems of Cadmon, and the quainter poetry of our early forefathers, the stirring poem of "Brunanburh," as translated by Tennyson, would give a boy not only a chance for a fine piece of declamation, but also some insight into the realities of that pre-Norman period which is now so dim and shadowy that many of us thankfully omit it from our school curriculum, and try to imagine that English history, except for an incident or two, begins with William the Conqueror.

Again, leaving on one side the legendary story of England as told in Layamon's "Brut," or the Biblical paraphrases of the "Ormulum," why should we not read more of Chaucer's "Canterbury Tales,' many of which are quite easy to follow, and some at least would be interesting to our children?

But greater far for the purpose of illustrating the political history is Chaucer's contemporary, whom, though strictly speaking anonymous, we have agreed with Professor Skeat to call William Langland. His "Vision of Piers Plowman" and its sequel are, we must confess, a little difficult to read at first, and unfortunately so little interest is taken in them that there has been no encouragement to translate more than a small part. But the initial difficulties are soon overcome, and the reader then finds himself in a whole world of mediæval ideas. We see there, living before us, the Holy Catholic Church with all its uses and abuses, the ideas of the average Englishman on matters religious and political—and very "modern" we are astonished to find many of these are—paraphrases in the most beautiful language of Scripture passages, familiar and otherwise, quaint discussions on matters of theology, bold speculations as to Jesus Christ and the affairs of eternity. The whole is presented in the simplest language, with many a metaphor, and the whole poem is a series of allegories, rising high in tone and poetical feeling to the very end.

Choosing only the finest, since with such wealth at our disposal we can afford to be epicures, we come to the Elizabethan writers. It ought to seem impertinent to ask the question, but how many of us read and know our Shakespeare as we should? His historical plays, though least in value as dramatic literature, are excellent introductions for boys and girls to those periods of English history which they cover, and even "Romeo and Juliet" affords, in its opening scene, a picture of the evils from which England suffered from the wearing of liveries. A play of Shakespeare can be made, if treated otherwise than a parsing and etymological lesson, so interesting that pupils will remember and love the play years after leaving school.

We have no space to do more than mention Spenser's "Faery Queene," and its allegorical representation of the duel between England and Spain, or Bacon's "Essays," the value of which, and even their interest to boys and girls, is in inverse proportion to their size. Besides these we have Marlowe's plays, Beaumont

[1] "English Literature from the Beginning to the Norman Conquest." By Stopford A. Brooke. London: Macmillan & Co., 1898.
"A Short History of English Literature." By George Saintsbury. London: Macmillan & Co., 1898.

and Fletcher's and Ben Jonson's, not to mention the lesser lights.

John Milton's "Paradise Lost" is, of course, known to all of us, though by fewer of us than should be the case. But he was the author, besides, of great prose works. These, no doubt, are polemical, but the "Areopagitica" contains nothing with which we are not all in agreement nowadays, and the teacher who has read the rest in Bohn's edition, for example, can choose some of the finer passages, especially the autobiographical ones, to illustrate his lessons on the Stuart controversies. Some of Milton's sonnets, too, are excellent matter to commit to memory.

Even the eighteenth century, that despair of schoolmasters, because no adequate textbook has yet been written, nor perhaps can be on that period so difficult because too modern for beginners, can be illustrated from our literature. Pope and Swift have written things which can be understood by children, and Defoe wrote other books than "Robinson Crusoe;" for example, his satirical pamphlet, "The Shortest Way with the Dissenters." Then there are Goldsmith's writings, not to mention Steele and Addison. Finally we come to our own century, where the wealth is simply overwhelming. We choose for our present purpose such books as Kingsley's "Westward Ho!" Tennyson's plays and his "Ode on the Funeral of the Duke of Wellington," beside the many historical tales from Sir Walter Scott's downwards. These contain not of course absolutely correct history, but such material as is suitable for the child's imagination.

We recommend teachers not only to add these books and others of the same character which we have not the space to mention, to the school library, but to spare some time from the school curriculum, already, we know, so overcrowded, to introducing this literature to their pupils. A boy will let books remain on the shelves untouched, perhaps because of the colour of their binding, or because "no one takes them out." Let him once be induced to open their pages, and even be *made* to read some portion of them, and we may hope to banish much of the current twaddle from our boys' (and girls') mental diet. We may even teach them some day to explore a library for themselves.

RECENT SCHOOL BOOKS.

Modern Languages.

The Teaching of Modern Foreign Languages in our Secondary Schools. By Karl Breul, Litt.D., Ph.D., Cambridge University Lecturer in German. vii.+86 pp. (Cambridge University Press.) 2*s.*—These lectures on modern language teaching were written in 1896, and are now published with slight alterations. They do not describe the teaching as it is, but suggest the methods to be employed in making it more perfect. Dr. Breul shows himself to be a thorough-going adherent of the reform method, and it is to be hoped that his support will induce many English teachers to make an earnest attempt to study Continental methods. There is also a paper on "The Reference Library of a School Teacher of German," which contains valuable suggestions as to the "best books."

Boileau, L'Art Poétique. Edited by D. Nichol Smith, M.A. xxxii+104 pp. (Cambridge University Press.) 2*s.* 6d.—The editor has excellently accomplished his difficult task of producing a critical and scholarly edition of the *Art Poétique.* The lucid introduction consists of three sections: "Boileau's Life," "The Criticism and Doctrine of the *Art Poétique*," and "The Influence of the *Art Poétique.*" The notes are carefully compiled, and give all necessary information. The book should find a very wide circle of readers, for it will appeal not only to boys in the top forms of a modern side, but to every student of French literature.

Scenes of Familiar Life. Arranged progressively for Students of Colloquial French. By Mrs. J. G. Frazer. xii.+164 pp. (Macmillan.) 1*s.* 6*d.* *Scenes of Child Life.* In Colloquial French. By Mrs. J. G. Frazer. xvi.+124 pp. (Macmillan.) 1*s.* 6*d.*—These are "prize editions" of these capital little books, which have only to be seen in order to be appreciated. The scenes are quite charming, full of life, and just the very thing for children. Both volumes are rendered still more attractive by a number of thoroughly good drawings by Mr. H. M. Brock; the French spirit and local colouring are very cleverly reproduced.

Méthode Naturelle pour Apprendre le Français. By G. Hogben, M.A. 332 pp. (Nelson.) 3*s.* 6*d.*—There is an allusion in the preface to the "Teacher's Book," which has apparently not yet been published, but even without this aid we easily recognise that Mr. Hogben has been considerably influenced by the "reform" movement. He shows himself to be a skilful teacher, and his book is consequently of real value; perhaps, however, it will be more useful to the teacher than the taught. The book contains many respectable illustrations. We welcome it as another step in the right direction.

Jean de la Brète, mon Oncle et mon Curé. Adapted and Edited by E. C. Goldberg, M.A. xv.+150 pp. (Macmillan.) 2*s.* 6*d.* — This text is more suitable for rapid reading than for careful class-work, and will probably interest girls more than boys. It is the brightly-written account of the youth of a very outspoken young lady, whose frank admiration of herself reminds one of Marie Bashkirtseff. Her final conversion to "un ange" and "la plus douce des femmes" has been very much curtailed, so that the adaptation is less well balanced than the complete text. Mr. Goldberg's notes are distinctly good; and the book is carefully printed. There are the usual appendices for *viva-voce* drill and for re-translation, and a chapter on Word Formation.

Saintine, Picciola. Edited by A. R. Ropes, M.A. x.+248 pp. (Cambridge University Press.) 2*s.*—This is a great improvement on the previous Pitt Press edition. Mr. Ropes supplies a brief introduction and excellent notes, particularly noteworthy for the capital renderings he supplies. It is to be regretted that this text is so long (it runs to 164 pages in this edition); it is hardly possible to read it in a single term.

Goethe, Egmont. Edited by S. Primer, Ph.D. li.+174 pp. (Macmillan.) 3*s.* 6*d.*—We learn from the title-page that Mr. Primer is "Professor of Teutonic Langues (*sic!*) in the University of Texas." He has produced a very acceptable edition of *Egmont*, with a full introduction in which the play is considered from the literary and the historical point of view. The notes are good. There are five reproductions of contemporary portraits, which lend additional interest to this edition.

Goethe, Iphigenie auf Tauris. With Introduction and Notes by C. A. Eggert, Ph.D. lxi.+180 pp. (Macmillan.) 3*s.* 6*d.*—A very full apparatus of introductions, notes, &c., which give much information, some not to be found in previous editions. The editor has spared no pains in producing this book; but it is not the ideal edition of the Iphigenie, for his work lacks the fine literary quality which is essential. This is particularly striking in some of the renderings of Greek passages (taken from "cribs") which disfigure the notes, and in the editor's own translations of Goethe's text, which often are bald prose.

Hans Wachenhusen, Vom ersten bis zum letzten Schuss. Edited by T. H. Bayley, M.A. xvi.+169 pp. (Macmillan.)

2s. 6d.—A short text (about 65 pages), describing the Franco-Prussian War very much from the German point of view. There are also maps of the battlefields, and some patriotic songs with the music. The editor warns us that we must not expect the polished style of the great classical writers, but comforts us with the thought that it is "the German of to-day." But we want to teach *good* German; and Wachenhusen's style is anything but good. He does not disguise his contempt for the French; but the number of French words he uses would justify the *Allgemeine Deutsche Sprachverein* in putting this book on their black list. The book is suitable only for army classes.

Fontane, Vor dem Sturm. Edited by Aloys Weiss, Ph.D. xxviii.+212 pp. (Macmillan.) 3s.—A capital tale of the winter of 1812-13, with a Life of Fontane, a brief historical introduction and thoroughly satisfactory notes. Mr. Siepmann has himself supplied the appendices, as usual; the fourth of these is an interesting chapter of "Word Formation," in which he discusses certain "suffixes of concrete substaives."

Word and Phrase Books to L'Abbé Daniel, L'Anneau d'Argent, Sacs et Parchemins, and *La Première Croisade* (volumes in Siepmann's French Series). (Macmillan.) 6d. each; and Keys to the same, 2s. 6d. each.—The "Word and Phrase Books" give the English and French (in parallel columns) of the lists of words and phrases for *viva voce* drill which are given in an appendix to the above-mentioned reading books. The keys contain these also, and renderings of the "Sentences on Syntax and Idioms" and of the "Passages for Translation." They appear to have been carefully translated, and will be very welcome to teachers who use the books in question.

Classics.

Caesar. Gallic War. Books I., II., III., IV., V., VI. By John Brown, B.A. (Blackie.) 1s. 6d. each. Book III., 1s.—Volumes i., ii., and v. contain chapters on the Life of Caesar, his Commentaries, Roman Books, the Roman Army, and Hints for Translating; iv. has the same without the Hints; iii. has Ancient Ships and Roman Naval Warfare, and vi. has Druidism and the Army. The Notes and Vocabularies are sensible and sound. All the books contain exercises based on each chapter of the text with English-Latin vocabularies.

Virgil, Aeneid XI. By T. E. Page, M.A. xxvi.+152 pp. (Macmillan.) 1s. 6d.—Mr. Page prefers this spelling of his author's name for fear of pedantry. The notes are stimulating, and that on line 268 is very convincing. We prefer to explain *solitum tibi* (l. 383) and *artificis scelus* (l. 407) as accusatives in apposition to the sentence, and *habilem* (l. 555) is surely proleptic. The vocabulary is by the Rev. G. H. Nall, M.A. The book is a distinctly good specimen of the "Elementary Classics" Series.

Plato: The Apology of Socrates. By T. R. Mills, M.A. 98 pp. (Clive.) 3s. 6d.—This book contains Introduction, Text, Notes and Index of proper names, and is a quite typical volume of the University Tutorial Series.

The four following books are volumes of the "Cambridge Series" for Schools and Training Colleges. 1s. 6d. each. (Pitt Press.)

The Anabasis of Xenophon. Book IV. By G. M. Edwards, M.A. xxviii+116 pp. This edition of the simplest and most interesting book of Xenophon opens with a good introduction, and contains useful indexes and vocabulary. The notes are excellent, but explanations might have been given of the forms, *e.g.*, of the genitive Ὀρόντα and the 3rd person plural ἀντιτετάχαται.

Caesar. De Bello Gallico. Book III. By E. S. Shuckburgh, M.A. x+68 pp.—*Book IV.* By the same. xii.+76 pp. Mr. Shuckburgh can always be relied upon as sound and helpful, and here maintains the high level of this series.

The Aeneid of Vergil. Book XII. By A. Sidgwick, M.A. 117 pp. This is a revised issue of Mr. Sidgwick's previous edition, with vocabulary added. Should not *connubiis* (l. 821) be scanned as three long syllables, and not as stated in the note, p. 67?

Latin Exercises. Third Part. By Rev. A. J. Church, M.A. 63 pp. (Seeley.) 8d. This book of continuous pieces for Latin Prose will fitly follow the first two parts of Mr. Church's Exercises. It contains useful hints to stimulate thought and to initiate into style.

Latin Vocabularies. By A. W. Ready, B.A. 63 pp. (Seeley.) 8d.—These are classified according to subjects, but are not alphabetical either in the English or the Latin. This book is also bound up with the last mentioned (price 1s.), though there is no particularly close connection between them.

A Latin Grammar for Schools and Colleges. By G. M. Lane, Ph.D., LL.D. (Harvard). xv.+572 pp. (Harper.) 6s.—Professor Morgan, of Harvard, states in the preface that, owing to Professor Lane's death, about 120 pages have been arranged, and about 70 sections added, by him. This work will be found very useful, especially perhaps in the verbal forms, exhaustive lists of which are given with authorities. There are full series of quotations, and good classifications of usages, but no history of development, *e.g.*, of moods and cases, nor explanation of the origin of constructions. The results of Schmalz's labours do not appear to have been incorporated. Long vowels are marked throughout the book. The section on Prosody, (433-485 pp.) by Dr. Hayley, contains the best account of metres which we have seen in English, and apparently follows the lines of Gleditsch's work.

Edited Books.

Notes on Beowulf. By Thomas Arnold, M.A. 135 pp. (Longmans.) 3s. 6d.—The object of this book is "to place before the British reader the present position of Continental and British opinion on the leading Beowulf questions." With this in view Mr. Arnold successively examines the language of the poem, the story and its episodes, its allusions to historical events, dynasties, tribes and individuals, its date and authorship, and all its possible transformations. The aggravating topic of mere literary criticism the author has not attempted, and his work is the more valuable by the omission. Mr. Arnold perceives an Homeric element in Beowulf, but does not consider it at great length. Its connection with the Nibelungenlied is, however, fully treated, and the author claims an exclusively Scandinavian origin for both compositions. The chapter which deals with this point, and the further links between Beowulf and the Edda and Voldeniga Saga is a highly interesting presentation of literary comparisons which should be of great value to men of letters. The legends concerning Offa and the Goths are very fully dealt with, and not the least interesting section of this little work is that which deals with the geography of the poem. It is illustrated by a map, and the wide field for conjecture which is afforded by this topic is amply indicated. In the concluding pages Mr. Arnold discusses the mythological theories which have been applied to this remarkable composition, but in the end he leaves to Sarrazin the full responsibility for the ever popular nature-myth with which that laborious commentator has attempted to explain away the whole story. This is to indicate only a very few of the points with which this ably managed little volume deals. Scholars will find much assistance in it; and to

those students of Anglo-Saxon who are preparing for examination it will be found indispensable. There is not a "dry" page in the book, which, considering the subject, is saying a great deal.

The Lays of Ancient Rome. Edited by J. H. Flather, M.A. 181 pp. (Pitt Press). 2*s.* 6*d.*—Is in thorough keeping with the other volumes of this series, an evidence of patient labour, and no mean tribute to Macaulay himself. Besides the "Lays," five other poems are included, and Macaulay's own preface is retained for advanced students. The notes are brief and pointed, and two useful maps are appended. The introduction is brief, but exceedingly well done.

The first volume of the *Eversley Edition Shakespeare*, by Professor Herford, of Aberystwith, promises well. (390 pp., Macmillan, 5s.) There is a clear, scholarly, general introduction, and in addition a most complete criticism of each play. The type and style are beautiful, and the notes arranged at the foot of each page are just what notes should be. The number of editions of Shakespeare is multiplying amain, but this promises to be quite one of the best contributions to the cause of Shakesperian scholarship.

Messrs. Horace Marshall & Son send us *The Temple Reader*, edited by E. E. Speight. (272 pp., 1*s.* 6*d.*) To this very comprehensive little compendium Professor Edward Dowden supplies a valuable but brief introduction. A volume which illustrates Livy and Hakluyt, Froissart and Defoe, the Book of Ecclesiasticus and the Edda, Sterne and George Meredith, cannot be accused of one-sidedness. All the selections are admirably done, and the only fault seems to be their brevity. The illustrations are an additional source of interest. This book well used will do much to foster that ideal taste for literature which Charles Lamb thanked his stars for—"so catholic, so unexcluding."

The Swiss Family Robinson, "retold in English and Abridged for use in Schools." 160 pp. (Geo. Bell). 1*s.*—Is likely to be a favourite reading book if introduced into the lower forms of secondary schools. This edition gives simply a bare abridged text, but it is well illustrated.

In *Short Studies of Shakespeare's Plots*, Professor Cyril Ransome now turns to *King Lear*. 161 pp. (Macmillan.) 9*d.*—Originally delivered as popular lectures, these masterly criticisms are full of subtle suggestiveness. Advanced students will find this interpretation of King Lear exceedingly helpful. It ought also to stimulate much finer thought than the average commentator is able to do.

The latest volume of the "Pitt Press Shakespeare," edited by Mr. Verity, is *Richard II.* (232 pp., 1*s.* 6*d.*) As in all the preceding volumes of this series, Mr. Verity displays laborious scholarship with a thorough command of his material. The introduction, text, notes and glossary, all maintain the high level hitherto reached by this series. A unique feature in this volume is a selection of extracts from "Holinshed's Chronicle," which the editor suggests should be used as a separate lesson in the English of that period. Some "Hints on Shakespeare's English" at the end are valuable. The whole play is admirably adapted for use in examination preparation.

An Introduction to English Literature from "Macmillan's Advanced Reader." 51 pp. (Macmillan). 6*d.*—Is an exceedingly handy compendium of the subject. Side by side with the historical development, the psychological significance of English literature is brought out. The sections on the "Age of Creation" and "The Age of Thoughtfulness" are well done and supply a new hint for a scheme for criticism.

Selections from the Poetry of William Wordsworth. By E. E. Speight. 80 pp. (Horace Marshall). 6*d.* net.—Is a handy little book for class use. The selections are very varied, and in the main exhibit Wordsworth at his best. Needless to say, "We are Seven" and "Intimations of Immortality" are included. There are no introduction and no notes, but a preface by Dr. Edward Caird, of Balliol, short as it is, is well worth perusal. This is not a book for examination purposes. It will foster a deeper appreciation of literature if carefully used—and that is much better.

The Student's Queen Elizabeth. 96 pp. (Bennion Horne, Smallman & Co.) 2*s.*—Is an examination book pure and simple. It is certainly dear at the price. About one-third of it consists of a wide margin, with a very poor marginal analysis very unequally distributed. This sort of thing may do for purely practical examination purposes, but it is unmitigated "cram," and seems designed to make a pupil teacher's knowledge of history more superficial even than it is accustomed to be.

The Pleasures of Life (or, rather, genial Sir John Lubbock's interpretation of them) are now to be purchased for sixpence. 108 pp. (Macmillan).—It is certainly a cheap rate in literature, whatever else may be costly. This edition cannot fail to popularise one of the best books of this half century, and if it should find its way into the small libraries sometimes owned by schoolboys in the upper forms of secondary or public schools, it ought to aid their mental development upon healthy, sane and cheerful lines.

The "Dinglewood Shakespeare Manuals" are a useful little series of questions and notes of which two little booklets have come to us: (1) *Richard II.*, and (2) *Supplement to Richard II.* By Stanley Wood, M.A. 46 pp. and 24 pp. respectively. (John Heywood.) 1*s.* and 6*d.*—Both are invaluable to teachers and students engaged in preparing this play. A mastery of the matter contained therein will provide a capital foundation for examination purposes.

History.

A Short History of Switzerland. By Dr. Karl Dändliker. Translated by E. Salisbury. 322 pp. (Swan Sonnenschein.) 7*s.* 6*d.*—This is an abridgment into one volume of some three hundred pages, of the author's larger history of Switzerland. It will be useful to those who wish to know in moderate outline the story of the Confederations of Upper Germany, but it will not be fully understood without some preliminary knowledge of general European history. The whole course of the history is traversed, from the prehistoric cave-dwellers to the revision of the Constitution in 1874. Perhaps the most interesting part of the book is the story of the prosaic beginnings of Swiss "freedom" in the thirteenth and fourteenth centuries, followed as a contrast by the history of the development of the legendary story. Hence onwards we follow the growth of the Confederations, their internal and external organisation, their wars and revolutions, to the present day. The chief lessons to be learnt, we take it, are: (1) that peasant republics and town communities were in their day and generation as exclusive and despotic as the greater European dynasties with which they were contemporary; (2) that the "Reformation" of the sixteenth century introduced greater restriction on thought and increased the power of government in Swiss valleys as on German plains; and (3) that the French Revolution was as much needed in "free" Switzerland as in the monarchical states of Europe. The translation is on the whole readable, but we have noticed, here and there, sentences whose English might be more free from Germanisms.

Landmarks in English Industrial History. By G. T. Warner, M.A. vi.+368 pp. (Blackie.) — We can heartily recommend this book to our readers, both for their own use, for the school library, and for the "general reader" who might wish to have a clearly-written, eminently readable, and up-to-date account of the chief features in the industrial and commercial history of our country. We have found a few minor points on which to differ from Mr. Warner, and still fewer and less important in which we think he is mistaken. We will not mention even these, lest we should have even the appearance of finding fault with a book which is among the very best of its kind.

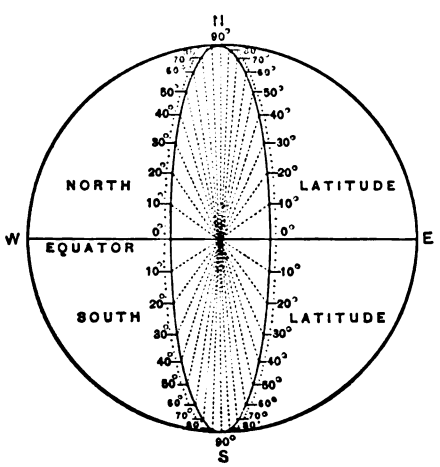
Early English History to the Norman Conquest, in Twelve Series. With illustrations by J. Williamson. 163 pp. (Geo. Bell & Son.)—The old stories told in the old uncritical way, and with strange uses of the words "England" and English." The best part of the book consists of the verses by various authors chosen to illustrate the "stories."

Essex: Past and Present. By Geo. F. Bosworth, F.R.G.S. x.+238 pp. 2*s.*—*Essex: its Geography and History.* (Philip & Son.) 32 pp. 4*d.*—Both these are excellent. The first is a book to be read by all Essex folk, Londoners, and everyone who is interested in our "local" histories. The author errs somewhat on points of general history, but the rest is well done, and the illustrations should tempt more visitors to this "home county." The second is a brief manual "for use in schools." It should be in every Essex school. Both books have a good map of the county, coloured geologically.

Help-Notes to the Study of English History. By W. V. P. Hexter, M.A. 27 pp. (Sandwich Grammar School Text-Books. Printed privately.)—As summaries of lessons given, these notes would be useful. But they leave much unsaid, and are sometimes, on that account, misleading.

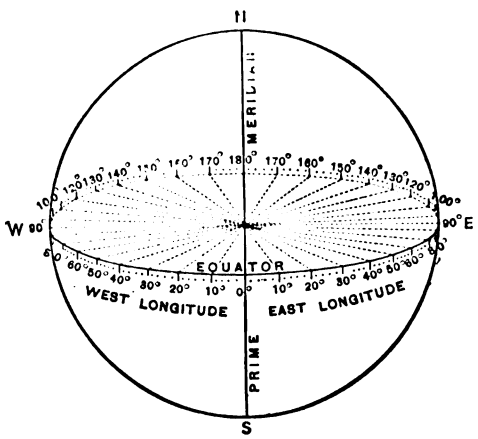
Geography.

An Illustrated School Geography. By A. J. Herbertson, F.R.S.E., F.R.G.S. 263+16 pp., maps. (Edward Arnold.) 5*s.*—This is a brilliant addition to geographical text-books, and one that will not readily be surpassed. The text is satisfactorily



DEGREES OF LATITUDE.

planned and accurate; the illustrations, which occur on every page, are most picturesque and instructive, the photo-relief maps being particularly fine; and the sixteen pages of coloured maps present many original characteristics. The introduction, in which the scope of geography is described, and a few simple facts with regard to the earth as a rotating globe revolving round the sun are stated, occupies ten pages. By the publisher's courtesy, two of the diagrams used in this section to explain the meaning of latitude and longitude are here reproduced. Every teacher will see how much more accurately these figures express the meaning of degrees of latitude and longitude than the definitions and diagrams usually given. Accompanying them, of course, are other figures to show how parallels and meridians are produced. Following the introduction is Part I. (54 pp.), on the physical and general geography of the whole earth, but this need not be studied in detail before passing to Part II. (182 pp.), dealing with the geography of different countries. In this part the British Isles are given 34 pp.; Europe, 37 pp.; Asia,



DEGREES OF LONGITUDE.

26 pp.; Africa, 18 pp.; North and Central America, 30 pp.; South America, 9 pp.; Oceania, 16 pp. The volume contains enough material for at least a three-years' course, and the pupils who use it as a text-book for that period will acquire an intelligent knowledge of, and interest in, geography which cannot possibly be obtained from the dreary details of the old type of text-book. Teachers who are looking for an attractive volume in which a rational course of geography is given are strongly advised to obtain this one. Our only regret is that the size, 12 × 10 in., and weight (3lb. 5oz.) are too great for the volume to be used as a reading-book in class. The volume can only be studied with ease when it rests upon a convenient fixed support.

A Class-Book of Physical Geography. By the late Prof. William Hughes. New edition: Revised and largely re-written by Prof. R. A. Gregory. viii.+328 pp. (G. Philip & Son.) 3*s.* 6*d.*—The late Prof. Hughes's book has, under the editorship of Prof. Gregory, put on a modern dress, with the result that it is in some respects hardly recognisable. It is to be regretted that so educative a subject as Physical Geography undoubtedly is, should, from the congested state of the school time-table and other causes, receive so little attention in our secondary schools. But those teachers who wish to become acquainted with the present state of knowledge on the many important aspects of the subject will find Prof. Gregory's well-illustrated volume a clear and instructive guide.

Modern Geography. (Sullivan's School Series.) 210 pp. (Longmans.) 9*d.*—This is a school geography on a very old-fashioned plan. After dealing with mathematical and physical geography in the first chapter in the way which was, we are glad to know, commoner twenty years ago, the continents are briefly dealt with in order. Then, in successive chapters, the

British Islands, the British Empire, European, Asiatic, African and American States are treated; but, in so small a space, that little more than a bald statement of isolated facts is possible.

Commercial Map of China. 1s. *Special Map of Africa.* (G. Philip & Son.) 1s. — These two maps should be in every school — not necessarily in the class room, but in a prominent place where boys can look at them and trace the course of current events. A better knowledge of commercial and political geography will be thus obtained than by learning pages of unreal information from text-books.

The Popular Atlas of the British Empire. 32 Plates. Size 7½ × 9 inches. (G. Philip & Son.) 1s. — A series of maps of the United Kingdom and the British colonies and dependencies throughout the world, designed more particularly to meet the requirements of teachers preparing for masters' certificates under the Education Department.

Mathematics.

A Shilling Arithmetic. By C. Pendlebury, M.A., and W. S. Beard, F.R.G.S. x.+192 pp. (G. Bell & Sons.)— On pp. 10, 11, some malicious elf has made the authors write 6542=6 thousands 15 hundreds 14 tens 12 units, and other such enormities. Art. 137 is premature, and contains the word "integers," which does not seem to have been explained. But these trifling oversights are quite exceptional; the book, as a whole, is clear and accurate, and ought to prove very useful.

Examples in An Arithmetic for Schools. By S. L. Loney, M.A. 212 pp. (Macmillan.) 3s. 6d.—This collection is not entirely free from fantastic questions of the too familiar type; but it is much better than usual in this respect. Heartily to be commended is the inclusion of questions on approximations, averages, mixtures, velocity, thermometers, and elementary mensuration. There are also numerous good sets of miscellaneous problems.

Mathematical Tables for the Use of Students in Technical Schools and Colleges. By J. P. Wrapson, B.A., and W. W. H. Gee, B.Sc. 28 pp. (Macmillan.) 1s. 6d.—A very handy and well-printed set of tables selected from the same authors' larger work. The contents comprise four-place logarithms and antilogarithms, natural and logarithmic sines cosines and tangents, tables of n^2, n^3, $\sqrt{n}$, $\sqrt[3]{n}$, e^x, $\log_e x$, weights and measures, and a conversion table.

Elementary Hydrostatics. By C. Morgan, M.A., R.N. viii.+106 pp. (Rivingtons.) 2s. 6d.—This appears to be a trustworthy and practical book for beginners, and contains a large number of exercises, many of which are very instructive. To say that "a liquid has a definite size" is rather odd; and the statement that in the barometer "the column of mercury *DC* must be entirely supported by the atmospheric pressure on the surface of the mercury in the trough" is almost certain to be misunderstood.

Elementary Perspective. By L. R. Crosskey. viii.+120 pp. (Blackie.) 3s. 6d.—A simple introduction to the subject, no auxiliary planes being used except those which are horizontal or vertical. Two methods are discussed: the "plan" method, and that in which measuring points are used. There is a brief appendix on special methods used by architects, and a small (too small) collection of unworked exercises. The directions are clear, and the slight amount of theory required is intelligibly presented. As a book for beginners it may be recommended.

A New Sequel to Euclid. By W. J. Dilworth, M.A. 196 pp. (Blackie.) 2s. 6d.—A good selection of exercises, worked out and otherwise. Many of the most useful propositions, of course, are to be found in the better class of school editions of Euclid, but some teachers may think, with the author, that it is an advantage to have them in a separate book. This sequel cannot compare with Casey's in respect of originality and interest, but it is distinguished by much of the elegance of the Dublin school. The data of the propositions are indicated by enormously thick lines, and it is a mistake to begin the book with a long list of definitions "to be committed to memory."

Studies and Questions in Book-keeping and Advanced Accounts. By A. Nixon, F.C.A., F.S.A.A. viii.+184 pp. (Longmans.) 2s. 6d.—A collection of papers, well graduated, of sufficient variety, and of a thoroughly practical kind. After working them out intelligently, a lad should be able, not only to pass any reasonable examination in the subject, but also to undertake with confidence the duties of an accountant. The occasional notes are very useful.

Science and Technology.

Advanced Inorganic Chemistry. By G. H. Bailey, D.Sc. viii.+333 pp. (W. B. Clive.) 3s. 6d.—Dr. Bailey has added another book to the many previously published, with the object of preparing students for the advanced stage of the examination in chemistry of the Science and Art Department. So many compounds are described in a small space that the book is in places little more than a dictionary. We do not consider that Appendix II., which deals with Spectrum Analysis, is suitable for the class of student addressed. The spectra of incandescent solids are described *before* the spectroscope. The result is the student will vainly try to imagine what is meant by "a narrow beam of white light" (p. 273), and will be completely nonplussed by the parenthesis on p. 274, viz., "images of the slit through which the light is admitted," since this is the first reference to the plan adopted for obtaining the narrow beam of light. It is not sufficiently borne in mind by many writers of text-books that such carelessness causes the poor student real trouble and unnecessary brain fag.

The Coming of the Kilogram. By H. O. Arnold-Forster. xvi.+150 pp. (Cassell.) 2s. 6d.—After reading some parts of Mr. Arnold-Forster's "Battle of the Standards," we have come to the conclusion that it is possible to be too simple and too anxious to be interesting, Let us give an example. It is easy to make measurement by comparison quite readily understood without the tedious accounts of the boiler which J. Robinson wanted to sell to C. White; the see-saws of Tiny, Margery and Charlie; and the babies of Mrs. A. and her very dear friend Mrs. B. at the Cape of Good Hope. We suspect that after reading chapter i. most children would have a confused picture of see-saws, babies and boilers, and little idea of measurement by comparison. But it must be borne in mind that Mr. Arnold-Forster intends his book to make "Englishmen realise the position in which they stand in the competition of the civilised world," and not as a "manual of instruction in the use of the Metric Weights and Measures." We are quite in sympathy with any attempt to popularise the only rational system of measurement, but we do not think that the Coming of the Kilogram will be greatly hastened by books of this kind.

Mathematical and Physical Tables. By James P. Wrapson, B.A., and W. W. Haldane Gee, B.Sc. viii.+215 pp. (Macmillan.) 6s. 6d.—This volume contains a compact set of mathematical tables, important formulæ, and constants required in the study of mathematics and physics. It will prove a very useful book of reference to all students of mathematics, physics, and engineering. As long as it is kept for its proper purpose, and is in no way allowed to supersede necessary text-books, its

use can be recommended; but the student must not be led to suppose that proofs of formulæ are of second-rate importance. The data throughout are accompanied by clear and instructive illustrations.

Radiation. By H. H. F. Hyndman, B.Sc. 307 pp. (Swan Sonnenschein.)—May serve a useful purpose in the reference library which should be attached to the modern side of large secondary schools. A boy with a fair knowledge of physics will be able to read and understand Mr. Hyndman's account of electro-magnetic radiation and Röntgen and Cathode rays.

Elementary Architecture. By Martin A. Buckmaster. 144 pp. (Clarendon Press.)—Mr. Buckmaster is undoubtedly right when he says "that an elementary course of instruction in the principles of architecture can readily be made both profitable and attractive. Such a course seems desirable, both as a natural and direct way of educating the eye and the artistic taste of the young." But an already overcrowded time-table would seem to make it impossible. In any case, however, with such a guide as this beautifully illustrated little volume, those persons who are no longer at school have a simple means of educating themselves in what is too often a neglected subject.

The Way the World Went Then. By Isabella Barclay. xiv. +153 pp. (Edward Stanford.) 4*s.* This is a posthumous book, and hence somewhat out of the reach of criticism. We will content ourselves with a generalisation. Simple and interestingly written volumes should be accurate and contain well-chosen subjects. The popular story before us is found wanting in these respects. It is attractively illustrated and daintily bound.

Notes on Volumetric Analysis. By J. B. Russell, B.Sc. 39 pp. (Methuen.) 1*s.* — Something less than 20 pp. of this book are concerned with volumetric analysis. We cannot approve the publication of small scraps of science like this.

Elementary Physiology. By Benjamin Moore, M.A. vi.+ 295 pp. (Longmans.) 3*s.* 6*d.*—Mr. Moore has written an attractive introduction to physiology. The volume is nicely printed and well illustrated, and will be sure of a favourable reception. It is a pity that the practical exercises are consigned to an appendix, for, as the author says in his preface, "Physiology is a subject with which a living acquaintance can only be made by employing experimental methods." We fear the student may imagine the obscure position given to the instructions for dissection means that he is to consider them of second-rate importance.

Object Lesson Handbook of Natural History. 186 pp. (W. & A. K. Johnston.)—Though the information given in this volume is specially adapted for the series of natural history wall diagrams published by Messrs. Johnston, it will be of assistance to all teachers who give object-lessons. The chief facts with regard to the structure, habits, and uses of animals of various kinds are described; and points of resemblance and difference likely to interest children and lead them to make observations for themselves are indicated. As a concise set of notes or lessons on zoological subjects, the book will be found very useful. The plates before us (3*s.* 6*d.* each), of familiar fish, are of a satisfactory and helpful nature.

Miscellaneous.

Modern Business Methods—Import and Export Trade. By F. Hooper and J. Graham. xx.+272 pp. (Macmillan.) 3*s.* 6*d.* —This is another of the excellent "Modern Manuals of Commerce," which the authors are preparing. Primarily intended to meet the wants of that commercial beehive, the West Riding of Yorkshire, the manuals are eminently suitable for the whole of this nation of shopkeepers. Pioneer work is generally arduous, and not always well done, but imitators will experience great difficulty in improving on the excellent work of Messrs. Hooper and Graham. In those schools where a commercial side has been developed, teachers will be glad to see a text-book so simple and yet so full of information. The work does much to bridge the gap between class-room and business-house.

Clear Speaking and Good Reading. By A. Burrell, M.A. 161 pp. (Longmans.) 2*s.* 6*d.* — A very useful book which should be carefully studied by all teachers. If only Mr. Burrell is taken as the guide, we can look forward with confidence to an immediate decrease in the prevalence of bad reading in our schools.

Recitation Books for Schools. (Kegan Paul & Co.) 1*d.* and 2*d.* each. *Poetry for Children.* (Cassell.) 1*d.* each.—The former are selections from the poems of Sir Lewis Morris, printed in large clear type, with a very few necessary notes. They will be useful in the lower forms of girls' schools. The latter comprise a miscellaneous series of pieces of a very simple kind.

The Gospel according to St. Luke, with Introduction and Notes. By George Carter, M.A. 170 pp. (Relfe Bros.) 1*s.* 6*d.*—Mr. Carter has already edited the Gospels of St. Matthew and St. Mark upon the same original plan as he follows here. Those who are familiar with the learned but somewhat lengthy and full notes and introduction of the Cambridge Bible for Schools will find all the essentials of a good teaching edition here, in a very condensed and handy form. The appendices are extremely valuable to teachers, and range over a great variety of subjects.

JUNIOR OXFORD LOCAL EXAMINATION.

JULY, 1899.

Guide and Monthly Test Papers.—No. 2.

English Grammar.

Parts of Speech (continued).

(1) "A preposition and noun together form a phrase which is equivalent to either an adjective or an adverb." Illustrate this statement.

(2) What are Conjunctive Adverbs? Give examples of the word *only* (1) as an adjective, (2) as an adverb. Show that the meaning of a sentence depends upon the position of this word in it.

(3) Parse *but* in each of the following sentences:—
(i.) None but the brave deserves the fair.
(ii.) We cannot but hope that he will succeed.
(iii.) There is no one but hopes he will succeed.
(iv.) He is but a child.
(v.) They are clever, but deceitful.

(4) Explain Correlative Conjunctions; Subordinate Conjunctions; Conjunctional Phrases. Give an example of *now* as a conjunction.

(5) Why are "shall" and "will" classed as Anomalous Verbs? State all their peculiarities.

(6) Describe fully the formation of the Possessive Case.

(7) Classify the English Pronouns, and discuss the term Pronominal Adjective.

(8) Write an Essay on one of the following:—
(i.) Telegraphy.
(ii.) Manufacture of Iron.
(iii.) "God made the country, Man made the town."

History of England.

(1455—1509 *A.D.*).

(1) Write out the military story of the Wars of the Roses, mentioning, with dates, leaders, and results, all the battles from 1455 to 1464. Illustrate with a map.

(2) Make a genealogical tree of the descendants of Edward III. (including Henry VII.), to illustrate the Wars of the Roses.

(3) Tell the story of Warwick's revolt and death (1470-1).

(4) What do you know of the Star Chamber Court?

(5) What methods did Henry VII. use to get money?

(6) Tell the story of Perkin Warbeck. Why did he call Margaret of Burgundy his "aunt"?

Geography.

(*England and Wales.*)

(Illustrate by sketch maps whenever possible.)

(1) Draw a map of the basin of the Yorkshire Ouse, inserting tributaries and the following towns:—Leeds, York, Harrogate, Wakefield, Hull; and give a summary account of the trade of the last-named town.

(2) Where, and of what importance or interest are the following?—Chatham, Bangor, Yeovil, Redditch, Fotheringay, Coventry, Brixham, Honiton, Dowlais, Crewe.

(3) Name the islands off the coasts of England and Wales, and state the principal towns and productions of each.

(4) In what parts of England are the following found?—iron, coal, tin, slate, china-clay, salt. What are the chief imports of England from India?

(5) Name in order the counties passed through in going by the Midland Railway from London to Carlisle. Describe the different kinds of soil crossed.

(6) Account for the supremacy of Liverpool in the cotton manufacture, Leeds in wool, and Nottingham in lace.

(7) What rivers and counties would be crossed in travelling from Canterbury (longitude 1° east) to Ilfracombe (4° west)? Explain how to calculate the distance between these two places by means of the longitude. Difference of latitude may be neglected.

(8) Which of the Welsh counties are bordered by the sea? What are the chief watersheds of England?

(9) In July Gateshead and Pembroke have the same temperature, viz., 61°; but in October the temperature of Gateshead is 49°, that of Pembroke 52°. Explain these variations.

Latin.

Virgil.—Æneid VI.

Ll. 155-335.

(1) Translate:

(*a*) Ll. 171-182. Sed tum . . . . montibus ornos.

(*b*) Ll. 199-209. Pascentes illae . . . . bractea vento.

(*c*) Ll. 295-304. Hinc via . . . . senectus.

(2) Translate with notes on the Grammar:

(*a*) multa inter sese vario sermone serebant quem socium exanimem vates, quod corpus humandum diceret.

(*b*) . . . . pars ingenti subiere feretro, triste ministerium.

(*c*) ni docta comes tenues sine corpore vitas admoneat volitare cava sub imagine formae, inruat.

(*d*) Stabant orantes primi transmittere cursum.

(3) What do you know of—Sibyllae, Hecate, Proserpina, Phlegethon, Dis, belua Lernae, Charon?

(4) Give the meanings of—Lituo, taedis, ferales, latices, saetas, aena undantia flammis, vino bibulam lavere favillam, loca nocte tacentia late, rogis.

Cæsar de Bello Gallico.—Book IV.

Ch. X.-XVI.

(1) Translate:

(*a*) Ch. XI. Cum id non impetrassent . . . . postulatis cognosceret.

(*b*) Ch. XIII. Hoc facto proelio . . . . fallendo impetrarent.

(2) Translate and explain the construction of italicised words:

(*a*) Interim ad praefectos, qui cum omni equitatu antecesserant, mittit qui *nuntiarent*, ne hostes proelio *lacesserent* et, si ipsi *lacesserentur*, *sustinerent*, quoad ipse cum exercitu propius *accessisset*.

(*b*) ita perterritos egerunt, ut non prius fuga *desisterent* quam in conspectum agminis nostri *venissent*.

(*c*) Qui omnibus rebus subito perterriti . . . . perburbantur, copiasne adversus hostem ducere, an castra defendere . . . . praestaret.

(3) Put into oratio recta:

responderunt: populi Romani imperium Rhenum finire, si se invito Germanos in Galliam transire non aequum existimaret, cur sui quicquam esse imperii aut potestatis trans Rhenum postularet?

(4) What does Cæsar say his reasons were for crossing the Rhine?

(5) Draw a map and put in the following places, etc.: Mons Vosegus, Lingones, Rhenus, Alpes, Batavi, Helvetii, Sequani, Nantuates, Mosa, Usipetes, Tencteri.

French.

A.

(1) Translate into French:—

(*a*) How do you sell your grapes? A shilling a pound.

(*b*) I was quite warm yesterday, but it is freezing to-day.

(*c*) I cannot make myself heard.

(*d*) If I asked him for food he would not give me any.

(*e*) He must go for a doctor.

(*f*) A mule, laden with salt, fell into a river. The salt dissolved (*se fondre*), and the mule, feeling his burden lightened, from that day forth, whenever he passed the river, used to fall in. His master, therefore, loaded him with sponges. When he came to the river's bank the cunning mule fell in as usual, but soon found out that he was the dupe of his own trickery (*artifice*). After that he took care not to fall into the water.

B.

(1) Translate into English:—

Peu de temps après on aperçoit de loin Gessler descendre de la montagne. Une malheureuse femme dont il fait languir le mari dans les prisons se jette à ses pieds et le conjure de lui accorder sa délivrance; il la méprise et la repousse; elle insiste encore; elle saisit la bride de son cheval et lui demande de l'écraser sous ses pas ou de lui rendre celui qu'elle aime. Gessler indigné contre ses plaintes, se reproche de laisser encore trop de liberté au peuple suisse. Je veux, dit-il, briser leur résistance opiniâtre; je veux courber leur audacieux esprit d'indépendance; je veux publier une loi nouvelle dans ce pays; je veux . . . . . Comme il prononce ce mot, la flèche mortelle l'atteint; il tombe en s'écriant: C'est le trait de Tell.

(2) Give the plural of—homme, pays, voeu, bijou, vitrail: and the feminine of—clair, léger, sec, bénin, tiers, compagnon.

(3) Write short sentences to illustrate the uses of—qui, de qui, que, quoi, dont, duquel.

(4) Give the present participle and present perfect in full of—se coucher; the third singular and second plural of the imperfect indicative and future of avoir, vendre, courir and savoir.

(5) Give the rule as to the sign of the plural in the French for—80, 100 and 1,000. Put into French—89, 80, 300, October 25th, 1878; it is 400 miles from here to London, and more than 4,000 miles to Adelaide.

C.

For those who offer "L'abbé Constantin" (pp. 51-110).

(1) Translate the following passages:—

(*a*) p. 58, l. 21-p. 59, l. 7; (*b*) p. 65, ll. 10-22; (*c*) p. 98, l. 13-p. 99, l. 5.

(2) Write short notes on—Sonnait un peu la feraille—pendre la crémaillère—pardessus le marché—un bruit de grelots.

D.

For those who offer "La Mare au Diable" (pp. 15-31).

(1) Translate the following passages:—

(*a*) p. 16, ll. 27-36; (*b*) p. 22, l. 33-p. 23, l. 4; (*c*) p. 27, ll. 9-19.

(2) Write short notes on—à tâtons—dresser les oreilles—boiteuse—faillit s'abattre.

PRIZE COMPETITION.

Result of No. 2.—Most Popular School Subjects.

THE eight school subjects which, in the opinion of the numerous competitors in our second contest, are most popular with boys at school are, in the order of the votes given to them, as follows:—

Boys' Subjects.

Chemistry.
= Arithmetic.
= Geography.
= History.
Drawing.
Algebra.
French.
English Literature.

Latin, Scripture, English Grammar, Physics, and Shorthand came next in order of popularity; and altogether thirty-three subjects were mentioned! Our prizes are awarded to

V. G. H. Hicks,
Kirkham Grammar School,
Lancashire,

and

David Rees,
4, Eldon Road,
Dolgelly,
N. Wales,

whose lists, printed under their names, are given below. The subjects not mentioned in the final list are printed in italics.

Chemistry.	Drawing.
Drawing.	Arithmetic.
Arithmetic.	Chemistry.
French.	History.
Geography.	Geography.
History.	French.
Latin.	English Literature.
Algebra.	*Grammar.*

Girls' Subjects.

Of the thirty-six subjects named by those of our readers who took part in this section of the competition, the eight which secured most votes and, for our purpose, to be considered the most popular are, when arranged in order, as follows:—

= French.
= History.
Drawing.
English Literature.
Geography.
Botany.
Music.
Arithmetic.

The list which most nearly approximates to the above is that of

Elsie M. Winter,
41, Surrey Street,
Norwich,

whose brother, it will be remembered, secured the first prize last month for the best list of most popular books in boys' libraries. The list sent by the first prize-winner contains every subject which occurs in the final list, though in a different order. Her list reads:—

(1) Music.	(5) History.
(2) English Literature.	(6) French.
(3) Drawing.	(7) Botany.
(4) Arithmetic.	(8) Geography.

The second prize is secured by

Bessie B. Simmons,
Bramley,
Guildford,

who mentions seven out of the eight subjects judged most popular, in the following order:—

(1) Drawing.	(5) *Divinity.*
(2) History.	(6) English Literature.
(3) French.	(7) Botany.
(4) Geography.	(8) Music.

In two or three other lists received seven subjects given in the final list are named, but the order in which the subjects occur does not so nearly approach the order of the final list as that to which the second prize is awarded. The subjects which received the next largest number of votes to those recorded in the final girls' list of most popular subjects are Algebra and Divinity with an equal popularity, followed by Class Singing, German and Latin, all with the same number of votes.

Competition No. 3.

The Greatest Teachers of the Century.

This month we offer **two prizes** of books, each of the published price of one guinea, to be chosen from the catalogue of Messrs. Macmillan & Co., Ltd., for lists of the **six greatest British teachers of the present century**, whether men or women. The six greatest teachers will, for the purposes of this competition, be those who are named most frequently in the lists sent in.

The lists of teachers must be accompanied by the coupon printed on p. iv., and must reach the editors of THE SCHOOL WORLD, St. Martin's Street, London, W.C., on or before Friday, March 31st, 1899.

OUR CHESS COLUMN.

No. 3.

THE prize for the competition of last month is awarded to

W. T. Mellows,
Nonconformist Grammar School,
Bishop's Stortford.

The following also sent correct solutions:—H. Bateman, F. G. M. Beck, N. B. Dick, A. Hudson, W. O'Kuffe, N. P. Wood. Fewer slips were made than in the January competition, but one competitor wrote K—Kt2 instead of K—Kt3.

The mate is as follows:—

WHITE.	BLACK.
1. Q—R6 (ch.)	1. K x Q
2. KKt—B5 (ch.)	2. B x Kt
3. Kt x B (ch.)	3. K—R4
4. P—KKt4 (ch.)	4. K x P
5. R—Kt3 (ch.)	5. K—R4
6. B—K2 mate.	
or	
4. R—R3 (ch.)	4. Kt—KR5
5. R—R5	5. K—Kt3
6. R—R6 mate.	

I have allowed competitors either solution, but, in future, I shall award the prize to the sender of the first postcard examined giving all possible solutions correctly

The following have entered for the Inter-School Correspondence Tourney and are by this time busily engaged in competing for the Staunton Chess Men and Board which I offered in the January number:—

Bishop's Stortford: Nonconformist Grammar School.
Cheltenham: Cheltenham College.
Harrogate: New College.
London: Merchant Taylors' School.
Manchester: Grammar School.
Trowbridge: High School.

A minimum of two moves per week has been fixed upon, and the basis of the Competition is the League principle. The clubs are arranged in two divisions, and the winners of each division compete in the final. I shall publish some of the games, with comments.

I am so convinced of the merits of the "B. C. M. Guide to the Openings" (see last number) as a book for young players that I offer a copy to each of the senders of the first two correct postcards examined after the 25th inst. in connection with the game published below:—

	White.	Black.
1.	P—K4	P—K3
2.	P—Q4	P—Q4
3.	Kt—QB3	Kt—KB3
4.	B—KKt5	B—K2
5.	B x Kt	B x B
6.	Kt—B3	Castles
7.	B—Q3	P—QKt3
8.	P—KR4	B—Kt2
9.	P—K5	B—K2
10.	B x P (ch.)	K x B
11.	Kt—Kt5 (ch.)	K—Kt3
12.	Kt—K2	B x Kt
13.	P x B	P—KB4
14.	KtP x P (*en passant*)	R—Rsq
15.	Kt—B4(ch.)	K—B2
16.	Q—Kt4	R x R (ch.)
17.	K—Q2	P x P
18.	Q—Kt6 (ch.)	K—K2
19.	Q—Kt7 (ch.)	K—Ksq
20.	Q—Kt8 (ch.)	K—K2
21.	Q x P (ch.)	K—Bsq
22.	R x R	B—Bsq

White to mate in four.

Rules.

I.—Write on postcards only.
II.—Give name, date, and school address.
III.—Address all communications to

The Chess Editor,
The School World,
St. Martin's Street,
London, W.C.

CORRESPONDENCE.

The Editors do not hold themselves responsible for the opinions expressed in letters which appear in these columns. As a rule, a letter criticising any article or review printed in The School World *will be submitted to the contributor before publication, so that the criticism and reply may appear together.*

Will you allow me to point out that my old school, Radley, has *three*, not two, representatives in the present House of Commons, viz.:—Hon. Evelyn Hubbard, General Russell, and Mr. R. G. Webster? If you could find room for this correction in the next number of your excellent paper, The School World, in which I am much interested, and which I take in regularly, I should be greatly obliged.

A. G. Rogers.

New University Club,
St. James' Street, S.W.,
February 26th.

CALENDAR.

[*Items for the April Calendar should be sent in by March 31st.*]

March, 1899.

Thursday, 16th.—Corpus Christi College, Cambridge. Examination for Scholarships.
Friday, 17th.—Oxford Responsions begin.
Lincoln College, Oxford. Examination for Scholarships.
Saturday, 18th.—Selwyn College, Cambridge. Examination for Scholarships.
Local Committees to apply for Examination papers for S. and A. Exams. at S. Kensington.
Monday, 20th.—Return forms for City and Guild's Institute Examinations.
Apply for Indian Civil Service Examinations before this date.
Tuesday, 21st.—Rossall School. Examination for Scholarships.
Tuesday, 28th.—Return forms for Preliminary Examination of Pharmaceutical Examination.
Harrow School. Examination for Scholarships.
Wednesday, 29th.—Merchant Taylors' School. Examination for Scholarships.
Friday, 31st.—Examinations for Bursaries at Glasgow University begin.
Return forms for Royal Agricultural Examinations.

[During March a Civil Service Examination for Women Clerks in the Post Office takes place. Entrance and scholarships examinations are held this month at Girton and Newnham Colleges, Cambridge.]

April.

Saturday, 1st.—Return forms for Leaving Certificates, Scotch Education Department.
Thursday, 6th.—Last day for sending items for next Calendar.
Tuesday, 11th.—Pharmaceutical Society Preliminary Exam. begins.
Return forms for Senior Commercial Certificate Examination of London Chamber of Commerce.
Friday, 14th.—Return forms for Entrance Examination, King's College, London.
Saturday, 15th.—April Number of The School World published.

The School World.

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The Editors will be glad to consider suitable articles, which, if not accepted, will be returned when the postage is prepaid.

All contributions must be accompanied by the name and address of the author, though not necessarily for publication.

The School World

A Monthly Magazine of Educational Work and Progress.

NO. 4. APRIL, 1899. SIXPENCE.

THE CURRICULUM FOR GIRLS COMPARED WITH THAT FOR BOYS.

By SARA A. BURSTALL, B.A.,
Head Mistress of Manchester High School.

THE question of the proper curriculum for boys or for girls depends on many antecedent questions: our conception of education, the tradition of what constitutes learning, practical considerations as to future work, class distinctions, and most of all our philosophic doctrine of human nature. As the last is by far the most important and far-reaching in its consequences, it is best to discuss it first. There are two views on the subject which must largely affect our ideals of education, in proportion as we hold one or the other. The one, held by many who are scarcely conscious of what their view really implies, is that men and women, boys and girls, are so essentially different that they are for practical purposes to be treated as different creatures, that their education should therefore be entirely different in its aim, methods, and curriculum. There needs but one simple statement to demolish this pretension; every boy has a woman for his mother, and every girl a man for her father. But in spite of this very obvious truth, the erroneous view has in the past wrought considerable injury, not only to the education of girls and the position of women, but also to the intellectual development and life of boys and men, whose mental and moral interests can never be separated from those of their sisters and wives. During the last generation or so a truer ideal has begun to prevail, that men and women, boys and girls, are essentially of one kind, are human beings with a common humanity, and that what is good for the boy or the man is *à priori* good for the girl or the woman, unless strong reason can be shown to the contrary. Whatever may have been the eccentricities and even mistakes of some of the workers for this ideal, it is clear to any unprejudiced observer that its prevalence has during the last twenty years done much for the happiness of individuals, for the raising of the standard of social life, and for the progress of the community.

IDENTITY OF CURRICULUM DESIRABLE.

We shall then, for the purposes of this article, maintain the view that, as boys and girls are both human beings with a common human nature, whatever subjects are likely to develop the highest intellectual qualities of a boy will do much the same for the boy's sister. This thesis leads easily to the discussion of our conception of education, of what its end really is. There can be little need on this occasion to prove the theorem that the end of education is the development of faculty, is the training of all the powers and capacities of the body, the intellect, and the will. It may be well, however, to note that this means also the realisation of our inheritance[1] in all that the past has won, in science, art, literature, institutions, and religion, all that makes up civilisation and culture, without which the human being of to-day cannot be said to exercise fully the faculties and powers he may possess.

So far our investigation would lead us to say that the curriculum for boys and for girls ought to be identical, as the aim of education is to develop the common human nature of which they equally partake, and to bring them into their inheritance of knowledge and thought, secured by the great ones of the past. And this is unquestionably the fundamental principle. As was finely said by Henry Sidgwick, at the Holloway College Conference last December, there is no argument for teaching classics, or for not teaching classics, which does not apply with equal force to the education of girls and to that of boys. The same statement might be made of any subject in the curriculum whose aim is the training of faculty and the attainment of a liberal education—literature, art, mathematics, science. During the last ten years the truth of this view has been acknowledged even in the field of physical education, where the games that have done so much for boys have been introduced into girls' schools with the most satisfactory results both to health and "tone."

SOME RESULTS OF EXPERIENCE.

The movement for the higher education of women at the Universities, which means to some extent similarity of curriculum in girls' and in boys' schools, is now old enough for us to judge fairly of its effects. We see the truth of our theorem demonstrated practically by the success of women

[1] See Nicholas Murray Butler's "The Meaning of Education." New York, 1898.

in what were once thought the essentially masculine studies of classics and mathematics, and by the valuable work which college women are doing in various departments of human activity, not forgetting the sphere adorned by so many of them as wives and mothers, leaders of social life and builders of homes. We might here touch on a most important argument for teaching boys and girls very much the same subjects, viz., the advantage to society and to its moral progress of a common area of intellectual and æsthetic interest shared by both men and women. It is evident that for the highest ideal of marriage and family life, and of reasonable and ennobling social intercourse, men and women must understand one another. If their education is on entirely different lines and has entirely divergent aims, this is impossible, as India and the East, Greece in ancient days, and many unhappy homes in modern England, sufficiently prove. On the other hand, we have already ample material to illustrate the opposite principle, not only in such well-known cases as the ideal relation between the two Brownings, Robert and Elizabeth Barrett, but in many obscurer lives both in England and America, where the comradeship of father and daughter, brother and sister, husband and wife is made more real, more true, and more delightful by the identity of education.

Modifications in Practice.

It is now necessary, however, to state certain practical considerations which modify the theoretical view we have so far taken. Chief of these is the question of preparing a boy or girl for the work of life, for earning a living. Directly we begin to consider not liberal but technical education the question alters. On the whole, men and women earn their living in different ways, and this must always be so, especially as women's work in earning a living is largely connected with the domestic arts and with the duties of a mother. The curriculum must therefore be varied to some extent, the girl, *e.g.*, learning sewing and perhaps cookery, the boy more science and mathematics; the future merchant geography and languages, the future merchant's wife, the elegant accomplishments which adorn society. (The difficulty of this is that one does not at school know who she is!)

The degree of variation in curriculum is not, however, as great as might be supposed. Much of the education given in schools as a preparation for the work of life is not directed to any special employment. General elementary science, for instance, is as useful to the girl who is going home to manage a household and cook dinners, as to the boy who will control or design machinery, dye cloth, or brew beer. The difference appears chiefly in the education of those who leave school at 14 or 16. The work of a first-grade school, where boys and girls remain till 18 or 19, is much the same for both. It is here that we see the influence of class affecting the curriculum, the leaving age being in England largely a class distinction as yet. The teacher whose pupils' education will cease at 16, except for chance attendance at evening classes, must modify the curriculum so that the boy or girl takes the subjects most useful on the whole for future work. Such a girl, for instance, ought not to learn Latin. She will never do enough at it to make it worth while to begin. Her linguistic training must be got from French and German, her literary training from these and from English, of which she should do as much as time allows. Nor ought she to do much in mathematics; elementary algebra and one book of Euclid will have their value if well taught, even if the study goes no further. The boy, on the other hand, ought probably to do more science and mathematics; as to his Latin, we shall not dare to give an opinion. The proper curriculum for a boy who leaves school at 16 is, we believe, yet to be discovered.

Differences in Health and in Capacity.

There is another practical consideration which affects the curriculum, and which is not altogether easy to state concisely. There appears to be in girls' schools much greater variety between different sets of girls as to capacity for study than is, at all events, *recognised* in boys' schools. (Perhaps the variety may exist; Thring seems to have thought so, and provided for it.) Our best girls are, so far as we can judge by examination results, as good as the best boys, though perhaps not so original; they are certainly just as fit to do Latin and mathematics. But there is a very large number of girls for whom a complete course of training is not only inadvisable, but impossible; the weaker members of this class would never learn classics or geometry if they stayed at school till they were 21. Some of them can, with much pains and effort, be brought up to the standard of the London Matriculation in mathematics and Latin; the labour and teaching power had much better be spent in other ways. The conscientious and watchful teacher will arrange that these girls get the training they can acquire from sound arithmetic, some science, say botany, French, perhaps German, and a good deal of English history and geography. Such girls have often a taste for music and drawing, and can with profit give special attention to these. Some causes for this variety between different sets of girls can easily be stated, the chief being health. We cannot say whether girls are by nature more delicate than boys; an interesting article in the *Spectator* of November 12th, 1898, suggests they are not. Things being as they are, however, we can positively state that the teachers in girls' schools must for years to come pay the most careful attention to health questions, and we can also state that there is a certain amount of delicacy among girls which must necessarily modify the curriculum for some. The fairly strong girl from a sensible hygienic home can begin Latin and mathematics at 12 or 13, and go on quietly, perhaps beginning Greek at 16, and finishing the completed course at 19. Her delicate cousin from a badly-managed household needs

special care, and can never stand the strain of working at Latin prose or geometry. One reason why this difficulty is not so prominent in boys' schools is that boys are naturally more lazy and less conscientious than girls—for so we are on high authority informed. Thus the delicate, anæmic girl, rapidly developing and needing all her energy for growth, disregards nature's call to rest and idleness, and slaves away with her bloodless brain at the quadratic equations or oratio obliqua, which ought never to have been required of her at all. The boy cuts the whole affair, and lounges as nature tells him.

Lack of Early Training for Girls.

There is a second reason for this variety in the want of a good education in early years, from which, we think, girls suffer more than boys. When means are limited (and, as Rudolf Rassendyll says, "no one's income is ever quite sufficient"—"Prisoner of Zenda," chap. i.) the money is spent on the boys, who will certainly have their own way to make in the world, and too often in the past the girls have had to wait, on the theory that they would marry, and therefore need no education. Later, perhaps, circumstances change, and the girl is sent to a good school, where her lack of thorough early training makes it difficult for her, however able, to learn all the subjects of the complete curriculum in two or three years. No one who had not had practical experience would believe how poor is the education, if so it can be called, received by some girls even now, particularly between 9 and 14. A third reason is the fluctuating demand from the parents, who are not always able to say how long they will keep the girl at school, or whether they wish her to follow any definite course after she leaves. Thus a school must be prepared to teach the more advanced subjects at any stage, and cannot lay down rigid courses, to which the girls must be made to conform, as do many of the boys' schools.

We may then decide that for many reasons it is not possible to give the complete curriculum to all girls in a school. It may be possible to teach Latin to 70 per cent. or 80 per cent. of boys, while only 40 per cent., or at most 60 per cent., of girls can study it with real profit. We are aware that in some girls' schools Latin is taught to every girl, but we cannot but feel that this plan is likely to involve the danger of over-pressure, or the neglect of subjects of even more fundamental importance, such as experimental science, which ought to be compulsory even in primary education.

Influence of Tradition.

There is one other matter leading to a difference in the curriculum for boys and girls, the influence of tradition, especially strong in England. It is part of our tradition that boys should reach a high standard in classics, and that girls should excel in French and in English literature; in the same way many girls learn music only from tradition, though the brothers are probably just as musical. We may think, too, that tradition has a good deal to do with saying that girls only should learn cookery and needlework. There is no reason in the nature of things why the school boy should not mend his own stockings just as much as the school girl hers, and as for cooking—we all know which sex excels in that art.

From all these considerations, the preparation for life, the allowance for variety between different sets of girls and the influence of tradition, we must agree to modify the complete curriculum of a liberal education somewhat more elaborately for girls than for boys. Exact identity of subjects for both is for a long time likely to be impossible, even if it be desirable. To discuss uniformity of method would lead us into the question of co-education. As far as we can see at present, it seems as if boys and girls after 12 years of age must be taught on different plans, even if the curriculum and the principles of method be the same. Making all these allowances will render the time-table and the organisation of a girls' school somewhat different from that of a boys', even though the ideal curriculum be the same for both. And what should this ideal curriculum be?

The Ideal Curriculum.

The answer is simple to state, though hard to carry into practice. The curriculum should include, as we have seen, all that can develop human faculty and open to the youth the great inheritance of civilisation; language, including not only French and German, but classics, and most of all the mother tongue: literature, above all in English; mathematics and experimental science, at all events in their earliest stages; art, and if not its practice, its appreciation; history, the study of institutions, and the duty of citizenship; religion, even more as an all-pervading influence than as a formal subject of instruction. These, and all these, are needed to bring both our boys and our girls to the full stature of their intellectual and spiritual growth, and to fit them as men and women for their work in the world and for their fellowship with one another.

Are Schoolmasters Popular?—Deservedly or not, schoolmasters are unpopular. The reason is a simple one. Where they do their duty to the children, they involuntarily impose some kind of discipline upon the parents. In day schools this extends to many small things which are apt to be annoying. The unpopularity of compulsory games, for instance, in day schools is far more often due to the fact that, if a boy is compelled to play a game at a certain time, he cannot do something else—for instance, go out with his father or mother—than to the fact that games are in themselves disliked. And when a child first goes to school, his or her parents for the first time discover that this is not the only child in the world, and that some domestic arrangements have to be modified, not because the schoolmaster is a tyrant, but because he has to consider the convenience of more than one family.—John C. Tarver. "Debatable Claims." (Constable.)

THE SCHOOLS OF PUBLIC MEN.

III.—English Judges and Queen's Counsel.

IN this inquiry the schools of the following judicial officers have been obtained :—

Judges of Superior Courts in England	23
Judges of County Courts in England	27
Recorders in England and Wales	77
Metropolitan Magistrates	17
Provincial Stipendiaries	14
Special Officers	4
	162

We have also succeeded in tracing the schools of 112 Q.C.'s, a considerable number of whom are necessarily included in the above list of officers, hence it is expedient to disregard them until we have glanced over the schools of the 162 gentlemen of whom they form part. This number represents slightly less than two-thirds of the whole list of judicial officers.

(To bring our inquiry within easily-managed limits, we have been reluctantly compelled to postpone a consideration of the schools of Irish Judges and the Scots Lords of Sessions and Advocates.)

Eton heads the list with 26 names to its credit. Among these may be noted :—

Hon. Mr. Justice Kekewich,
Chancery Division.
Hon. Mr. Justice Kennedy,
Queen's Bench.
Sir R. Harrington, Bart.,
Worcester County Court Judge.
Mr. J. S. Dugdale, Q.C.,
Recorder of Birmingham.
Hon. A. Lyttelton, M.P.,
Recorder of Oxford.
Mr. A. De Rutzen, D.L., J.P.,
Metropolitan Magistrate.
Mr. Wyndham Slade, J.P.,
Metropolitan Magistrate.

The late Rt. Hon. Lord Justice Chitty also was an old Etonian.

Harrow follows with 13, among the most noticeable of whom are :—

Rt. Hon. Mr. Justice Jeune,
President of Probate, Divorce and Admiralty Division.
Hon. Mr. Justice Channell,
Queen's Bench.
Hon. Mr. Justice Ridley,
Queen's Bench.
His Honour Judge Smyly, Q.C.,
Derby County Court.
Sir Charles Hall, K.C.M.G., M.P.,
Recorder of the City of London.

Winchester takes the third place with 11 judicial officers. Prominent among these are :—

Hon. Mr. Justice North,
Chancery Division.
Rt. Hon. Lord Penzance,
Late Judge of Provincial Courts of Canterbury and York.
His Honour Judge Masterman,
County Courts—Notts and Yorks (W. Riding).
Mr. H. W. Cripps, Q.C.,
Chancellor, Diocese of Oxford; and Recorder of Lichfield.

Rugby, which is next in order with 10, is very much to the front in Metropolitan Magistrates, four of whom are from the great Midland school, viz. :—

Mr. J. R. W. Bros, J.P. (Clerkenwell).
Mr. G. L. Denman, J.P. (Lambeth).
Mr. A. A. Hopkins, J.P. (Lambeth).
Mr. F. Lushington, J.P. (Bow Street).

Among other distinguished Rugbeians who have attracted our attention are :—

Rt. Hon. Lord Davey,
Lord of Appeal in Ordinary.
Sir W. L. Selfe, K.B.,
East Kent County Court.

Westminster is represented by 8 judicial officers, three of whom are judges of superior courts :—

Rt. Hon. Lord Justice Williams,
Court of Appeal.
Hon. Mr. Justice Bucknill, who so recently succeeded Mr. Justice Hawkins,
Queen's Bench Division.
Hon. Mr. Justice Phillimore,
Queen's Bench Division.

From the five preceding schools come practically half the number of those whose schools have been traced.

Cheltenham, Marlborough and **King's College School** have 4 representatives each. Two Metropolitan Magistrates are from Cheltenham, viz. : Mr. H. Corser and Mr. J. Dickinson; Mr. E. Baggallay, West Ham magistrate, is from Marlborough; and the Hon. Mr. Justice Grantham (Queen's Bench) is from King's College School.

Charterhouse and **St. Paul's** follow with 3 names each. Sir Harry B. Poland, Q.C. (Recorder of Dover), and Mr. J. C. Lewis Coward (Recorder of Folkestone), are both from the latter school.

A considerable number of the representatives of Bench and Bar were educated privately or at private schools. Fifteen are so returned, noteworthy among them being Rt. Hon. Lord Watson and Rt. Hon. Lord Justice Romer, successor to the late Rt. Hon. Sir J. W. Chitty.

The Lord Chief Justice of England, Rt. Hon. Lord Russell of Killowen, was educated at Castle Knock College; the Master of the Rolls, Rt. Hon. Sir Nathaniel Lindley, and Sir Arthur Charles, successor to Lord Penzance, are both from University College School; the Rt. Hon. Lord Justice Rigby was educated at Liverpool College; Hon. Mr. Justice Stirling, at Aberdeen Grammar School; Hon. Mr. Justice Day at Downside College, Bath; Hon. Mr. Justice Cozens-Hardy (appointed to succeed Mr. Justice Romer as a judge of the Chancery Division), at Amersham; Hon. Mr. Justice Wills, at Edgbaston Proprietary School; His Honour Judge Emden, at King's School, Canterbury; His Honour Judge Waddy, at Wesley College, Sheffield. Bath Grammar School gives us Mr. W. Blake Odgers, Q.C., Recorder of Winchester; King Edward's School, Birmingham, Rt. Hon. A. Staveley Hill, Q.C., M.P., Recorder of Banbury; Norwich Grammar School, Sir

Forrest Fulton, Q.C., Common Sergeant of London.

Among retired judges, Baron Brampton is from Bedford, Lord Hobhouse from Eton, Baron Esher from Westminster.

Regarding the Q.C.'s apart, of the 112 whose schools have been traced, 15 are from Eton, 7 from Rugby, 6 each from Harrow and Westminster, 4 each from Cheltenham and University College School, 3 each from Charterhouse, City of London and Winchester; 2 each from Amersham, Edinburgh Academy, King's College School, Shrewsbury, Tonbridge, and Ushaw. Some of the most noteworthy are:—

Rt. Hon. H. H. Asquith, M.P., City of London; Mr. Augustine Birrell, M.P., Amersham; Rt. Hon. E. H. Carson, M.P., Portlushington; Sir Edward G. Clarke, M.P., Edmonton School and City Commercial School; Sir R. B. Finlay, M.P., Solicitor-General, Edinburgh Academy; Mr. J. Fletcher Moulton, M.P., New Kingswood School, Bath; Sir Richard E. Webster, M.P., Attorney-General, King's College School and Charterhouse.

PLAYGROUNDS.

How to Make Them; and What to Pay for Them.

MAN'S natural playground is the greensward. But no turf in the world can abide the incessant trample of schoolboy feet. Though the playground will never supersede the playing-field, it will always retain a valuable place of its own; for, unlike its rival, it can be located independently of climatic conditions, and can be used in almost all weathers. The ideal material for its construction has probably yet to be found, but the nearer it approaches the resilience, the coolness, and the restfulness (to the eye) of turf, the greater will be its claims on our attention as a substitute. Meanwhile we must be content with what is available, and it behoves the educationist, especially in urban areas, to study the best materials and the best methods to be employed in construction. The hygienic and the educational must take precedence of the merely financial point of view. Anything may be made to *do*. Let children loose, and they will play anywhere. Theirs is the art of extracting pleasure from the spot next accessible, though it be pit-mound or street-gutter.

Ideal Playground.

But as the conditions under which they play affect vitally the sum and quality of the good they derive, it is of the utmost importance that these conditions should be as perfectly adapted to beneficial ends as it is possible to make them. Therefore, in school construction the playground should never be an after-thought. It should take a vital part in the plan, and should be arranged on the sunny side of the building—even at the sacrifice of architectural points. As nearly as possible, it should be a horizontal plane, with a surface absorbent of the sun's rays, and capable of being kept sweet and sanitary. Almost all playgrounds, unless already formed of a firm sand-stone or gravel soil, need to be "made." The principal materials offering reasonably satisfactory results are cinders, gravel, tar-paving, and rock asphalt.

Cinder Playgrounds.

Cinders are not very sightly, but where gravel is not to be had, and where the better materials cannot be afforded, they make a very passable playground. Let the area to be covered be forty yards square, or a superficial area of 1600 square yards. Where large furnaces or factories abound, cinders and ashes may often be fetched away free, or at a nominal cost per load. A cart-load will cover a space of nine square yards to a depth of three inches. It costs, say, with cartage, one shilling per load, or less than three-halfpence per square yard. The playground will thus require £10 worth of material. But it will previously need "picking over;" the ashes will have to be carefully spread—the large clinkers below, the finer stuff above; it will need raking, watering, and rolling. This cannot be done so as to make a sound job under an expenditure of £10 in labour, *i.e.*, five men working five days a week for a fortnight at sixpence per hour. Total cost, £20. A cinder playground, though less pleasing than a gravel one, may be kept very neat by sweeping and rolling; it wears to a very smooth surface, is soft to fall on, is kind to the eyes, and offers no temptations to stone-throwing. With a gradient of 1 in 20 or 30 it will retain a dry surface after the heaviest rains. From the point of view of playing, this gradient is of course a disadvantage. Other disadvantages are muddiness after a thaw and dustiness in dry weather. In districts where procurable, *red* ashes should be used as a top covering. They give a neat and attractive finish to the work. The cost is about 3s. per load.

Gravel Playgrounds.

Gravel laid in the same way as above, at 6s. 9d. a load, will cost to cover the same area (1600 square yards), £60, *i.e.*, ninepence a square yard. This is an outside price, as it will naturally vary considerably according to the distance of haulage or cartage. Only the best quality smooth pebbly gravel should be used. Three or four loads of sand may be required to help the "setting." This, with labour, will involve an additional outlay of £15; total cost, £75. Gravel is apt to kick up, and a great deal of attention is needed to get it to set in the first instance. Being porous, it may be kept dry at a moderate gradient, but it is spoiled by usage immediately after rain. Sharp, flinty detritus should be excluded from its composition, thus minimising the dangerous results of falls. The action of heavy rains tends to wear bad ruts; this may be largely obviated by good drainage. Places

observed to contain standing water should be promptly picked with the axe, filled in with new material, and rolled. Some amount of patching is inevitable, and absolute evenness of surface is unattainable. Weeds may be destroyed by salting after rain, or by watering with diluted waste acid (equal parts).

Tar-paving Playgrounds.

Another material in use is tar-paving. This is little more than a conglomerate of gravel and gas-tar. It makes a fine show for a time, but, as many municipalities and school boards know to their cost, it is a bad investment, involving endless annoyance and expense. It soon cracks and goes into holes. The price of this work is 1s. 6d a square yard. Total cost for playground (1600 square yards), £120. Unscrupulous paviors sometimes lay this as asphalt.

Asphalt Playgrounds.

Asphalt is really the best available material, *i.e.*, rock-asphalt. The initial outlay, however, is great—cost, 4s. 9d. per square yard, including foundation. To pave the above area, £380. The work should be entrusted to a first-class firm, and done in dry weather. It is set on a solid base of cement-concrete, and hence will not crack like tar-paving. The contractor will give a guarantee for 12 to 15 years. The chief advantages of rock-asphalt are its permanence, its cleanliness, its quickness in drying, and its beautifully even surface. Its gradient need be of the slightest, say 1 in 150, and it makes a playground apparently as flat as a billiard-table. Though hard to fall on, it is a mistake to imagine that rock-asphalt never yields—it retains a certain elasticity for some years. Ultimately, however, it compresses very close. A Paris pavement, which had worn for seventeen years, was found to have lost 25 per cent. of its thickness, though it had only lost 5 per cent. of its weight. A fall involves a bruise rather than a cut, but, if the latter, there is little fear of deleterious substances being picked up. Asphalt can be swept and cleaned without injury to the surface. In dusty and in hot weather the hose-pipe should be occasionally applied. Though expensive at the outset, its up-keep involves little labour or expense. There is none of the incessant repairing, weeding, and rolling so necessary in connection with other materials. Nor are there the lurking dangers of broken glass, rusty nails, and even disease germs which menace elsewhere. In short, so far as the perfect material has been ascertained, rock-asphalt with its admitted drawbacks is the nearest approach to it. Considering its unrivalled advantages—hygienic, economic and recreative—its initial expense should not bar it out from any well-managed school.

Papyristite.

The very latest material is papyristite. Its chief ingredient is a pure pulp obtained from waste paper. Like cement, it will set in a few hours. It is claimed to be "adapted to all temperatures, light, elastic, non-absorbent of moisture or obnoxious matter, and inexpensive." Papyristite is, however, too distinctly on its trial to admit of recommendation for playground-making without further light on its capabilities and performances. Leaving this out of count, the respective cost of the four materials mentioned, for covering a playground 40 yards by 40 yards inclusive of all labour, works out thus:—

Cinders, £20, or 3d. per square yard.
Gravel, £75, or 11¼d. ,, ,,
Tar-paving, £120, or 1s. 6d. ,,
Rock-asphalt, £380, or 4s. 9d. ,,

WORK FOR SCHOOL PHOTOGRAPHERS.

THE "Camera" or "Photographic" Club is so popular in most schools, especially during the summer term, that it seems a pity not to turn the energies of its members into a useful channel. We think it is only necessary to make known the work of the National Photographic Record Association, and to explain how the many amateur photographers in our secondary schools for boys and girls can assist in it, to ensure a considerable addition to the photographic treasures which the Association has already collected.

The Association, of which Sir J. Benjamin Stone, M.P., is the president, was formed for collecting photographic records of objects and scenes of interest throughout the British Isles, with a view of depositing them in the British Museum, where they may be safely stored and be accessible to the public under proper regulations.

The class of subjects which are to be included in the collection will be best understood from a perusal of the following suggestions, which have been circulated by the Association:—

There will be among the workers those who will take or collect photographs for the collection, and others who are not photographers but who can generally help by preparing a list or register of objects of Architectural, Historical, or Archæological interest; by making known the observance of any local custom or ceremony, and particularly by calling attention to the threatened destruction of any ancient building or monument.

In the opinion of the Association there is a wide scope for work, which should include any subject that may be of interest in connection with the history of our time, or that may be of use to the future Historian, Architect, or Archæologist.

Ethnological subjects should have special attention, such as Dress, Occupations, Amusements, Local Customs or Celebrations. In particular, Records should also be secured of such customs as are in a state of transition, as for instance, the use of the Flail, Plough, Churn, &c., which may

at any time be changed by the introduction of machinery. Street Scenes, Various Methods of Locomotion, Sailing and Steam Ships, and Railway Rolling Stock are suitable subjects for photographing. Abundant work will also be found in the Architectural work of our cathedrals, among the ruins of our ancient abbeys, and in old and modern churches, in old monuments, and in the details of ornament and inscriptions upon them.

Ancient Mansions, old Manor Houses, Tithe Barns, Labourers' Cottages, Village Scenes, &c., as well as illustrations of the homes of the present generation; as also any interesting Archæological objects, including copies of old Manuscripts, and articles of general or domestic use are, of course, included.

In all cases it is desirable to introduce some means of estimating the size of objects photographed, either by the introduction of a figure, or better still, where possible, by using the three-feet scale, published by the Society of Antiquaries, which can be obtained for sixpence. The point of view should be chosen from which the best record picture can be taken, and not necessarily the most artistic.

With each print should be forwarded as many of the following particulars as possible:—

(i.) Date, (ii.) Subject, (iii.) Time when taken, (iv.) Focus of lens, (v.) Remarks, (vi.) Point of the compass towards which the lens points when the photograph is taken, (vii.) Contributor and address.

The prints, whole plate ($8\frac{1}{2}$ by $6\frac{1}{2}$) will be considered the standard size. Pictures only will be accepted which are printed in some permanent process, such as Carbon, Platinum, &c., and which must be forwarded, unmounted, to the honorary secretary, Mr. Geo. Scamell, 21, Avenue Road, Highgate, London.

Mr. Scamell, in writing to us, says that the best course for photographers in schools to take would be the photographing of objects of interest in their immediate neighbourhood. Moreover, though the whole plate ($8\frac{1}{2}$ by $6\frac{1}{2}$) is mentioned as a standard size, the National Photographic Record Association are willing to accept smaller prints, printed in some permanent process. We shall be glad to reproduce a few specimens of the work of school photographers in the directions indicated above, provided that the prints sent us are of sufficient general interest.

Writing in 3580 B.C.—The use of papyrus in Egypt, the country of its production, goes back to an indefinite antiquity. The earliest extant specimen is a papyrus containing accounts of the reign of King Assa, whose date, according to a moderate estimate of Egyptian chronology, is about 3580-3536 B.C.; while the earliest literary work which has come down to us (the Prisse Papyrus at Paris), although the copy which we have of it seems to have been written between 2700 and 2500 B.C., is stated to have been composed (and therefore originally written down) in the same reign.—F. G. Kenyon, M.A. "The Palaeography of Greek Papyri." (Frowde.)

ON THE TEACHING OF HISTORY.

By A. Johnson Evans, M.A.

IV.—Richard I. and John.

ENGLISH history, as commonly understood among us, suffers perhaps more at this period than at any other, from want of taking the proper point of view. Just as the mediæval astronomers were hopelessly wrong because they persisted in regarding the earth as the centre of the universe, so we English will never understand our Angevin kings till we rid ourselves of the narrowness of patriotism and consent to view England from outside.

Let us, therefore, tear ourselves away and stand in imagination in Paris and in Rome for the years 1189-1216. We find ourselves at the centres of two organisations, **the Holy Catholic Church and the French Kingdom**. Neither has yet arrived at the condition of Alexander the Great, weeping for worlds to conquer. On the contrary, they find abundance of work to do, and their lament is rather for want of power to effect it. But they are young and vigorous, strong in the belief that with time they will achieve the results at which they aim. That aim is, in a word, expansion at the cost of foes. The King of the French wants to make his title a reality, to beat down the power of his nominal vassals, specially the Angevins, and to make France co-extensive with ancient Gaul. The external ambitions of the Holy Catholic Church are to hold its own against its Eastern rival, Islam, and to extend its territories over Mohammedan Spain and heathen Prussia. Internally, it is tending more and more to a monarchy, even an absolute monarchy. The Papacy has relations, more or less unsatisfactory to itself, with the Emperor and other kings, with archbishops and the "inferior" clergy, as well as with heretics.

In 1187 came the news that the kingdom of Jerusalem, the easternmost extension of Western Christendom, had fallen to Saladin. The Pope proclaimed a **holy war**, and three kings went westward with their armies to repel the invasion. The attempt was an almost total failure. The "Third Crusade," as it was called, gained only a coast town or two, and a permission for Christians to visit the city sacred to both religions.

Philip Augustus (Philip II.) **of France** began to reign in 1180. In 1198 a cardinal was chosen by his fellows to be Pope, who took the title of **Innocent III.** His reign was almost conterminous with that of John, King of England.

The word "reign" is used advisedly. Christendom was a State, with a monarch and with laws. It had an internal constitution always changing, and a foreign policy, varying with circumstances. A selection from the events of this reign, taken chronologically, will prove and illustrate our point.

In 1199-1200 Philip Augustus of France wanted to put away his wife; the law of the Church forbade it, and Philip was compelled by Innocent III.

to take his wife again. The method used to enforce the sentence was an interdict laid on Philip's territories.

In 1199 a disputed succession arose to the dominions of England, Normandy, &c. This matter concerned John and Arthur, the disputants, and Philip Augustus, their feudal lord. It ended with the confiscation, by that feudal lord, of the lands held of him by the survivor who had (probably) murdered his rival. While this "secular" quarrel was happening in France, a crusade had started and had been diverted from its original purpose. Instead of attacking Moslems in Palestine, it overthrew the "Eastern Schism" and established Latin Christianity for a time in Constantinople.

In 1201 Orders of military monks were formed to extend Christendom among the heathen Wends in N.E. Germany.

In 1211 Innocent III. set up Frederick II. as Roman Emperor, and he was successful against his rival Otho.

In 1206-12, war was waged against the Albigensians of Southern Gaul, who, among other differences from their neighbours, rejected the authority of the Catholic Church and of its monarch. The Albigensians were defeated, and a few years later almost exterminated, their territory falling to the King of France.

In 1212-13, Innocent III. authorised two new orders or societies who proposed to devote themselves to the work of the Catholic Church. The Franciscans undertook the mediæval equivalent of our modern sanitation schemes. The Dominicans undertook elementary education in the gospel for the poor and ignorant.

In 1212 the Christians of Spain broke the power of the Moors in the battle of Navas de Tolosa, and in 1214 Philip Augustus at Bouvines settled at the same time his own quarrel with the Count of Flanders and the Pope's quarrel with the ex-Emperor Otho.

Finally, in 1215, a Lateran Council—*i.e.*, the Pope at the head of his clergy—defined the Catholic faith on the matter, till then unsettled, of the doctrine of transubstantiation.

In all these events Innocent had had a share. What more could a *modern* government do than decide disputes, carry on foreign warfare, concern itself with the spiritual and temporal welfare of its subjects? All this was done by the State called the Holy Catholic Church.

If this has been realised, and has become the framework of our thought, if we have succeeded in transplanting ourselves mentally to the beginning of the thirteenth century, and in leaving all later-born conceptions quite out of our intellectual and moral equipment, it will be possible to appreciate John of Anjou and England somewhat more sympathetically than is our custom.

King John had a quarrel with the monastic chapter of Canterbury. Both claimed the right to nominate the new archbishop, the primate of all England. One party to the dispute, the monks, appealed for help to the monarch of Christendom. He in turn claimed, in cases of disputed elections, to nominate a third person of his own choosing. John refused to acknowledge this claim. It was a further stage in the quarrel of investitures over which Henry I. and Anselm had fought and compromised.

The dispute is one foreign to our present ways of thinking. We do not easily understand the weapons used on either side. Interdict and excommunication mean nothing to us. Resolute indifference and ignoring of these attacks do not strike us as powerful weapons of defence. But John has defied the universally acknowledged authority of the time. He has rebelled. What loyal subject will undertake to put down the rebellion? Philip Augustus. How will John escape the impending wrath? By submission.

John has never been forgiven this failure in "foreign" policy, as we, misunderstanding, call it. But in Henry VIII.'s reign he had sympathisers. John Bale wrote a play of which he is the hero. What the brave man of the thirteenth century, fighting against such allegorical personages as "Civil Power," "Papal Tyranny," &c., failed to do, Henry VIII. will now successfully accomplish. Henry VIII. revenged the death of John.

How many of us have *read* **Magna Carta?** We talk and read *about* it, and call it the "foundation of our British liberties." A popular textbook of the last generation (we wonder if it is still used?) describes it as "a Bill, or Act of Parliament, granting the barons and citizens greater privileges than they had ever enjoyed before. By this Act, which was passed A.D. 1205, the obligation of the feudal law was abolished, and English freedom restored." This would be a perfectly true statement if a "not" were introduced into every clause. We merely laugh at John when he exclaimed, "They might as well ask my crown," and "They have given me five-and-twenty kings." Was he right? If not, how account for the fact that when the barons who had forced John to sign the charter were ruling in the name of his infant son, and were re-issuing the charter, they omitted among other clauses those which required the assent of a *concilium* to the imposing and levying of scutages and aids? If Magna Carta were all we think it was, why was the Habeas Corpus Act necessary? And how was it so long in coming?

It is best to think of Magna Carta—that form of it, at least, which John signed—as a program. Some clauses, the more business-like, were retained, and did useful work as statements of law; others were radical and revolutionary, and were almost immediately dropped. Others, again, were pious aspirations, statements of desirabilities to be reached and enforced some day. Of these Nos. 39 and 40, those which promised liberty and security to ordinary folk, have now been generally realised. But though the first clause promised "quod ecclesia Anglicana libera sit," its fulfilment for good or for evil has never been approached even afar off.

THE TEACHING OF ALGEBRA.

By G. B. Mathews, M.A., F.R.S.,

Late Professor of Mathematics in the University College of North Wales, Bangor.

General Remarks on Method.

BY way of conclusion I shall now put down a few general remarks, which are expressed in a dogmatic form, merely for the sake of convenience; they are offered as personal opinions, based upon my own experience, and I wish to disclaim any intention of dictating to schoolmasters whose acquaintance with the practical teaching of schoolboys, especially young ones, is in most cases much greater than mine.

There is no infallible method of teaching mathematics which can be imparted like a trade recipe. The best way, and indeed the only good way, of developing the faculty of teaching, is to be present when a lesson is given by a good and experienced teacher. Every successful teacher has his own system, constructed partly by adoption, partly by his own invention.

It is possible to know a subject without being able to teach it: on the other hand you cannot teach what you do not know, be your "method" what it may. It is impossible to know too much of your subject; and everything you know about it will react upon your teaching, even that of the rudiments.

Do not ignore the history of mathematics. Used with discrimination, it is a guide to the natural development of mathematical ideas in the individual. It is a mistake to be a slave to some rigid ideal of "logical sequence," and starve the imagination of your pupils by doling out a dry series of purely deductive propositions.

The elementary stage is the most difficult of all. What the beginner wants is an *outline*, not professing to give complete detail on any one point, but trustworthy so far as it goes. There is no excuse for making inaccurate or misleading statements at any stage, or under any circumstances. Amplification may rightly follow, but not abolition. A student's mathematical knowledge should grow like a photographic negative under the action of the developer. In both cases, also, any attempt at too rapid developing is very apt to end in failure.

Mathematics, like other sciences, has its experimental side; in fact, all mathematical discovery is the result of experiment or induction. Lose no opportunity of illustrating this; for example, in finding factors by trial, in finite summations, in permutations and combinations, and so on.

The best teaching is not that which most quickly produces tangible results. A quick boy soon learns how to apply rules and do sums; to grasp fundamental principles requires time. The prevailing type of written examination unfortunately puts a premium on the superficial, as opposed to the thorough, teaching of algebra; and it requires considerable courage to resist the temptation thus presented.

The capacity of boys for mathematics is so extremely variable that no rule can be laid down as to the age at which a given part of the subject should be learnt. It is better, I think, to risk beginning the subject too late than to attempt it too early. Arithmetical computation (as distinguished from the principles of arithmetic) must be taught early, or facility will never be acquired.

Boys with a special aptitude for mathematics are always a minority. For the rest the value of the subject is mainly as a discipline in habits of neatness, order, diligence, and above all, of honesty. The fact that a piece of mathematical work must be definitely right or wrong, and that if it is wrong the mistake can be discovered, may be made a very effective means of conveying a moral lesson. Difficult as it is to enforce the rule, a boy should be strictly required to send up all the working of his exercises, and orderly arrangement and legible writing should be insisted upon. I have often had reason to remark that the net result of a liberal education is not infrequently, to all appearance, the acquisition of a slovenly and illegible style of handwriting.

It may be your rare good fortune to find among your pupils a boy endowed with the strange and inscrutable gift of mathematical genius. As it is your highest privilege to awaken his dormant powers, and guide him towards the right use of them, so it is the gravest error into which you can fall to exploit him for your own credit or profit. By drilling him into a youthful prodigy, a sort of champion problem-solver, you will very probably stunt his intellectual growth, give him a false idea of the science of mathematics, and possibly even disgust him with the subject altogether. I cannot help thinking that the comparatively small number of English pure mathematicians who have a European reputation is due to the excessive attention paid in this country to the solving of artificial problems.

Do not postpone the introduction of valuable ideas simply because you first acquired them when you were grown up. A very eminent mathematician once assured me that in his (University) lectures he made a point of acquainting his classes with the very latest and most novel results of analysis, *because youthful minds were the most likely to profit by them.* A fact is not made simpler by growing old; nor is it hard to understand merely because it is new.

Do not be afraid of using technical terms; explain them, of course, with the utmost care when they are first used. A technical term is simply a short word for a complex idea; and the advance of a science may be roughly estimated by the number and precision of its technical terms. The popular prejudice against them is indefensible; surely everybody can see the advantage of saying "Smith minor," instead of "that red-haired boy in the Third Form who keeps mice and is always getting into trouble with his arithmetic." Now the

advantage of using technical terms is just like this. What is really objectionable is pedantic jargon, and the vague slipshod use of terms imperfectly understood.

As to apparatus. The choice of a text-book is not a serious matter. Excellent results may be obtained with a good book, with no book at all, or even with a bad one: all depends on the teacher. Most of your boys will never read a line of the treatise which, after anxious thought, you make their parents buy for them. Still, a few of the clever ones may look at it out of curiosity; so it is well, if you have a class-book, to choose one free from actual errors, and clearly printed. In my own junior class I always used Messrs. Hall and Knight's "Elementary Algebra" as a text-book; it served mainly as a convenient store of examples. Lectures on theory were inspired by De Morgan, Chrystal, and many other sources too numerous to detail. It is the teacher's duty to read and digest as much as he can; at the end of this article I give a brief list of books, mostly in English, which I think likely to be useful. Plenty of blackboard, and plenty of chalk (some coloured) are the absolute necessities. Useful supplements are a second board ruled in squares (for plotting off curves), a pointer, and a piece of string for drawing circles. A blackboard cannot be too large, and you cannot write or speak too plainly.

A great part of a schoolboy's work in algebra consists in written solutions of examples. In the choice of these examples there is room for a great deal of discretion. Time is mischievously wasted when it is spent in the idle repetition of questions all of the same type, or in the solution of those artificial puzzles which illustrate the perverse ingenuity of examiners. But the solution of questions which really illustrate principles, or lead up to them, is the best way of becoming really familiar with those principles themselves. The simpler the calculations involved, the better, unless the example is specially chosen as a test in computation. On the other hand, the "neat" or "elegant" results of many of the examples in the text-books are simply misleading; a boy accustomed to simple equations which come out to $x=1$, $y=2$, $z=3$, or something like that, is ill-prepared for the calculations of a physical laboratory, worked out to so many places of decimals.

If you ask your pupils to note down any definition, formula, or piece of bookwork, be sure that they get it correctly. The avoidance of error is better than the correction of it.

The class should take, as a matter of course, both written and oral examinations without previous notice. The habit of cramming for set examinations should be discouraged as far as possible.

List of Books.

In addition to those already mentioned, anything by De Morgan; Peacock's "Algebra," (to be read with discrimination, but still valuable); Chrystal's "Text-book of Algebra"; Clifford's "Common Sense of the Exact Sciences"; Cajori's "History of Mathematics." Although not professedly dealing with algebra, Frost's "Curve-Tracing," Clifford's "Elements of Dynamic" and Clerk-Maxwell's "Matter and Motion," will be found full of valuable suggestions.

The very best treatise on algebra, properly so called, is H. Weber's "Lehrbuch der Algebra"; a French translation of the first volume has recently appeared. For a detailed discussion of the fundamental rules there is O. Stolz's "Allgemeine Arithmetik"; the principal authority on the history of mathematics is M. Cantor's "Vorlesungen über Geschichte der Mathematik." Dedekind's two tracts "Was sind und was sollen die Zahlen?" and "Ueber Stetigkeit und irrationale Zahlen," are of extreme interest and value.

The English books in this list might be properly included in a school library, except Peacock.

PROPOSITIONS CONCERNING BOYS AND GIRLS IN SCHOOL LIFE: FOUNDED ON OBSERVATIONS.

By Francis Warner, M.D. (Lond.), F.R.C.P.

IV.

In preceding articles I described observations that you may record when looking at boys and girls in school; my purpose now is to show that generalisations formed from such records may be of considerable interest and useful in considering some questions of school life. I refrain from troubling you with the figures that have been used elsewhere in support of the following propositions; they will be found in statistical analyses of the 100,000 children I examined 1888-94.[1] The conclusions arrived at are in accord with much experience of individual cases, while additional evidence of their truth is found in the explanations they afford of many social facts.

Proposition I.—*Pupils who are bright in mental action usually present the signs of good action of the brain in balance movement and response.*

Take a class of bright, quick-minded pupils; observe the nerve-signs in each; they mostly show spontaneity, but this can be quieted to attention, and controlled in physical exercises; they imitate your action with some accuracy co-ordinated by sight of your movements, and may perhaps be able to repeat them without guidance. Their heads are held well up, the hands balance straight, and no listless slouching attitudes are seen; while their response is prompt to do as they are told.

Again, take a class of dull pupils who cannot rise in place according to age and the amount of teaching received; such may be found in some secondary schools, for reception of superannuation pupils.

[1] See "The Study of Children," Chapter xiii. (Macmillan & Co.); "Report on the Scientific Study of the Mental and Physical Conditions of Childhood." (Published at Parkes Museum, Margaret Street, London, W.)

You will probably find here many children with sub-normal nerve-signs; defective expression, dulness of face and frowning; wandering eyes, slow and inaccurate response in movement and asymmetry of balance with drooping hands; it may be accompanied by over mobility uncontrolled, or a passive inactivity. You may test the truth of the proposition in another way. Take twenty boys and twenty girls newly entered in the school and unclassed; sort them into two groups—those with good action, and those sub-normal in movement, and see whether experience confirms the statement made.

Of 2,853 boys and 2,015 girls with sub-normal nerve-signs—

	Boys. Per cent.	Girls. Per cent.
At 7 years and under	43·3	47·0
Aged 8-10	42·6	41·9
Aged 11 years and over	39·6	40·4
At all ages	41·8	42·6

were said by their teachers to be dull mentally, or below the average for their age in school-work.

Proposition II.—*Fewer girls than boys in schools are dull or below the average in mental ability, and fewer girls present sub-normal nerve-signs; but, in certain cases, girls are more apt to acquire brain-disorderliness with dulness and low health.*

This generalisation is based on observations in schools, together with the teacher's report on any pupils in their experience below the average of their age in school-work. A smaller proportion of the girls than of boys show any points in physiognomy or development below the normal: the proportion of normal children is higher with girls than boys. Children with any physiognomical condition of the head or body sub-normal show on the average less vitality of constitution, being more liable than others to weak health, delicacy and anæmia. This fact specially applies to children at the youngest ages; among those of eleven years and over, the proportion of girls delicate from this cause is double that of the boys. It is those girls in the school who show signs of some constitutional weakness that thus tend to become delicate, *not all girls;* hence the teacher's point of view differs from that of the physician who is called to see delicate children. Taking only boys and girls of normal development there is an equal proportion of each who were pale, thin, or delicate in the schools. Put briefly, the normal girl does quite as well as her normal brother, if not better; but the girl with any degree of constitutional low development tends to acquire more harm therefrom than a boy similarly constituted, unless sufficient care be taken. It is a pity, then, to see, in public elementary schools at least, a smaller number of girls than boys in attendance; perhaps this is the reason why the proportion of illiterate brides is still greater than that of the bridegrooms, though the difference is less than formerly. What has been shown above is in accord with the more normal course of women than of men in social life; with occasional exceptions to the contrary. Women on the average live longer than men. Insanity is slightly more frequent among males, so is imbecility; but chronic cases are more frequent among females. Male criminals are much more numerous; but the worst cases show a preponderance of females. This shows the importance of preventing "brain disorderliness" during school-life, and the probable evils that result from withdrawing delicate children, especially girls, from educational advantages adapted to their requirements.

Of 2,308 boys and 1,618 girls with some developmental defect—

	Boys. Per cent.	Girls. Per cent.
At 7 years and under	22·7	35·0
Aged 8-10	16·0	22·1
Aged 11 years and over	7·5	15·0
At all ages	16·2	26·3

were thin, pale, or delicate children.

Proposition III.—*Delicate children are often dull mentally, with sub-normal nerve-signs.*

In any school there is usually to be found a larger number of delicate girls than boys who need special attention. I dwell on the conditions of delicate children because evidence shows that the school should be adapted to their special needs, rather than seek to exclude them; they require careful training as much, and more than, the stronger children at all ages, especially in the advancing years of school-life, to fit them to attain self control and to undertake the duties of a social position. If the brain does not work well in childhood as to mental power, with signs of disorderliness shown in want of due co-ordinated movement, the lower physical status renders the probability of permanent inaptitude more probable, and calls urgently not only for the prevention of fatigue passing on to exhaustion, but also for such adapted physical training as may bring the brain under better control. Listlessness can be lessened by imitation of symmetrical attitudes and movements in the instructor; restless eye-movements may be controlled in training; while anything—like a sharp word—which may cause a spreading nervous movement should be avoided in school discipline. Carefully note any signs of fatigue, especially in the face and in a feeble hand-balance. Delicate children under the normal body-weight for their age may show too much spontaneity and nervous uncontrolled movement; if this becomes excessive there are some grounds to fear that St. Vitus' dance or chorea may supervene, then rest in bed and careful feeding have to be resorted to; this more commonly occurs with girls than boys.

Headaches are common in delicate children; it is mainly any indications of fatigue that have to be looked for in these cases as guides to action. Hygiene is all-important; regular hours of work, home-lessons and sleep; proper meals and well-ventilated rooms do much to promote health.

Of 749 boys and 770 girls found pale, thin, or delicate,

	Boys. Per cent.	Girls. Per cent.	
At 7 years and under	41·1	36·0	showed sub-normal nerve signs.
Aged 8-10	51·1	51·1	
Aged 11 years and over	56·4	49·9	
At all ages	47·1	43·5	

Among the same children—

At 7 years and under	43·6	42·0	were said by their teachers to be dull mentally, or below the average for their age in school-work.
Aged 8-10	44·8	40·7	
Aged 11 years and over	37·6	35·6	
At all ages	43·1	40·5	

Proposition IV.—*The causes of mental dulness are more often directly associated with the presence of subnormal nerve-signs than with developmental defect of the body.*

Evidence is derived from the observation of school children referred to.[1] According to the rules of Logic, "Among two Phenomena or Classes of Defect, each of which is found to be often associated with a third Phenomenon, the more general and direct cause is probably that which is so associated in the largest number of cases."

Among 50,000 school-children: boys, 26,287, girls, 23,713—

	Boys.	Girls.
Those with sub-normal nerve-signs and dulness, but not delicate, were	703	487
Those with developmental defects and dulness, but not delicate, were	394	314

It is thus seen that the proportion of dull children with nerve-signs only, is greater than that with developmental defects only. Nerve-signs, whether they occur alone or in combination with delicacy, are more commonly associated with dulness than is defect in development. It is, however, noteworthy that, taking all the cases with developmental defects, the proportion of dull girls is higher than with nerve-signs. This is due to the marked association of delicacy with developmental defects in girls.

We infer that nerve-signs are a more general and direct indication of the causes of mental dulness than defect in development.

This conclusion plainly shows that an object in training children should be to remove, or prevent, any of the subnormal signs of brain action in movement, which are so strongly co-related with the causes of mental dulness.

The proposition presents an encouraging side to the educator; you cannot alter the construction of the child's body, or altogether prevent the tendency to delicacy in those subnormal in constitution; but much may be done by careful training to prevent the acquisition of brain-disorderliness in action, and in mental faculty. If the child is small-headed, with a poor physiognomy, you may, by improving the expression, encouraging spontaneity and co-ordinated movements of the eyes and the hand, in imitation of your exercises, do much to cultivate mental faculty, while improving the social status of the pupil.

Proposition V.—*Many causes of dull and backward mental action are removable.*

The effects of good physical training in school are to diminish the number of cases with motor brain-disorderliness (subnormal nerve-signs) and the number of dull pupils. This is very obvious in schools where efficient training is used, in contrast with others where it is neglected. Physical training tends to improve the brain-condition of the pupils as well as their bodies, and promotes health in each; this applies to children perfectly well made in body, and also to those in some slight degree below the average.

The child with uncontrolled spontaneity in movement often shows mental confusion—there is too short a pause for arranging the thoughts correctly before answering a question. Uncontrolled eye-movements may lead to mistakes of addition in arithmetic, which may be wrongly inferred to be due to mental fatigue or inaptitude. A spreading area of brain action producing movements will probably be called "fidgetiness with inattention"; irregular uncontrolled thoughts are then apt to be interspersed among those that should be expressed. This may be due to over brain action (excitement and weariness), calling for a change of occupation or food.

Training should accompany teaching at all ages during school life.

I conclude this sketch of child-study in school with the description of a healthy boy, showing indications of good physiognomy and brain action. It is obvious that the description of mental action might be extended in many directions in a school report.

A Healthy Active Boy, well trained and showing good mental ability. Age 14 years.

Developmental Signs.

Head. Well shaped, of good volume, circumference 21½ inches, forehead wide, no lumps or ridges.

Face. Features well proportioned, mouth and eye-opening of good size, lips thin, nose well developed, ears well shapen.

Palate. Sufficiently broad, teeth not overcrowded.

Growth. Well grown and proportioned, height 5 feet 2 inches, weight 105 pounds.

Nerve-Signs.

General balance of body. Stands straight, feet together, knees straight, head held well up.

Expression. Lively, bright, intelligent-looking, good tone about eyelids.

Eye movements. Looks straight and fixes sight well on parts of the figure demonstrated on the black-board, eyes well and accurately moved as he examines an object, looks about when disengaged.

[1] For further evidence in author's papers, *Journal of Royal Statistical Society*, Feb., 1893 and March, 1896.

The Hands are quietly and easily moved out in imitation of the teacher, and the series of finger movements are exactly reproduced without extra-movements or fidgetiness.

Response occurs without delay, except when a question is put that requires thought; no frowning or eye-movement while thinking.

The general modes of brain action may be summarised:—

(1) *Spontaneity.* Seen in his lively changes of expression, in playfulness both before and after lessons, as well as when not occupied; also in prompt action.

(2) *Impressionability* is indicated in his controlled and co-ordinated action.

(3) *Inhibition.* He is quiet during work. This is not due to want of spontaneity, but follows the call for attention; when response is delayed for a moment his reply shows that mental action occurred during the pause. Eye movements are inhibited and controlled in reading.

(4) *Control through the Senses.* Eye-movements are accurately controlled by sight, so are his hands and fingers in copying. His replies and action are controlled by hearing the question and the directions given; no over stimulation occurs expressed in extra-movements.

(5) *Muscle sense.* He measures the parts of an object well by sight, and their dimensions with his fingers; he is also able to appreciate differential weights in his hands.

(6) *Compound cerebration.* Physical exercises are well repeated from memory. He carefully separates the parts of a flower to be examined, and places the parts in due order for demonstration. His sentences are well arranged in giving an orderly description.

(7) *Retentiveness.* He readily repeats what he has heard or seen in action or by speech.

(8) *Co-ordination.* His well-performed actions, controlled through the senses, show that his brain has been well organised by impressions received in his previous training. Similarly, his speech in the use of words and in description is connected.

(9) *Spreading action.* No extra-movements interfere with his physical exercises. He does not drop things or break them; no wandering movements of the eyes interfere with correct observation. No spreading area of brain action is indicated by uncontrolled movements or vague utterances, and no mental confusion results from spontaneous thoughts. After work, spontaneity recurs and spreads to his limbs and vocal organs.

(10) *Response delayed.* Action follows quickly upon the stimulus received; when there is a delay indications of mental action during the pause are seen.

Here proportioning of the body in its development is normal. The nerve-signs show healthy spontaneity of brain well under control, and already to some extent organised by training. Such a pupil will probably show good mental ability, as in arithmetic and geography; his composition essays being well written and the spelling correct. His recitation may be expressive, without nervousness; and he is likely to prove an apt pupil in studying Natural Science.

ELEMENTARY EXPERIMENTAL SCIENCE.

By Professor R. A. Gregory and A. T. Simmons, B.Sc., Associate of Royal College of Science, London.

FOLLOWING the plan adopted in the lessons on "density," we shall, in this number, suggest a few simple practical exercises on the "Principle of Archimedes" and the determination of the relative density of a solid. The pupil will then be in a position to understand the principles which can be exemplified by the study of some of the physical properties of the air around us.

VIII.—Principle of Archimedes.

Lesson 1.

Things required.—Brick with string tied to it. Pail of water. Metal ball or other heavy object. Spring balance. Tumbler. Balance with one pan shortened. Box of weights. Graduated jar. Small tin canister. Small nails or shot. Methylated spirit or turpentine.

Practical Work for the Class.—Hold a brick by a string having one end tied round it. Keeping the string in your hand, lower the brick into a pail of water and notice that the brick seems to become lighter when it is immersed in the water.

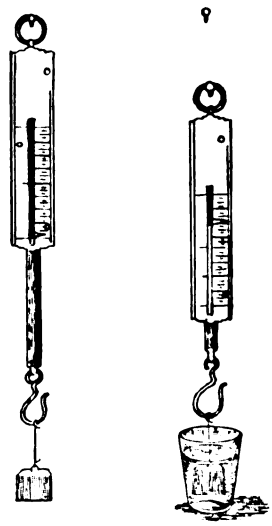


Fig. 1.—The metal cube weighs less when immersed in water than when suspended in air.

Suspend a metal cube, or any other fairly heavy object, from a spring balance, and notice the reading of the balance. This indicates the weight of the object in air. Immerse the cube in water, as in Fig. 1, and again notice the reading of the balance. It is less than before, and the loss of weight shows the buoyant power of the water.

Find the volume of the cube, or other object used in the last experiment, by noticing the volume of the water it displaces in the graduated jar.

Hang the object from one pan of the balance, as shown in Fig. 2, and determine its mass in grams. Now bring a vessel of water under the pan so that the object is immersed in it, as in Fig. 3. The pan rises, indicating a loss of weight.

Put gram weights in the pan until the balance sets horizontally as before. You thus find the apparent loss of mass due to the buoyancy of the water.

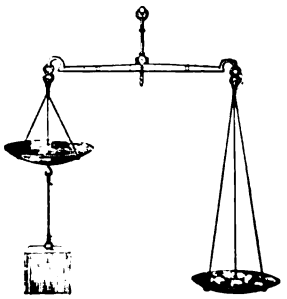


Fig. 2—Weighing an object in air.

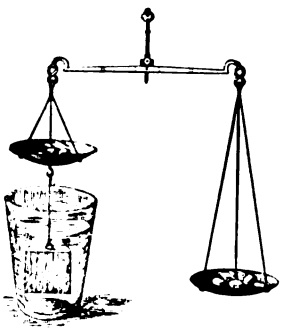


Fig. 3.—The same object weighed in water. Notice that weights are in the short pan to make up for the buoyancy of the water.

Notice that this number is the same as that giving the volume of water, in cubic centimetres, displaced by the object.

If time permits, repeat the experiment with another object, and find again that the number giving the volume of the object in cubic centimetres is the same as that giving the loss of weight when immersed in water.

Procure a small tin canister about half the diameter of the graduated jar. Put some water into the jar. Notice the level. Place the canister in the water and gradually put shot or small nails into it until it just sinks in the water when the cover is on. Pour the water displaced by the canister into a beaker counterpoised upon a balance; then take out the canister, wipe it, and place it in the other pan of the balance. You will find that the mass of the canister and shot is practically the same as the mass of the water displaced.

Repeat the experiment, using another liquid, such as methylated spirit or turpentine, instead of water.

IX.—Determination of the Density of a Solid.

Lesson 2.

Things required.—Balance and box of weights. Solids suitable for determination of densities. Beaker of water. Fine thread.

Practical Work for the Class.—Attach the solid, the density of which you are going to determine, to one side of the balance, as shown in Fig. 4. By weighing, find its mass in air. Then immerse the solid in water placed in a beaker standing upon a small platform, as shown in the figure. Find its weight in water, and by subtracting this number from its weight in air determine the loss in weight of the solid when suspended in water.

Another plan of determining the weight of an object in water was explained in the last lesson (Fig. 3).

This loss of weight equals the weight of a quantity of water having the same volume as the solid. We can therefore write:—

$$\text{Density of solid} = \frac{\text{Weight of the solid in air.}}{\text{Its loss of weight in water}}$$

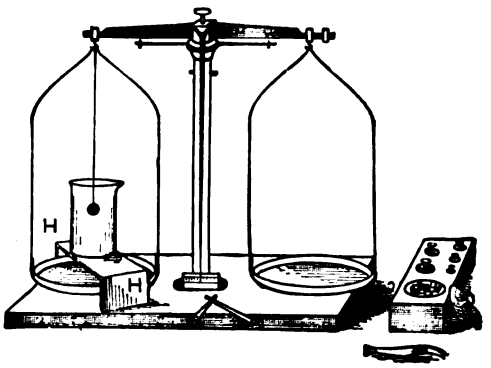


Fig. 4.—How to find the weight of an object suspended in water.

X.—The Air Around Us.

Lesson 3.

Things required.—Glass trough full of water. Bottle. Flask or bottle fitted with funnel and tube, as in Fig. 7. Balance. Weights. Two 8-oz. flasks, one fitted with tubing and clip, as in Fig. 8.

Practical Work for the Class.—Try to force an empty bottle, held upright with its mouth downwards, into a vessel of water. When you leave go, the bottle jumps up again. There is something in it which acts like a spring. (Fig. 5.)

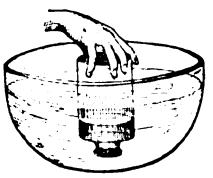


Fig. 5.—The air in the bottle cannot escape, and is compressed as the bottle is pushed down into the water.

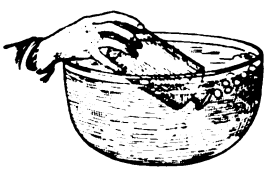


Fig. 6.—As the water goes into the bottle, air bubbles out.

Tilt an empty bottle, held mouth downwards, in a trough of water, and notice the bubbles of air which pass up as the water enters the bottle. (Fig. 6.)

Take a funnel with a narrow tube, and fit it firmly into a bottle by means of an india-rubber stopper with two holes in it. Through the second hole pass a short piece of glass tubing bent at right angles. (Fig. 7.)

Place a finger over the open end of the tube, pour water into the funnel, and notice that, so long as you keep your finger upon the end of the glass tube, the water is prevented from getting into the bottle by something—air—already there. Take your finger away. The water now runs into the bottle, and air escapes from the tube. The escaping air may be felt, or its effect upon a lighted match may be shown.

The following experiment needs to be carefully done with a good balance in order to be successful. Obtain two large flasks. Fit one with a closely-fitting india-rubber stopper, having a hole in it

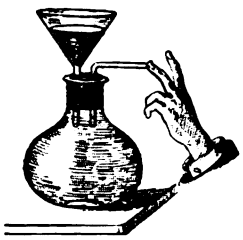


Fig. 7.—The bottle only contains air, but the water will not run in until the finger is taken from the tube, and then the air can be felt coming out.

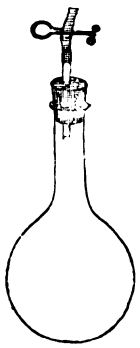


Fig. 8.—When air is sucked out of the bottle, the bottle weighs less than before.

through which a short piece of glass tubing passes. A short piece of india-rubber tubing is fitted upon the glass tube and a clip is fastened upon it. (Fig. 8.) Place the flasks in the two pans of the balance, and counterpoise them.

Now insert a short piece of glass tube as a mouthpiece in the india-rubber, open the clip, and suck air out of the flask, without touching the flask. Fasten the clip while you are sucking out the air. Take out the mouthpiece, and you will find that the flasks no longer counterpoise, the one from which air has been withdrawn being lighter than before. Admit air by opening the clip, and it will be found that the flasks again counterpoise one another.

XI.—The Pressure of the Air.

Lesson 4.

Things required.—Narrow glass tube or pipette. Leathern sucker. Flask fitted with tube as in Fig. 9 (the stoppered flask used in the experiment to determine the mass of air will do). Toy

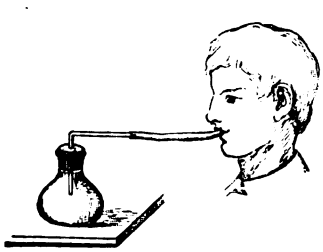


Fig. 9.—The water in the flask cannot be sucked out while the cork is tight.

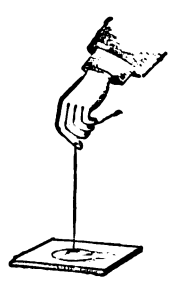


Fig. 10.—The sucker cannot be pulled off easily because the air is pressing on the top of it, but not on the lower side.

squirt or glass syringe. Cylinder or tumbler with ground-glass edge. Piece of card large enough to cover mouth of cylinder or tumbler. Bellows.

Practical Work for the Class.—Dip a long tube, a pipette will do, into water. Place your finger over the top and lift the tube out of the water. Notice that the water does not run out of the tube although the bottom is open.

Moisten a leathern sucker, press it upon a flat stone, and notice that it can only be pulled off with difficulty, owing to the atmosphere pressing upon its upper surface. (Fig. 10.)

Fit a one-holed stopper into a flask of water. Push a piece of glass tubing through the stopper. Try to suck up the water. You cannot, unless you loosen the stopper so as to let the pressure of the air force the water up the tube. (Fig. 9.)

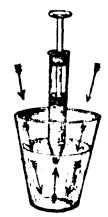


Fig. 11.—The pressure of the air forces water into the squirt when the piston is pulled up.

Fig. 12.—The paper does not fall off though the glass is full of water.

Dip the open end of a glass syringe or squirt into a tumbler of water; pull up the piston and observe that the water follows it, owing to the pressure of the atmosphere upon the surface of the water in the tumbler. (Fig. 11.)

Take a tumbler or cylinder with ground edges and completely fill it with water. Place a piece of cardboard or stout writing-paper across the top and invert the vessel. If the air has been carefully kept from entering the tumbler, the water does not run out. (Fig. 12.) Think what keeps the paper in its place.

Procure a pair of bellows. Notice that the valve at the bottom only opens inwards. Open

Fig. 13.—When the bellows are being opened the valve rises and air enters.

Fig. 14.—When the bellows are being closed the valve is pushed down, and air is forced out of the nozzle.

the bellows, and observe that the valve is pushed up a little as the air enters. (Fig. 13). Close the bellows; the valve is pushed down and the air is forced through the nozzle, as it cannot escape any other way. (Fig. 14.)

Tie a piece of thin india-rubber, such as is used in toy air-balls, over the mouth of a funnel. Suck air from the funnel, and notice that the

india-rubber is forced inwards by the pressure of the outside air. Place your finger over the open end of the funnel while the india-rubber is in this condition, and turn the funnel in different directions. Notice that the india-rubber undergoes no change in shape, thus showing that the air pressure outside is the same in different directions. (Fig. 15.)

Fig. 15.—The funnel at A has a sheet of india-rubber over the top. When air is sucked out of the funnel the india-rubber curves inwards, owing to the pressure of the air outside.

XII.—Barometers.

Lesson 5.

Things required.—Two barometer tubes about 36 inches long. Piece of glass tubing about 6 inches long, and the same width as the barometer tube. Thick india-rubber tubing to connect barometer tube and short tube. Board having two lines, 28 inches apart, drawn upon it, and a strip of paper, divided into tenths of inches, gummed to the top, as shown in Fig. 16. Mercury. Cup to hold mercury.

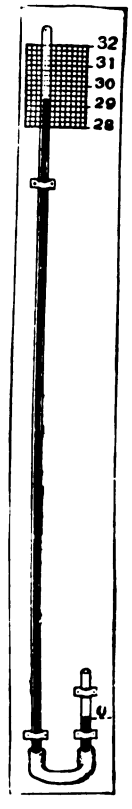


Fig. 16. — The pressure of the air on the mercury in the small tube is able to support the column of mercury in the long tube.

Practical Work for the Class.—Tie a short piece of india-rubber tubing upon the open end of a barometer tube. Tie the free end of the tubing to a glass tube about 6 inches long, open at both ends. Rest the barometer tube with its closed end downwards, and pour mercury into it (being careful to remove all air-bubbles) until the liquid reaches the short tube. Then fix the arrangement upright as in Fig. 16.

The air pressing upon the surface of the mercury in the short open arm of the U-tube balances a long column of mercury in the closed arm.

Slip a piece of india-rubber tubing upon the open end of the barometer, and notice what happens when you blow vigorously down it. Suck air out of the tube, and observe the result.

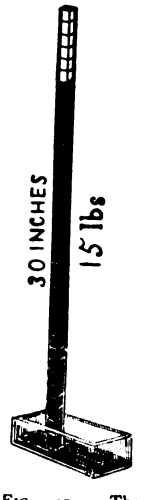


Fig. 17. — The mass of a cubic inch of mercury is ½lb.; therefore that of 30 cubic inches is 15lbs

Fill a barometer tube with mercury; place your thumb over the open end; invert the tube; place the open end in a cup of mercury, and take away your thumb.

The mercury in the tube will be seen to fall, so as to leave a space of a few inches between it and the closed end. Measure the distance between the top of the mercury column and the level of the mercury in the cup. It will be found to be about 30 inches. If a tube less than 30 inches (76 centimetres) long is used, there is no space at the top. Tilt the barometer tube, and notice that the mercury fills the tube when the vertical distance from the top of the mercury to the mercury in the cup is less than 30 inches.

ON THE EARLY TEACHING OF FRENCH.

By Professor Walter Rippmann, M.A.

VII.

Class Management.

IT is only after some hesitation that I have decided to include in this series of articles some remarks about the management of classes. To teachers of experience they will appear commonplace enough; the "child psychologist" may think them scanty. But those young teachers for whom my suggestions are particularly intended will perhaps find some of them useful. I have often seen good knowledge of the subject and a keen desire to impart it frustrated by an altogether defective acquaintance with general principles of teaching.

Such ignorance becomes fatal where the participation of the children is specially active: and that is the case in the method here described. It is not the only branch of education in which the children are being led more and more to join in the work, and not allowed to remain purely receptive.

In the early stages, the living voice will to a large extent take the place of the printed word; the teacher does not place a book in the hands of his pupils, and must therefore determine exactly what fresh knowledge he is going to impart in each lesson. He must prepare himself carefully: he may even with advantage go so far as to assign a certain number of minutes to the various things he wishes to teach in the hour or period. This sounds rather pedantic. But, in the first place, it prevents too much time being spent over one part of the work, and the lesson forms a complete whole; nothing is more unsettling to the children than to break off in the middle of what they are doing because the bell is ringing. In the second place, the teacher may be trusted to some discretion in the matter; he will act in accordance, if not with the letter, yet with the spirit of my remark. I believe he will find it particularly important where the time at his disposal is small;

for it will enable him to distribute it to the greatest advantage.

You may indeed plan the hour's work, but circumstances will sometimes make a change advisable. It may appear that the knowledge of some point which you thought the children had acquired requires strengthening. Or again, weariness may set in, owing to various causes (a bad time-table, excessive physical exercise, fog, &c.), and recognised by various symptoms (the children grow listless or fidgety, or yawn); the teacher may be weary too, but he will have to remain brisk, and to stir up his class by passing to lighter or entirely different work.

The teacher should speak distinctly, but not with a precision which is painful. What appears to the child unnatural or affected interferes with its ready apprehension of what is taught. The voice should be pleasant, with sufficient modulation. Attention has been drawn of late to the faulty delivery of teachers, and to the mistakes made by them in voice-production. The whole matter is a good deal simpler than some charlatans of the "art" would lead one to suppose. One simple and useful rule is to use the lips a good deal in uttering the vowels. Those who have studied the elements of phonetics are hardly ever troubled with their voice.

If a good example is set, most children will not fail to follow it; but at first, when the pronunciation is being taught, constant attention must be given to clear utterance and good breathing. Owing to the frequently faulty teaching of English, defects may have to be removed, as in grammatical ideas, so also in speech; and here nothing is more dangerous than to say, "It will come all right in time." Time heals a good many wounds, but it cannot be relied on to effect by itself an improvement in speech.

Reading a passage or reciting a poem in chorus will be found good practice for the class as a whole. At first the teacher's voice is required to lead the others, and to suggest the right expression; a tendency to monotony has to be resisted. Before long, however, the children can be left to themselves, and the teacher is now able to listen carefully. He will soon be able to identify the voice which has made a mistake.

I have applied the word "brisk" to the teacher, but it is a quality which may degenerate into "nervous" or "fidgety." There must always be a certain repose in his manner, if he is to manage a class at all successfully. The timid will then readily turn to him for encouragement; boys in particular often suffer from a certain shyness, a horror at being considered to have "side." When such a boy made a mistake, I have known the master to grow sarcastic, and then the other boys of course laughed at him. The result is that the boy is still more unwilling to answer when he is asked again. Now sarcasm is a favourite instrument with some teachers, and it is no doubt invaluable in certain cases; but it requires very delicate handling. Where the two parties are on such a different level as here, where the one subjected to it cannot retaliate without fear of punishment, its improper use is very much like bullying. No doubt, it is often useful in repressing the forward; though even here it must not leave a bitter sting.

It is far harder, however, to repress oneself. Particularly the young and clever teacher, fresh from the University, primed with much knowledge, is tempted to give a pyrotechnic display. As Prof. Joynes[1] has said, "It is so easy to waste time in displaying our own erudition; so pleasant to astonish or amuse our pupils; so hard to forget ourselves for their sake; so easy, in a word, to be a scholar, so hard to be a teacher."

"To forget ourselves for their sake": it is an ideal for which we have to strive. We must ourselves be even as children, and learn to look upon the world with their eyes, before we can teach them. The more young and delicate the plant, the greater must be our care; the faults in our treatment may produce in the end trees that are gnarled and stunted. Seeing, then, how grave is the responsibility of early teaching, let it be entrusted only to men and women who regard it as a privilege, who devote to it their most careful thought, who love the little ones.

VIII.

First Steps.

About the pronunciation of French I have already spoken, and the first lessons will be devoted to it exclusively. It never fails to interest the children; they are constantly led to compare, and still more often to contrast, the sounds of their mother tongue. Only where a sound offers exceptional difficulty is it necessary to teach it by itself; as a rule they should be practised in combination. I have suggested that for this purpose the French names may be utilised which are given to the pupils. There is no harm whatever in letting the children know the meaning of these names. They may write them down (of course, the French only) beside the real names of their fellow pupils.

The home lessons are obviously confined to practice in the utterance of the new sounds. Two or three times five minutes is all that need be required. In some cases it may be found advisable to set a few simple breathing exercises. In going through the exercises for rounded vowels (which give so much trouble) the use of a hand-glass should be insisted upon.

When the teacher has satisfied himself that all the children can produce each foreign sound correctly (though, perhaps, not fluently in all combinations), he will promise to introduce them to a family in France. He may tell them that they are simple folk, living in a country village.—I know

[1] In "Methods of Teaching Modern Languages," p. 35. (Heath & Co., Boston, 1896.)

there are some teachers who object to this, alleging that the object and the foreign word must be suggested at the same moment, and that from the very beginning the foreign speech only should be used in the class-room. It shows the danger of riding a hobby to death. To prepare them for what is coming in the next lesson is a distinct aid, and helps rather than retards the desired "direct" connection of the object and the foreign word.

In the next lesson, then, the Hölzel picture of *Le Printemps* is put up. It is large enough (55 × 35 inches) to be seen by the whole class. It was S. Alge, of S. Gallen, who hit upon the happy idea of making the persons appearing in it members of the same family. By permission of Messrs. Hachette & Co., we are enabled to give the picture here in a reduced form.

LE PRINTEMPS.

The father (*Auguste Bontemps*) is a farmer; he is in the field, harrowing; his wife, *Rose*, is working in the little garden, together with her father-in-law, *Maurice*, whose wife, *Madeleine*, is sitting on the doorstep with her youngest grandchild, *Paul*, on her lap. The other children are: The group of four in the centre, *Charles*, *Marie*, *Louise*, *Julie* (taking them in order from left to right), *Henri*, the boy in the garden, and *Cécile*, who is feeding the ducks and hens. The farmer's brother, *Eugène*, is coming along the road: he owns the mill on the left of the picture. His sister, *Émilie*, lives there, too; she is just crossing the little bridge. The door of the farmhouse is open, and we see the servant busy at work.

Here we have a simple family, the kind of family we might meet just as well in England or Germany. But we have given it reality and human interest by assigning names. The persons on the picture cease to be mere types.

We begin by pointing,[1] say, to *Charles*, and give his name. It is repeated until the teacher is satisfied that all can pronounce it correctly ("pure" *a*, distinct *r*, tongue not too far back for *l*). He proceeds in the same way to introduce them to *Marie*, *Louise*, *Julie*, and to *Henri*, *Cécile*, *Paul*. He then points to this child and to that, until the names come quite readily. He may then point to two at a time, and thus introduce *et*. In the same way he points to, and names, *le père* and *la mère*, *le jardin* and *la maison*. The children

[1] In using pictures the teacher cannot remain always at his desk; nor is this at all desirable. There is no good reason why those who sit in the back rows should always be at a disadvantage. The voice of the teacher has further to travel; they cannot watch his face so easily. Moving among the children, he can give them more equal attention; and at the same time he will to a large extent remove the temptation to dishonest copying, prompting, &c.

When the children have writing to do in class, he will be able to see whether they have quite grasped what is required of them. He will often correct a mistake in the work of an individual, without telling the whole class; obeying the excellent principle: *Impress what is right, do not dwell at length on the wrong.*

For this reason also he will very rarely put a wrong form, construction, &c., on the blackboard, and will rub it out at once when it has served its purpose; and when a mistake has been made by a pupil he will ask another, not to repeat the incorrect words, but rather to give the words as they should have been said.

notice the difference in the article, and *père* and *mère* suffice to suggest that it represents a difference of gender. (Grammatical explanations of this kind are at first best given in English.) The speaker speaks the little sentences, *c'est Charles, c'est la mère*, &c.; and the pupils repeat until all can say them quite fluently, the teacher simply pointing to a person on the picture, and naming the child who is to give the answer,[1] or letting all answer together. He next says, "I shall now tell you what he (pointing to Charles) is: *Charles est un garçon.*" The children see the meaning without difficulty. (It may be taken as a general rule that, at the very beginning, the English word may be supplied, if the teacher has reason to believe that the word is not understood by some of the children. As, however, most of the words first taught represent objects on the picture, the necessity does not often arise.) The children repeat the sentence, and the names of the other boys are substituted for *Charles*. The sentence, *Marie est une fille*, is next taught. The children observe *un* and *une*, and compare this with *le* and *la*. Questions are then asked, first by the teacher, who intentionally exaggerates the tone of question in his voice, *Qu' est-ce que Charles? Charles est un garçon;* and when this has been sufficiently practised, *Qui est-ce qui est un garçon? Charles est un garçon.*

In my next article I shall continue the course suggested. It is impossible to say how much can be taken in each lesson; everything will depend on the intellectual standard of the children, and the length and frequency of the lessons.

The Growth of the Empire.—The Empire is a territory of 11,500,000 square miles, or 13,000,000, if we include Egypt and the Soudan; and in this territory there is a population of about 407,000,000, which would be increased to over 420,000,000 if Egypt and the Soudan were included—a population about one-fourth of the whole population of the earth. Of this population, again, about 50,000,000 are of English speech and race, the ruling race—in the United Kingdom, in British North America and in Australasia; and the remaining 350,000,000 to 370,000,000 are the various subject races, for the most part in India and Africa, the proportion of the governing to the subject races being thus about one-eighth. (South Africa is an exception, being self-governing, with a white minority in power, but with the black subjects greatly predominating in numbers.) The increase in area and population in this Empire, excluding Egypt and the Soudan, amounts, since 1871, to 2,854,000 square miles of area, or more than one-fourth of the whole, and to 125,000,000 of population, which is also more than one-fourth of the whole. The increase of the ruling race included in this population amounts to about 12,500,000, or about one-fourth of the number in 1897; and the increase in the subject races is 112,000,000, or nearly one-third the numbers in 1897.—Sir Robert Giffen, K.C.B., F.R.S.

[1] The question should always be followed by a very short pause, to enable all the children to *think* the answer. The name of one pupil in particular is then given, who *speaks* it. Or, if there can be only one answer to the question, the whole class may utter it together,

THE SECONDARY EDUCATION BILL.[1]

The new Bill dealing with secondary education was introduced in the House of Lords on Tuesday, March 14th, by the Duke of Devonshire, and read a first time. In presenting the Bill His Grace explained that there was no intention to bring secondary education under any centralised control such as that which has been found necessary in regard to elementary education. It is proposed in the new Bill to constitute a Board of the same character as the Board of Trade or Board of Agriculture. Like the Board of Trade, but unlike the Board of Agriculture, it will have a Parliamentary Secretary as well as a President, and the office of Vice-President will cease to exist. Following the precedent of the Board of Trade Act, 1867, a temporary provision has been introduced that during the tenure of office of the Vice-President he will continue to be a member of the Board. The experience and knowledge of the subject possessed by the Vice-President will be of great value, not only in the conduct of the Bill through the House of Commons, but in organising the Department. The present Bill will give more elastic powers of transfer of the educational functions of the Charity Commissioners to the new Department. It will give power to the Queen in Council to order the transfer to the Education Board of such powers as may appear to relate to education. The question of whether a trust is of an educational or other character, and the apportioning of endowments for educational or other purposes, will, however, as in the Bill of last year, be reserved to the Charity Commissioners.

The question of inspection and examination of schools by the new Board is one of such importance that it is dealt with in the new Bill in a separate clause instead of in a sub-section of a clause, as in the former Bill.

The present aim is limited to the better organisation of the provision for local centralisation on the lines indicated in the report of the Royal Commission, and all at present in view is such an inspection of local schools as may assist the local authorities, hereafter to be constituted, to bring the endowed, municipal, and private proprietary schools within their areas into some common local scheme. Inspection in all cases shall, it is proposed, be optional, except in the case of those schools which are being conducted under schemes of the Endowed School Commissioners, in whose case the new department will inherit the powers of inspection which are already possessed by the Charity Commissioners.

No attempt is to be made to impose upon secondary schools anything like uniformity in their course of instruction; inspection will be conducted on the advice of, and in consultation with, the consultative committee formed under the Bill; due care will be taken in the selection of the inspectors; and University or other competent organisations will be admitted as equivalent to give inspection.

The regulations under which registers of teachers are formed will be framed in consultation with and on the advice of the consultative committee. The composition of that committee will not be stereotyped by the terms of the Bill further than that it is provided that it shall be as to two-thirds representative of the Universities or other teaching bodies, and endowed, as it will be, with permanent functions.

The organisation of the Science and Art Department will be revised, and the task will be undertaken by a departmental committee, which will be appointed as soon as the principle of

[1] Copies of the Bill, price 1d., can be purchased either directly or through any bookseller from Eyre and Spottiswoode, 32, Abingdon Street, Westminster, S.W.; John Menzies and Co., 12, Hanover Street, Edinburgh, and 90, West Nile Street, Glasgow; or Hodges, Figgis and Co., 104, Grafton Street, Dublin.

the amalgamation of this department with the Education Department has been approved by Parliament. The inquiry will occupy a considerable amount of time, and it is therefore proposed that the new Bill shall not come into force until April 1st next year.

PRE-CLASSICAL CULTURE IN GREECE.

The March number of the *Journal of the Camera Club* contains a scholarly and deeply interesting paper by Dr. Horace Brown, F.R.S., entitled "Pre-historic Remains in Greece," which, as the author remarks, might be better described as "The Origin of the Arts and Civilisation of Classical Greece." We strongly recommend the essay, as a whole, to the careful attention of those of our readers who are engaged in classical teaching, and offer the following abridged account for the benefit of those who are unable to study the original.

Schliemann's Earlier Work.

The creation of this prehistoric Greek archæology is due to the genius and energy of one man, the late Henry Schliemann, and it will doubtless take several generations to complete the task he began, and to fill up those great gaps which still exist between the early civilisation and the commencement of that period of rapid growth in culture which came to its final fruition in the age of Pericles.

Schliemann's earliest work with the spade was carried on in the Island of Ithaca, on the site which tradition has assigned to the home of Ulysses. This was barren of results; so in 1870, having obtained the permission of the Porte to carry out investigations in the Troad, he set to work with the intention of settling a controversy which had long been carried on by scholars as to the real site of Troy. At that time nearly all influential scholars were of opinion that the ancient settlement, which the imagination of Homer had transformed into a royal city, must have been situated on the small mountain fastness of Bunarbashi, at some considerable distance from the sea, and could not have been on the hill of Hissarlik, much nearer the sea, where the almost unanimous voice of ancient writers had placed it. It was on the hill of Hissarlik that the new Ilion of the Greeks and Romans was certainly built after the Persian wars, and it is equally certain that it was the hill of Hissarlik which Xerxes, and after him Alexander, had visited, under the full belief that they were then regarding the site of the Homeric Troy.

Excavations at Hissarlik.

A survey of the country which Schliemann made in 1868 convinced him that the topographical details of the Iliad were in consonance only with the Hissarlik site, and it was here that he commenced his excavations in 1870—excavations which were continued at somewhat long intervals up to the time of his death in 1890, and were further continued by his associate, Dr. Dörpfeld, in the years 1893-94.

By means of excavations carried down to the virgin rock, Schliemann found the remains of seven distinct settlements, one over the other, and researches subsequent to his death have raised the number to *nine*. The lowest and oldest city built on the bed rock measures only 150 feet in breadth, and evidently belongs to that remote period of history, the period of transition from the stone to the bronze age.

It was the second city which, during Schliemann's lifetime, aroused the greatest interest, for it was in its remains that Schliemann imagined he had found the Homeric Troy. The whole of the city shows unmistakable signs of having perished in a great conflagration. But, although the fate of this second city corresponds with that of the Homeric Ilion, we now know that this second city of Hissarlik must belong to a much earlier date than will fit in with the Homeric legend. Dr. Dörpfeld has, however, recently found remains of what must be regarded as the real Homeric Pergamos in the sixth layer from the bottom, but the greater part of by far the most important city on the mound was destroyed during the building of the Roman Ilium about the first century of our era. The sixth stratum has a stately acropolis with many large buildings, and a strong circuit wall, all built in well-dressed stone. The city evidently belongs to an advanced Mycenæan period, which was the crown and culminating point of the age of which we get a glimpse in Homer—an age which came to an abrupt termination, as far as the mainland of Greece was concerned, about the eleventh or twelfth century before our era.

Discoveries at Tiryns.

The discoveries which were initiated in Greece by Schliemann simultaneously with his Trojan work, and the more recent developments of those discoveries by M. Tsountas, were then dealt with by Dr. Brown, and he especially drew attention to the ancient sites of Tiryns and Mycenæ. The ruins of Tiryns stand on a low solitary limestone rock rising out of the plain a little over a mile from the head of the Argolic Gulf, and there is reason to believe that Tiryns was an older settlement than Mycenæ. Its walls, the strength of which was a wonder to the Greeks of all ages, vary in thickness from 16 feet up to as much as 57 feet, and a peculiar feature is the existence of galleries and corridors in the thickness of the walls, with a series of small chambers leading out of them, apparently serving as store rooms. Both chambers and corridors are vaulted in the true Mycenæan style—not by any process involving the elements of the arch, but by the gradual over-lapping of the stones in the upper courses forming the sides of the corridor.

The hill of Tiryns is fashioned into three terraces, the principal citadel being on the summit of the hill. The main approach to the citadel is on the east side, between the massive citadel wall and that of the palace.

A Homeric Palace.

Following this main approach, which is strategically arranged so that an approaching foe would have to expose his right to the defenders above, we come half-way to a narrow gateway, of which one of the massive door-posts still remains in position. It is a great slab of hard breccia about 10 feet long. It is evident that this gateway was closed by strong folding doors opening inwards, which were secured by a great round wooden bar fitting into two round holes cut into the wall on either side. On the palace side this hole is very shallow, but on the opposite side it has been carried to a great depth in the citadel wall, so that the bar could be shot right back when the doors were opened.

Beyond this first gate the passage leads to a forecourt and another large gateway. The plan of this gateway is of considerable interest, since it is the prototype of all the formal approaches to the great buildings of Greece, even down to classical times.

The entrance gate of Tiryns is 45 feet wide, and on its inner side is a large court, the details of which have been altogether obscured by a Byzantine Church, built in very early Christian times. It is well to bear in mind that the ground plan of this palace of Tiryns corresponds very closely indeed with the arrangement of the rooms in a Homeric palace, an arrangement, it must be remembered, which was quite different from that which we find on coming down to historic times.

In the middle of one side of the court or quadrangle, within the gate, is a block of masonry with a round hole in it like the top of a well, for which it was, in fact, at one time mistaken. It is, however, an *altar*, having under it a shallow sacrificial pit —a similar altar to that of Zeus, which Homer mentions as existing in the house of Odysseus:

"Where oft Laërtes holy vows had paid,
And oft Ulysses smoking victims laid."

From the cloistered court we reach the Megaron, or men's quarters, up two stone steps on the north side. First we enter a columned vestibule, opening by three doors into an ante-chamber, and thence into the principal room. These various parts correspond exactly with the arrangement of rooms in the heart of the palace as described by Homer under the names respectvely of Aithousa, Prodomos and Megaron. Leading out of the Prodomos is the bath-room, one of the most interesting portions of the palace.

Kyanos of Homer.

The decorations of the walls of the vestibule must have been very imposing. Around the walls ran an alabaster frieze which was decorated with a rich pattern of palmettes, rosettes, and spirals, and these at certain points were inlaid with a bright-blue glass enamel. This blue enamel is similar to that which occurs so frequently in Egyptian works of art, and it is now universally admitted that it is the celebrated *kyanos* of Homer, which the poet describes as decorating the palace of Alcinöus.

Most of the remainder of the palace at Tiryns is taken up with the women's apartments, which are so arranged as to indicate that something like the harem system was in force amongst this ancient race.

Excavations at Mycenæ.

The excavations of the last twenty years at Mycenæ have given us a most accurate knowledge of the various parts of the city, and have enabled us, for the first time, to realise the very high degree of civilisation attained by its builders. In so many points does this information agree with the record of the Homeric Epics that there can be no longer any reasonable doubt that we have not only to do with the same phase of civilisation, but with the identical race whose deeds lived on in tradition for a few generations until, invested with a certain amount of poetic fancy, they found a worthy and a permanent record in those lays which gradually assumed the form in which they have come down to us from the ninth century before our era. The general plan of the palace within the citadel very closely resembles that of Tiryns.

The fortress has two main gates, of which the one on the west is the famous Lions' Gate, approached by a gradually ascending roadway nearly 30 feet wide.

The Great Beehive Tombs.

In the lower city, outside the precincts of the citadel, are the great Beehive Tombs, which have long been known as Treasuries. The construction of the great circular beehive chamber beyond the doorway is very remarkable. Its sides are constructed of very carefully wrought stones arranged circle upon circle, each course gradually overlapping the one below it. There is no unevenness in the interior due to this overlapping, since the inner face of each stone is wrought so as to give a continuous inward curve, gradually narrowing towards the apex, where the dome-like structure is closed by a single block. The general effect is that of a most carefully-built dome. It is not a true vault, since the principle of the arch is not employed.

Another series of graves, which include by far the most remarkable discoveries which have been made at Mycenæ, were next described.

Remarkable Mycenæan Graves.

Pausanias describes the tombs of Agamemnon and his followers, six in all, as lying *within the walls;* but he does not specify whether he means the citadel walls, or the walls of the lower town. Most scholars, up to Schliemann's time, had interpreted this passage as referring to the outer walls of the lower city, which include the great beehive tombs, and it was these which were believed to have been seen and described by Pausanias as the tombs of the sons of Atreus. Schliemann, however, put another construction on the passage, and, with the full conviction that the royal graves were *within* the precincts of the citadel, began by digging a great trench about 40 feet from the Lions' Gate, and it was not long before he came on a remarkable ring of slabs forming a great circular enclosure about 87 feet in diameter. It is now known with certainty that this is really the ring fence which cut off an important place of burial from the adjacent parts of the citadel.

Deeper down, within the ring, were found a number of *stelai*, or gravestones, and also a circular altar of roughly-hewn stones, very similar to that still existing in the court of the palace at Tiryns. Four feet below this altar were found the tombs which have yielded the most magnificent and astonishing finds which have ever fallen to the lot of an archæologist.

The tombs found by Schliemann were five in number, but later another was discovered, thus bringing them up to the exact number recorded by Pausanias.

The bodies, some of which were in a more or less mummified condition, were found lying in a layer of small river pebbles, and were surrounded with innumerable ornaments of gold, whose mere intrinsic value amounted to many thousands of pounds sterling. They consisted of diadems, face-masks, breastplates, bracelets, and massive gold goblets, some of them weighing as much as three or four pounds. Besides these were many other objects of art in gold and silver, and numerous bronze weapons, such as swords, daggers, spears, and arrows.

The Shield of Achilles.

All these objects are now in the Athens Museum. Some of the bronze dagger-blades, when carefully cleaned, revealed most remarkable inlaid work.

With these examples of metal inlaid work before us we can no longer believe that Homer was relying entirely on his imagination when he tells of the shield of Achilles, fashioned for the hero by Hephaistos, for he exactly describes the kind of work which we can see for ourselves.

The paper, of which we have only been able to give an outline, makes it quite clear that the existence of a pre-classical culture in Greece itself is now proved beyond all doubt, and the evidence is year by year becoming stronger that the culture survived, in a more or less languishing state, until the time was ripe for its renaissance in the sixth century B.C.

The Problem of Education.—The greatest and most difficult problem to which man can devote himself is the problem of education. For insight depends on education, and education in its turn depends on insight. It follows, therefore, that education can only advance by slow degrees, and a true conception of the method of education can only arise when one generation transmits to the next its stores of experience and knowledge, each generation adding something to its own before transmitting them to the following. What vast culture and experience does not this conception pre-suppose?—"Kant on Education" (Kegan Paul).

MIXED CLASSES IN SCHOOLS AND UNIVERSITIES.[1]

Co-education, or the education of boys and girls in the same classes, is the general practice in the elementary schools of the United States. Exceptions to this rule are found in a few cities —less, apparently, than 6 per cent. of the total number. In the majority of these cities the separation of boys and girls has arisen from the position or original arrangement of buildings, and is likely to be discontinued under more favourable conditions. Of the fifty principal cities enumerated by the census of 1890, four, namely, Philadelphia, Pa.; Newark, N.J.; Providence, R. I.; and Atalanta, Ga., report separation of the sexes in the high schools only. Two cities of this class—San Francisco, Cal., and Wilmington, Del.—reported, in 1892, separation in all grades above the primary. In six cities—New York and Brooklyn, N.Y.; Boston, Mass.; Baltimore, Md.; Washington, D.C.; and Louisville, Ky.—both separate and mixed classes are found in all grades. Five cities of the second class having a population of 8,000 or more report separation of the sexes in the high schools, and ten cities of the same group separate classes in other grades. Of cities whose population is less than 8,000, nine report separate classes for boys and girls in some grades.

Co-education is the policy in about two-thirds of the total number of private schools reporting to this Bureau, and in 65 per cent. of the colleges and universities.

Great Britain and Colonies.—In England 65 per cent. of the departments into which the elementary schools are divided have boys and girls in the same classes; in Scotland, 97 per cent. Statistics for Ireland show that 51 per cent. of the national schools have a mixed attendance of boys and girls.

Separate education is the general policy in English schools of secondary grade, and where both sexes are admitted to the same school it is generally to separate departments. It is noticeable that the Royal Commission on Secondary Education advocate the extension of the co-education policy.

In the British colonies, with very few exceptions, both mixed and separate schools are found. In Ontario all the schools are mixed. In Quebec the schools for English children are, as a rule, mixed, but in those for the French the sexes are separated. In the Australasian colonies the tendency to separate departments for boys and girls is noticeable in cities. In Cape Colony, while nearly all schools are mixed, separate schools for girls are encouraged.

France.—In France, custom and sentiment favour the separate education of boys and girls, and the law requires every commune having above 500 inhabitants to establish a separate school for girls unless specially authorised to substitute therefor a mixed school. The attendance at mixed schools slightly increased during the last decade, but not enough to indicate any decided change of sentiment in this respect. The mixed schools are seldom found in cities.

The department of the Seine, which is occupied by Paris and its environs, reported in 1891-92 for public schools only 0·2 per cent. of the pupils enrolled in mixed schools, and for private schools 9·2 per cent.

In secondary schools, public and private, separate education is the universal rule.

Germany.—Separate education is the preferred policy in the German States, but is not practicable in the rural primary schools. According to statistics of 1891, in Prussia two-thirds of the children in the common schools were in mixed classes, but in the cities the proportion was only three-tenths. In Saxony only the two lowest classes are mixed, so that separation occurs generally at the tenth year of age—always by the twelfth.

Other European countries.—Similar conditions prevail in the remaining countries of Europe, the tendency toward separation being most strongly marked in the Catholic countries. In Italy the law calls for separate schools for boys and girls, and if they attend at the same building it must be in separate departments, each provided with its own entrance door. The lowest classes, however, may be, and often are, mixed.

In Norway, and to a less extent in Denmark, girls are securing admission to secondary schools formerly reserved for boys.

South America.—The South American Republics follow the precedent of the Latin States of Europe. Brazil, like Italy, requires separate schools for the two sexes. In 1888 the experiment of admitting boys and girls to the same class rooms was made in a few schools, but they were seated in different rooms outside of recitation hours.

Co-education in the Universities of Europe.—The adverse vote of the senate of Cambridge University upon the proposition to admit women to the University degrees fixes for the present the status of women with respect to the two great English Universities. The vote, which was taken May 21st, 1897, stood 1,707 against to 661 for the resolution.

The university colleges established in England since 1868 are open to men and women. By the Universities Act of 1889 the Scotch Universities were authorised to open their dpors to women. Edinburgh admits them to the classes with men. Glasgow has affiliated Queen Margaret College for women, and more recently (1895) opened all lectures in the Faculty of Arts to women. The University College of Dundee, affiliated to St. Andrews, is co-educational.

In France women have never been legally deprived of university privileges, and since 1863, when the first woman was enrolled in the Paris Faculties, the number of women matriculants has been gradually increasing. Women have recently been admitted to courses in the Universities of Germany, Austria and Hungary, special authorisation being required in each individual case.

The University of Athens was opened to women in 1890.

[1] From the "Report of the United States Commissioner of Education, 1896-7," vol. ii.

INSTRUCTION OF THE DEAF.

One branch of education in which, as a nation, we are behind the United States is the instruction of the deaf. But though this work is neither fully organised nor completely developed among us, the main point has been secured, viz., its recognition as a part of the scheme of general education for which the nation makes provision. Unfortunately, there has been in the past a considerable divergence of opinion among British teachers of the deaf as to the best methods of teaching, and this want of unanimity has very much militated against the success of their efforts.

In America, on the other hand, methods of instruction have been systematised, and the Volta Bureau has done excellent work in this direction. From a publication recently issued by the Bureau it appears that the principal plans followed are two in number, the sign-language method and the English-language method. By the former, deaf-mute children learn from other deaf-mutes and their teachers a peculiar language of motions of the arms and upper part of the body, to which they learn to attach signification through usage. On this plan English is considered a foreign language, and the deaf and dumb are largely taught it through translation from the indefinite and crude sign-language. In the English-language method, deaf-

mute children are taught to connect objects, actions, feelings, &c., within the range of their experience directly with the appropriate English expression in the written or spoken form from the first. For instance, to illustrate the two methods.

To teach the English word *cat* to a deaf child, a "sign" teacher would show the child a cat if possible, or a picture of a cat, which would be recognised by the child. The next step would be to direct attention to the cat's whiskers, drawing the thumb and finger of each hand lightly over them. A similar motion with the thumb and finger of each hand above the teacher's upper lip at once becomes a sign for "cat." The instructed deaf child will be expected to recall the object, *cat*, on seeing this conventional sign. The child must learn this sign, from a "sign"-teacher's point of view, before he is prepared to learn the English word "cat." After the sign has become familiar the child is trained to write the word "cat" on a slate, blackboard or sheet of paper, and by frequent repetition the pupil associates the written word with the sign for *cat*, so that the written word recalls the gestural sign and the gestural sign serves to recall the idea, or more strictly speaking, the concept, "cat."

The intuitive, or direct method, called in this country the English-language method, would require the use of the living cat, or the recognition of the picture of a cat, by the deaf child, but would connect the written or spoken word "cat" directly with the object without the intervention of any artificial finger-sign.

CRICKET SONG.

By E. Sharwood-Smith, M.A.,
Headmaster-Elect of Whitchurch Grammar School, Salop.

Now summer's comin' in, and the sunny days begin,
And the scent of summer's sweet upon the lea,
You may take and pitch the wicket, for the time has come for cricket,
Put flannels on, and come along with me;
And we'll play the game once more
Our fathers played of yore,
The game that's made our England great the whole world through and through;
For Wellington, they say,
At cricket learnt the way
The French to shame, and win the game at merry Waterloo!

(*Chorus.*) So cheer, cheer, cheer,
For the game without a peer!
For England's game is England's fame, it's very, very clear!
So let us loudly call,
Good fellows, one and all!
Long live the game to English hearts and English muscle dear!

O bowler play your part, cool head and dauntless heart,
When science profits not, and naught avails,
When the batsman has your measure, as he smacks you at his pleasure,
And takes and pulls you calmly to the rails;
When the field is getting slack
And your captain's looking black,
O then's the time to test your skill and show them all you can;
Of all the joy there is,
There's naught to equal this—
To "tice" the "crack" and send him back a sadder, wiser man!

O batsman play the game, or a "duck" will blot your fame;
Don't shiver when the umpire sings out "Play!"
But be wary, wise and ready, play 'em straight and true and steady,
And watch the ball and gently feel your way
With a single it may be,
Or a snick to leg for three,
Or here and there a cut for two, and a drive along the floor;
For none there is that knows,
To tell in verse or prose,
The keen delight that thrills the wight who cuts the "pro" for four!

O fielder have a care, for you've not a run to spare,
And the "tens" are mounting frequently and fast;
Don't growl or groan or grumble if you chance to slip or stumble,
But up and off and after ere it's past;
You will learn it to your cost,
"Who hesitates is lost;"
It's the "ones" that turn the scale at last and save your side defeat.
What matters scar or scratch
To him that holds the catch?
And that loud shout that tells he's "out" is music passing sweet.

AFTER THE KINDERGARTEN.

An article in the March number of the *Atlantic Monthly* will be read with appreciation by many masters in preparatory schools. It is concerned with the condition of mind of the American children who have spent their early years in the kindergarten and have just entered schools in which subjects are studied systematically.

Every schoolmaster who has had to deal with children trained upon kindergarten principles knows that, compared with other children, the products of the kindergarten are backward in most school subjects, and are unable to apply themselves to serious work. A child from the kindergarten school can talk volubly upon most matters, but he objects to discipline and seems not to understand the meaning of effort and attention. No one would wish that young children should have their minds unduly taxed, but, on the other hand, it is not sound educational policy to give a child the idea that all knowledge can be acquired by means of games and pleasant occupations. Children cannot understand too early that they will have to do certain things which they may dislike as well as things they like, and a kindergarten training does not, as a rule, impress this fact upon them. Few children, for instance, care for writing, but it is essential for them to laboriously copy line after line before they can form their letters.

There is, however, another aspect of the question. Children trained on kindergarten methods are usually in advance of other children as regards an acquaintance with the objects and phenomena around them, though they may be backward in both knowledge and definitions. But these children receive little sympathy when they pass into the preparatory school, and the faculties of observation and inference which they have been taught to exercise are of little use to them. A boy may have obtained very clear ideas as to rivers and river valleys by means

of clay modelling, but this will not serve him when he has to learn what are the longest rivers or the highest mountains in the British Isles. Certain facts must be learnt, and the memory must be cultivated; but the ability to think and observe and exercise common sense is just as important, and no educational system is good which neglects the development of the mind in these directions.

The fact of the matter is that to instruct a child entirely by the method of play is a mistake, and to keep him closely at uninteresting work is an even more serious error. What is wanted both in kindergarten and preparatory schools is a wise combination of kindergarten methods with attentive study; for by these means children obtain mental discipline and the power of application, as well as the ability to observe and express themselves clearly. If such a combination were more general, the master who takes boys from a kindergarten school would have less cause of complaint as to their backwardness, and the kindergarten teacher would have less reason to complain of the want of sympathy of preparatory schoolmasters with kindergarten methods.

The following extracts from the *Atlantic Monthly* express the views of a teacher who has had to deal with children after the kindergarten :—

There was a day when we primary school-teachers all believed—ineradicably and eternally, we thought then—that by means of joy and sport and merry games the little children at their play would banish the arid drudgery of the old schoolroom routine; would laugh their way through reading and writing, sing their way through geography and history, dance their way through algebra and geometry, and progress in one beautiful, unbroken line of "continuous development" from the kindergarten, through the most difficult college examinations, on and on into a roseate futurity. Fifteen years ago, when free kindergartens were hardly more than starting in some of the large cities, we dreamed of the glorious era opening before both the children and the overworked school teacher.

Perhaps we expected too much. As we waited impatiently in the primary school for that first class of kindergarten-trained children who were to work without urging, and relieve us of all the responsibility of school government, we looked forward to a pedagogical millennium. The children came. In one day we discovered that they, as well as we, had expectations. They came expecting to be praised for every trivial act or piece of work: they came expecting to do exactly as they pleased at any hour of the day, and to be entertained at every hour of the day. They came expecting all these good things—and they were disappointed; so were we. They were not as happy in the school as they had been when they were in the kindergarten; neither were we. In a few days they made up their minds that we did not know how to teach, and at about the same time we made up our minds that they did not know how to learn.

We thought it but natural that when the children reached the primary school they should receive instruction in the arts of reading, writing, and arithmetic. Accordingly, we began our lessons upon them. The children went to the blackboards to copy certain letters. For three days this was a great success. Then Freddie asked, "Isn't this work?" We replied that it was intended to be, whereupon he laid down his crayon, remarking, "Then I don't want to do it any more. In kindergarten we don't *work*; we *play*."

There was no denying that the kindergarten child had ideas. His little mind was no *tabula rasa* upon which we were expected to begin the laborious inscription of the facts of life. We soon found that we could not mention any subject under the sun without bringing down an avalanche of inaccurate or incorrect information concerning it. Indeed, we finally discovered that we were not expected to impart instruction at all, but that our function as teachers was to set interesting topics for discussion, and listen quietly to the "facts already in the child's mind," remarking at frequent intervals, "Really?" "How very interesting!" "You astonish me!"

Our ideas seemed all old-fashioned. We had been brought up to believe that obedience was due from children to their elders, who were responsible for them—Freddie did not share this view with us; that a certain definite attainment should be the result of each year's work—attainment was not valued by Freddie; that industry and perseverance and the ability to do the work in hand, whether pleasant or unpleasant, were at the foundations of character and success—Freddie scorned such considerations, and openly scoffed at perfection.

Our relations became more and more strained, and in the course of time it was borne in upon us that our abilities were not such as to enable us successfully to develop in the primary school the flabby kindergarten intellect of the kindergarten child.

CURRENT GEOGRAPHICAL TOPICS.

By A. J. Herbertson, F.R.G.S.

The Philippine Islands.[1]

One of the most interesting practical geographical problems of the present day is that which the United States has undertaken to solve in the Philippine Islands, with their rich vegetation, their numerous races, and their climate so unsuitable for white men. This group is formed of a thousand or more islands lying between 5° and 20° N. latitude, and between 117° and 127° E. Their area is nearly that of the British Isles, and two of the islands, Luzon and Mindanao, are about one-quarter and one-sixth larger than Ireland respectively. Between Luzon and Mindanao are the Visayan Islands—Samar, Leyte, Zebu, Negros and Panay. Paláwan is a long narrow island stretching from Borneo to Mindoro and Luzon. These islands, except Zebu, are from two to one-third the area of Wales. Zebu is about the area of Wiltshire or Somerset.

The Philippines form part of the outer Pacific coast of Asia, and may be looked on as fringing continental islands, with the exception of Paláwan and the Sulu Archipelago, which, with Borneo and the other Philippine Islands, encloses the Sulu Sea. The Philippines form part of the "Ring of Fire" which girdles the Pacific Ocean. There are not only many recent volcanic deposits, but several active volcanoes, including the lofty, perfect cone of Mayon, rivalling that of Fujiyama in beauty, and the vigorous Taäl, only a few hundred feet above sea level, one of the lowest in the world. Earthquakes are numerous, and the level of the land is so constantly altering that natives often say they fish where their grandfathers once lived. The young volcanic rocks are not the only ones. Old schists, gneisses and granites, as well as stratified rocks, are found.

The climate is typically intertropical, the seasons being distinguished as rainy and dry. The mean temperature is probably about 80°F. at the sea level over most of the group, and the annual range little over 5° F. The country is dominated by the N.E. trades in the winter months, and by the S.W. monsoon or trades drawn across the Equator in the summer months. Speaking generally, therefore, the rainfall occurs in winter on the western sides, but a great diversity of relief in these islands makes the distribution of rainfall extremely irregular. Professor Worcester relates how he dodged the rainy season for a whole year by judiciously choosing his route, and tells how, "while we were in Marinduque, in May, 1888, the ground was so parched that one could thrust a hand into the cracks, yet we looked just across the strait to Mindoro and watched the storm clouds gather and burst day after day." No cyclones occur within 10° of the Equator, but north of that, in the Philippines, they do much damage in the spring and autumn at the change of monsoon. These typhoons, as they are called, start east of the Philippines, sweep over the northern islands, and curve to the north in the China Sea. The climate is unhealthy for those white men who have to move from place to place, and is very bad for women and children; but a white man may retain his health with due care in favourable localities.

The loose volcanic soil of the islands is very fertile, and the heavy rains make the vegetation very luxuriant. Dense forests have covered the land, but in some of the islands they have been completely cleared. The clearing steadily progresses, but much of the cleared land is quickly invaded by the cogon grass, which can be used only for fuel and thatch. The forest timber

1 Worcester, "Philippine Islands" (Macmillan, 1898); Guillemard, "Malaysia and the Pacific Archipelagoes"; Stanford's "Compendium of Geography," Australasia II., and the Philippine numbers of the *National Geographic Magazine*, Washington, June, 1898, and February, 1899.

consists of fine woods for cabinet-making, cinnamon trees, trees giving wax, gums, and gutta-percha. The abaca, related to the banana, yields the fibre known as Manila hemp. Cocoa-nuts grow well, and the copra is exported. The sago palm flourishes, as well as bananas, guavas, and fruits of every kind. Maize, rice and other cereals, sugar and tobacco, are among the chief plants of economic importance. The bamboo is one of the most valuable of plants, and "absolutely indispensable to the native. It furnishes him with frame, siding, and sometimes even roofing for his house, and from it he fashions rafts, outriggers for his boats, sledges, agricultural implements of many sorts, lance-heads, bows, bow-strings, arrows, spoons, forks, fish-traps, water pipes and receptacles, cups, measures for fluids, fences, bridges, carrying poles, musical instruments, and what not . . ."

The buffalo is the most important animal, and cattle are used both for food and draught. Every few years the locusts invade the islands.

No true coal is found in the Philippines, but lignite, of very good quality, exists. Petroleum has been tapped in Zebu, and gold is widely distributed. Silver, galena, copper and iron ores, are among the minerals that may be developed when the country is opened up.

Despite their richness the Philippines are not yet properly opened up economically. This is due partly to the greed and neglect of the Spanish officials, and partly to vexatious and oppressive taxation. One railway runs from Manila to Dagupan, 120 miles long. There are few roads, and most of these are bad, and communication with the interior is almost impossible. The coastal steamers are the chief means of transport.

Cigars are the only articles manufactured for export, and employ 10,000 people in Manila. Over 150 million cigars are exported every year, and ¾ million pounds of tobacco leaf. Tobacco is grown mainly in the north of Luzon. Of textile fabrics the natives make practically all they require.

Manila hemp or abaca grows on the hillsides of Leyte and southern Luzon, where the rainfall is heavy. Sugar is grown all over the islands, but the best quality comes from Negros.

Three or four different races inhabit the Philippines. They are either the small primitive Negritos or the more civilised Malays. The inhabitants of the Sulu Archipelago, called Moros by the Spaniards, are a fierce piratical people of very mixed origin. Some of the Malayan inhabitants of the larger islands have been partially civilised by the Spaniards, and it was these Indios who rebelled against the Spanish authority. The Chinese are numerous as well as half-castes of both Chinese and Spanish blood. The conquest of the Philippines has been more a religious than a military conquest, and much of the country has hitherto been ruled by the priests.

Manila, with the harbour of Cavite, is the chief port of the Philippines, with 300,000 inhabitants. Here, as in the other cities, the buildings are rarely over two storeys high, owing to the frequency of earthquakes, and the sanitary arrangements leave much to be desired.

Ilo-Ilo, on the island of Panay, which is clear of forests, has become the commercial city of the central Philippines. Its chief export is sugar. Zebu, on Zebu, was formerly much more important, and is the centre of the hemp trade of the Visayan Islands.

It may be expected that under the new *régime* the resources of the islands will be exploited in a way hitherto not attempted. They have a naturally favourable situation for commerce. Ships going north while the N.E. trades blow seek the shelter of Luzon, which lies on the direct route between Hong Kong and Australia. Manila has hitherto been avoided owing to custom-house chicanery, but should now grow rapidly as a commercial centre.

ITEMS OF INTEREST.

SEVERAL inquiries have reached us with reference to the sheet metal used for the construction of relief maps on the plan described in our February number. Mr. J. Stephen, the author of the article, informs us that tin sheets such as he used are supplied by Messrs. Stanton, metal merchants, Shoe Lane, London, E.C., at 2s. 6d. per lb. The sheets are 24 inches wide, and almost any length can be obtained. About three square feet go to the pound weight. Other materials which can be used for producing the relief effects are capsule metal (1s. 1d. per lb.) or Government metal (1s. 3d. per lb.), both of which are thinner than the sheet tin, and therefore a greater superficies is obtained for 1 lb. weight. Messrs. Harvey and Peak, Charing Cross Road, London, W.C., will supply either of these metals.

MANY educationists have regretted that, at the time of the death of Mr. R. H. Quick in 1891, no efforts were made to commemorate his work for education. The forthcoming publication of his "Literary Remains" by the Cambridge University Press affords a fitting opportunity to remedy this omission, and a committee has been formed with that end in view. It has been suggested that no more suitable memorial could be found than the establishment of a Quick Memorial Library at the Teachers' Guild—an institution with whose aims and work he fully sympathised. The library of the Guild already contains the nucleus of such a memorial, in the 900 volumes on modern pedagogy given by Mrs. Quick, and the valuable collection of works on historical pedagogy placed by her in the library on loan, and of which she is prepared to make a gift. It is proposed that, if sufficient money, say £500, be subscribed, the whole sum shall be invested, and the interest devoted to the purchase of books, so that the memorial shall be permanent. Subscriptions may be sent to Mr. John Russell, Cripplegate, Woking, Surrey, or to Professor Foster Watson, University College of Wales, Aberystwyth.

THE arrangements for the Modern Languages Holiday Courses for 1899, made by the Teachers' Guild of Great Britain and Ireland, are now complete. Two courses have been planned:—(1) That at Lisieux, commencing on Wednesday, August 2nd, and lasting for four weeks. Mr. E. J. Vie, B.A., headmaster of the Stockton-on-Tees High School for Boys, is in charge of this course. The second-class return fare to Lisieux from London is 38s., and board and lodging may be obtained at from 30s. to 35s. a week. (2) That at Tours, which begins on Thursday, August 3rd, and continues for three weeks, but will be extended to last for four weeks if a sufficient number of students wish it. Mr. S. de Ste. Croix, M.A., St. Edmund's School, Canterbury, acts as the representative of the Teachers' Guild Committee at Tours. The fares from London to Tours are, second-class return, 71s., third-class return, 51s. 9d., and board and residence cost rather more than at Lisieux. The courses are specially intended to promote among English people a knowledge of the language, customs, and ways of thought of the French nation. All instruction will be given in French. Students must have already some knowledge of the written language at least. Those who have no knowledge at all of the spoken language, or very little, are advised to choose the classes of M. Godal at Lisieux, and of M. Marjault at Tours. The other lecturers will speak as slowly as necessary, but will assume that their listeners are capable of understanding spoken French. Full information can be obtained from Mr. H. B. Garrod, the General Secretary of the Teachers' Guild, 74, Gower Street, W.C.

A general meeting of the Association of Headmistresses was held on Saturday, March 11th, when resolutions were passed, (1) welcoming the introduction into Parliament of a Bill dealing with primary, secondary and technical education; (2) approving the proposal contained in the Lord President's speech in introducing last year's Education Bill, for separate departments to deal with primary, secondary and technical education; (3) trusting that registration would find a place in the new Bill to be introduced; (4) expressing the views that (*a*) inspectors of secondary schools should be appointed by the Secondary Education Department; (*b*) that University inspection or examination should be accepted as an alternative to the inspection required under Scheme 2 (4) of the Board of Education Bill; (5) recording the opinion that (*a*) the Consultative Committee of the proposed Board of Education be established by law; (*b*) its constitution and duties should be assigned by Order in Council, an assurance being given that its members shall be representative of educational bodies, and shall hold office for a definite time; (6) urging that the Consultative Committee should contain some women representatives of the Universities and secondary schools; (7) trusting that local secondary education authorities may soon be established.

From an A.M.A. circular to members we find that according to Whitaker (1899) there are 586 secondary schools, and of these the names of the headmasters are given. In addition appear, without headmasters' names, 63 Welsh schools "resuscitated, aided or created by the Welsh Intermediate Education Act." This makes the total 649. It is reported that, for the future, the list of the I.A.H.M. will be adopted by Whitaker. The present list for 1899 is far from complete, for, among the 586 schools, only 21 Irish are included, 13 Scotch, 9 Welsh and 14 Roman Catholic.

Thus the list amended reads thus:—

Secondary Schools for boys (England)	...	529
,, ,, ,, ,, (Wales) (9+63)	...	72
		601

Out of the 586 names of headmasters given, 239 are clergymen, 45 have no degree, while 96 are members of the Headmasters' Conference.

The address delivered by Dr. James Stuart, M.P., on the occasion of his installation as Lord Rector of the University of St. Andrews in January last, has been published in book form by Messrs. Macmillan, and is well worth the earnest consideration of all educationists. Dealing with the question of the extension of University effort, Dr. Stuart maintained that, amongst other callings, those of engineering and teaching had a right to claim University recognition. Referring to the latter, he said:—"Let me instance another profession of quite a different kind. I refer to the profession of teaching—a profession the number of whose members has increased many fold in this country during the last fifty years. In this new learned profession we have a vast subject with many bearings and many portions—fit for professorships, bursaries, museums, scholarships, and degrees—and laboratories too, in the shape of attached schools, just as essential as the laboratories of the chemist or engineer."

A new chapel has been erected as an addition to the buildings of Malvern College. The new building provides accommodation for 500 boys, besides masters and visitors. The style is perpendicular. The chapel is 118 ft. in length internally, by 33 ft. in width, exclusive of a narrow aisle on the south side, originally designed for future extension, but by a subsequent decision of the Council carried out in the present building. Over the vestibule is a gallery 14 ft. wide, in which will be placed an organ presented by the Society of Old Malvernians. The materials used in the construction are Milton stone with Bath stone dressings externally, and Bath stone internally, except where the walls will ultimately be covered with panelling or other applied decorative work. The present chairs are to be replaced with oak seats, and there will be no pulpit. The architects were Sir Arthur Blomfield, A.R.A., & Sons. The total cost of the chapel will be about £14,000.

In his recent address to the London Mathematical Society on retiring from the office of President, Professor E. B. Elliot, F.R.S., said: "There are distinct signs that the era of elementary and quasi-elementary works of the neat but superficial order—which try to hide difficulties rather than to elucidate them or present them as matters for thought, which aim at presenting what may pass for demonstrations in the briefest form for writing out without waiting to enforce lessons of accuracy, and opportunities for intelligent consideration of principle—is passing away. I pause to make the trite remark that the opportunity for closing, the responsibility for continuing, this era rests largely with the conductors of examinations—and examiners are happily often taken from the ranks of those qualified to lead aright. I have already made it clear—perhaps too clear—that I don't want examiners to discontinue setting problems, to test realisation of principle or even ingenuity and technical skill."

It has been determined, says the *Athenæum*, to open a hall of residence for women students in connection with Owens College, Manchester, and a strong committee has been nominated in order to give effect to the decision. Similar halls are already attached to the Universities of Glasgow and St. Andrews, the three Welsh University Colleges, and University College, London. The hall opened last year in connection with Liverpool University College does not appear to have attracted any students, and we understand that it has for the present closed its doors.

A paper by the Rev. Professor Mahaffy, in the March number of the *Humanitarian*, deals with "The Dangers of Theoretical Education." Taking as his text a quotation from Sir John Lubbock's "Pleasures of Life" stating what boys and girls of fourteen may be expected to know, Professor Mahaffy discusses the subject, he says, "Not for the idle pleasure of demolishing what I regard as a piece of solemn nonsense, but because we stand in England in danger of large reforms in our secondary education, and if our reformers start with such notions as these, for average children, the last end of our secondary education will be far worse than the first." We strongly recommend the careful reading of the paper, and cannot refrain from culling one or two tit-bits. "Here is the principle I maintain: the higher you go in education, the less likely is a fixed system to be useful, the more likely is it to be mischievous."—"The liberty of our teachers in higher education is what we should most jealously guard, instead of sacrificing it for any uniformity or elegance of system."—"The tyranny of a single man is often bad and mischievous, but it is seldom so benumbing and paralysing as the tyranny of a Department—that indefinite, impersonal, intangible sort of control which absorbs its victims within its tentacles like the monstrous octopus of V. Hugo's fiction."

The following cutting from Peter Nicholson's "Course of Mathematics," to which we made reference last month (p. 104), will further serve to exercise the ingenuity of the members of mathematical forms:—

I happen'd, one day, at a tavern to be,
Carousing and drinking of port mighty free,
With a true Bacchanalian companion and friend,
(For a long summer's day we both had to spend,)

And, as plenty of Bacchus's juice always will
Make men prattle and talk, and boast of their skill,
So he made me advance; for I said that I could
Measure any champaign, meadow, or wood.
"Pray desist," says my friend, "your skill quickly try,
A triangular meadow of mine lies just by."
I being fond of the office, we both did repair
To this three-corner'd field; but, when we came there,
We found that with water 'twas so overflown,
Not a side, nor an angle, could then have been known;
At which I was puzzled. Not knowing what to do,
To assist me my friend then told me he knew
That there were three straight paths from the angle proceeded
And fell on these opposite sides (as they needed,
Namely), making right angles; and their lengths, he remembered,
Were poles ninety-five, nighty-eight, and one hundred.
And no more is there given to find the content;
So of my proud boasting I then did repent.
Now, artists, I pray you, for me be so kind
As the area and sides of this meadow to find.

THE *Englishwoman's Year Book* (A. & C. Black) for 1899 is edited for the first time by Miss Emily Janes. The volume forms a complete directory of every department of women's activity, and has reached its nineteenth year of issue. It runs to 296 pp., and is brimful of valuable and interesting information, the sections on the education of women and the work of women teachers being particularly exhaustive. The editor has secured the assistance of many well-known writers who contribute sections dealing with subjects of which they have an intimate knowledge. The volume deserves to be very widely known.

WE are glad to notice that a fourth and enlarged edition of a useful publication to which we have already called attention has just been published, viz., "A Code of Rules for the Prevention of Infectious and Contagious Diseases in Schools" (Churchill). A copy should be added to every master's library which is at present without it.

AN International Congress on Commercial Instruction will be held in Venice from May 4th to 8th, this country being represented by Mr. Gilbert Redgrave, chief senior inspector of the Science and Art Department. Among the subjects to be discussed are the Organisation of Secondary Commercial Instruction, Tuition in Foreign Languages, and Scholarships for the purpose of acquiring Business Training in foreign countries.

THE Associated Chambers of Commerce passed the following resolution at one of their recent meetings:—"That, in view of the time wasted in teaching a system of weights and measures which, according to the First Lord of the Treasury, is 'arbitrary, perverse, and utterly irrational,' and in the opinion of Her Majesty's Consuls is responsible for great injury to British trade, this Association urges Her Majesty's Government to introduce into and endeavour to carry through Parliament as speedily as possible a Bill providing that the use of the metric system of weights and measures shall be compulsory in this country within two years from the passing of the Bill, and suggests that meanwhile the system should be adopted in all specifications for Government contracts."

THE ninth meeting of University Extension and other students will be held this year in Oxford from July 29th to August 23rd. The meeting will, as in previous years, be divided into two Parts—Part I. July 29th-August 9th inclusive; Part II. August 9th-August 23rd inclusive. The main courses of lectures will be designed to carry on the sequence of study arranged for the meetings of 1891, 1892, 1894, 1895, and 1897, and to illustrate the history, literature, fine art, economics, and science of the period 1837-1871. There will also be a special course of lectures on Hellenic Studies in the Nineteenth Century, and special classes in the history and theory of education, the English language, Greek and Latin, moral philosophy, geology, and biology.

AT the recent conference of the National Union of Teachers at Cambridge, Professor Jebb, M.P., delivered an address on the relations of primary to secondary education. He pointed out that, though the distinction between them is real enough so far as it goes, it has been exaggerated, and there has been too great a disposition to assume that secondary education cannot be brought under any kind of rule. One cause of this state of things is that elementary-school teachers have long been regularly trained, while for secondary teachers little such training has been provided. It is now, however, generally conceded that the secondary teacher, no less than the primary, should be regularly trained for his work, and the new discipline for which provision is being made will bring more clearly into view the importance of the unity of education and of the mental habits which learners acquire under their first teachers.

HONORARY M.A. degrees were conferred by the University of Cambridge on Mr. Clancy, the President, and Mr. Yoxall, M.P., the Secretary of the National Union of Teachers, on the occasion of the conference at Cambridge. The recipients of these honours were presented in Latin orations by Professor Jebb, Deputy Public Orator, amid much enthusiasm.

FOREIGN NOTES.

THE *Journal des Instituteurs* contains some hints on the best method of teaching orthography, both native and foreign. The danger attending the ordinary dictation exercise is that the pupil who writes a word wrong may impress upon his mind the wrong form, and forget the correction. There are two ways of avoiding this danger. The one consists in writing the words first on the blackboard, and having them spelt out aloud before the dictation commences. That expedient gives the pupils, in addition to sight and muscular effort, a third element, sound, to remember the spelling by. The other method is the recently proposed one of marking out the copy books with a series of variously sized rectangles instead of plain lines. Each rectangle is of such dimensions as just to surround the correct letters, enclosing them, so to speak, in a box. The letters *b*, *d*, *l*, *h*, require long upright boxes; the letters *n*, *s*, *r*, small squares; *g* and *p* require rectangles dipping below the line, and so on. When the proper rectangles are thus marked out for any given exercise the pupil can hardly make a mistake without getting into conflict with the spaces marked out. He therefore is prevented from committing errors, and the teacher saves a great deal of time usually spent on corrections. After a series of such exercises the pupil learns to associate a certain outline with the sound of a word, and rarely mis-spells it. This method should be fairly tried, as it admits of wide application.

THAT writing involves a complicated physical process is made evident by some observations recorded in the *Schweizerische Lehrerzeitung*. The writer happened to enter a small inn, where he found the innkeeper's wife threatening to beat her little daughter because she would not write her alphabet without being given a copy. The writer, after a few questions, found that the child had not forgotten the shape of the letters, because she could recognise them instantly, but could not recall the motions necessary to produce them without having them suggested by a visible example of the finished product. The difficulty was soon overcome by making the girl "learn these motions by heart," one by one, executing them in the air. Another case of "agraphia" is described in which a boy suddenly lost the faculty of writing down letters dictated to him, though he could easily copy them correctly, and even name them from the printed or written page. The association between sight and sound, and between sight and motion remained, but

not the association between sound and motion. After five months' complete rest the faculty of writing the dictation was suddenly and completely restored. Such cases emphasise the importance of patience, and show that what is often erroneously attributed to want of good will is simply a form of nerve disease.

In another number of the same excellent periodical, Herr Schmucki deals with some educational difficulties arising out of the more or less formal attitude often adopted between teachers and pupils. The child is, as a rule, too passive and receptive. The most effective way of learning a thing is to do it, or so to speak, to act it. Hence the utmost possible initiative should be left to the pupil. The teacher should not lecture; he should make the child do the greater part of the speaking. The child only knows those things well which he can rightly express. Diesterweg says:—"Clear thinking is silent speaking, true learning is loud speaking." Above all, the tendency towards what might be called the catechism method should be avoided. Pupils should be trained to compose their own answers, and to do so in well-constructed and well-finished sentences. This is made impossible by leading questions and promptings. If for a whole week the teacher were to abstain rigidly from helping forward the pupil whenever he pauses, he would find that at the end of the week the pupil would have acquired the faculty of helping himself, and would avoid the awkward pause of his own accord. He would also find that with the passive attitude the languid and lazy pose of the children would have disappeared.

Rector Homner, of Siebenbürgen, writes in the *Allgemeine Deutsche Lehrerzeitung* on the importance of committing things to memory. When our parents were young that was, as a rule, the only method employed for acquiring knowledge. The new generation is apt to go to the other extreme. And yet it must be acknowledged that a thesaurus of poetry and wise and beautiful sayings is a great acquisition, and almost indispensable, to the preacher, the advocate, and the parliamentarian. Apart from its ennobling influence upon the spoken language, the practice of learning well-composed prose and verse by heart has a stimulating effect upon the imagination and the thinking faculties. An important application of the method lies in the teaching of foreign languages. The utility of committing foreign poetry to memory has been recognised long ago, but what should be encouraged even more is the memorising of good foreign prose. That is, of course, more difficult than poetry, since the memory has fewer points of contact; but just on that account it is a more vigorous mental exercise, and the comparative freedom from restraint prevents the recitation from becoming merely mechanical. The initiative of the learner is called into play, and even if he does not succeed in reproducing the piece *verbatim*, he will probably hit upon some correct variations of his own, which then become his permanent mental property.

We have received the first number of *L'Enseignement Mathématique*, a bi-monthly periodical edited by MM. C. A. Laisant and H. Fehr. An editorial introduction is followed by articles on the study of mathematics in Spain, on questions of terminology, on scientific pedagogy, on the teaching of "special" mathematics in France, on the teaching of elementary trigonometry, and on that of the theory of vectors. The rest of the number consists of a "chronique," reviews of books, and bibliographical notices. The journal is published at Paris (Carré et Naud): the yearly subscription for the Postal Union is 15 fr. English mathematicians, and teachers especially, cannot fail to be interested in this new venture, which we sincerely hope will be crowned with success.

THE SCHOOL PULPIT.

Notable Passages from Sermons Preached in Public Schools.

The Recognition and Use of Talent.[1]

Everyone of us has a liking for certain forms of character in other people, and we think ourselves entitled as we go on through life to choose out those characters, and either we silently neglect the rest or we speak contemptuously of them, or indeed sometimes we contrive to persuade ourselves that that which is good in them cannot really be good because it is so unattractive to us. This is a course of conduct desperately against the Christian standard of life. I do not, of course, mean that we are not to have special friends, or that it is wrong to like some better than others; but I do mean that we ought to take the very greatest pains to discern and to love all that is good in everyone, even though it be covered and nearly concealed by an exterior which we cannot like, by manners which are not our manners, and by weaknesses which happen to be just those that offend us most. Remember that the Holy Spirit was given on the day of Pentecost in the form of fire distributed to different individuals. That means that the goodness which may be in one is not and cannot be the same as the goodness in another, though it all comes from the same God. And, therefore, when you feel a dislike towards anyone consider carefully what it is you dislike in him. Simply to say that he irritates you is not a reason which a Christian ought to be content with, because it sometimes happens that the very thing in another which we find to be very irritating to us, we afterwards discover to be closely mixed up with what is best in him. I can perfectly well remember instances at school of great nobility of character, boys with really something of the heroic about them, not being popular simply because there was something in their look or their way of talking which did not happen to suit the fashion of the day, a fashion to which others, very likely of far less strength and grit, found it quite easy to conform. It will be a humiliating thing for you to find out, after you have grown up and gone into the world, that some schoolfellow whom you used to despise or dislike has developed into something of a hero, and that the very thing which used to annoy you was his strength of character, his firmness of principle, his zeal for goodness, his manly abhorrence of evil, no matter how fashionable it may have been.

. . . . . .

During your boyhood you are stirred on sometimes to form high resolves by reading, or hearing read, the stories of great men, how they conquered obstacles and pushed their way to the front, and little by little forced the world to recognise their talents, and made their mark upon their generation. It is profoundly satisfying to read how, after many years, perhaps, the due reward of recognition and praise comes from the hero's contemporaries. It has been long withheld, but at last it is given without grudging and without stint; and all that is generous within you is quickened by what you read into a longing wish to do something for God and for your country before you die. But as time passes, you are forced to admit the fact that as far as you can tell you have not got the talents sufficient to bring you to the front; you are slowly brought to the conviction of not being better equipped than the large average number of human beings. You may perhaps think that this does not apply to many of you; but what I mean must apply to the vast majority of any congregation, from the simple fact that the

[1] From a sermon preached in Haileybury College Chapel by the Headmaster, Rev. the Hon. Canon Lyttelton.

average man or boy means the one like the majority, and it is often a bitter thing for a young man to be brought to the knowledge that, though he has had hope of doing something worth talking of, yet he seems likely to swell the huge number of ordinary average men, the vast multitude who are not, and never will be, remarkable: not very rich nor very poor, not very joyous nor very sad, not very clever nor very dull, but middling in all these and other respects. When we find that this is the case we are tempted to wish that we had been given less, so as anyhow to have the stimulus of real poverty. For instance, in the parable of the talents the servant who received five talents had the stimulus belonging to great gifts; while he who had only one ought to have had the stimulus of despair, much as some men with everything against them in life have fought with unceasing energy against their difficulties, spurred on by the very sense that without the utmost effort they must succumb.

But how about the men with two talents?—a depressing number—a good long way removed from five, but only a little way above one. This is the number which denotes the vast majority of mankind.

Now there are dangers attaching to the possession of great gifts, and also attaching to poverty of endowment, but I believe the dangers which beset mediocrity are the most serious of all. It is so desperately easy to say, "I have got enough to get on with; I can get through my examinations, I can manage to secure some means of a livelihood; but no one can expect me to do anything brilliant, so that there will never be any need for me to exert myself to an inconvenient degree." I say it is desperately easy to fall into that tone of mind, and the result is as certain as possible. If you allow yourself to be always thinking that you are only average in ability, you will soon go on to say that you may also be average in conduct, average in love of duty, average in your view of right and wrong; and that is to hand yourself over to the guidance of the world, the heedless, drifting world, or to become, as one of our poets expresses it:—

Tame in earth's paddock as her prize;

like some wild animal that has been broken in to confinement in a meadow, and has ceased even to long for the free life of the open downs or the bracing air of the hills.

But how can we prevent this sort of depression? There are many things that might be said. It is well to remember that to belong to the great majority of people who are not distinguished as first-rate in anything has this advantage: we belong to those who, after all, make up the life of the nation, or the town, or the school to which we belong. If the mass of ordinary citizens in Greece and Rome had been sound in heart and true to their idea of duty, those two countries would never have sunk into ruin; and if ever England slides down into the same abyss, it will be, not because her rulers were unfaithful, nor because her great writers ceased to teach truth, but because the multitude of her ordinary average children ceased to care for noble things, and chose self-indulgence before duty. That is one thing worth remembering. And again, it may be truly said that if you belong to the unconspicuous multitude you have probably got the sympathies of the many, you probably, just because of your mediocrity, understand "the human heart by which we live" better than if you had some gifts of genius. Many and many a genius has failed to give its message on earth, simply because it was not combined with the absolutely essential quality of sympathy with ordinary minds.

Moral culture may easily take a wrong direction if the pupil gets to think that the claims of learning and qualification in various accomplishments are the most important, and that in so far as he answers to these claims he fulfils the essentials of moral culture.—"Herbart."

LONDON MATRICULATION, JUNE, 1899.

Guide and Monthly Test Papers.—No. IV.

I.—Latin.

Grammar and Composition.

(1) Give the ablative singular, genitive plural and gender of —lis, nix, tibicen, amnis, imber, pulvis, ōs, ōs, acus.

(2) Give the ablative singular, genitive plural and accusative neuter plural of—saluber, sinister, par, prosper, prudens, monens, dives, vetus, memor, pauper.

(3) Give the comparative and superlative of—antiquus, pius, intra, sæpe, potis.

(4) Give the meanings of—epulæ, ædes (plural), copia, copiæ, impedimentum, impedimenta, littera, litteræ, vis, vires.

(5) Give the perfect indicative active and supine of the following verbs, and also give the preseut indicative active of the simple verbs from which they are formed—requiro, concutio, cogo, pergo, desilio, occido, colligo, diligo, occīdo, confiteor.

(6) Put into Latin:

(1) He waited at anchor till the ninth hour to allow the remaining ships to meet there.

(2) Then the enemy made a sudden charge to prevent any of our men from finding either his arms or his rank.

(3) He says he never asked you to pardon the guilty or condemn the innocent.

(4) Such was his fear of Cæsar's victory that he could scarcely be restrained from surrendering himself to the Romans.

(5) Having gone out of the city, he lived three years in the country.

Cicero. Pro Marcello.

Ch. IX.—(end.)

I. Translate:

(*a*) Ch. IX., § 28. Nec vero hæc tua vita . . . . non habebit.

(*b*) Ch. X., § 32. Sed iam omnis fracta . . . . pollicemur.

II. Parse the following words as they appear in these chapters—actus, dicito, ostentes, oblivio, servi.

III. Translate with notes where necessary:

(*a*) Quid enim est omnino hoc ipsum diu, in quo est aliquid extremum.

(*b*) Alii fortasse aliquid requirent, idque vel maximum, nisi belli civilis incendium salute patriæ restinxeris, ut illud fati fuisse videatur, hoc consilii.

(*c*) Non enim consiliis solum et studiis sed armis etiam et castris dissidebamus.

(*d*) Sed qui non est omnibus stantibus necesse dicere, a me certe dici volunt, cui necesse est quodam modo.

Cicero. In Catilinam.

Ch. XI.—(end.)

I. Translate:

(*a*) Ch. XI., § 28. Quid tandem . . . . civium tuorum neglegis.

(*b*) Ch. XIII., § 31. Ut sæpe homines . . . . ingravescet.

(*c*) Ch. XIII., § 33. Tu, Jupiter . . . . mortuosque mactabis.

II. Translate carefully and explain the tense and mood of the italicised words:

(*a*) Etenim si mecum patria, quæ mihi vita multo est carior, sic *loquatur*.

(*b*) Ego, si hoc optimum factu *indicarem*, patres conscripti, Catilinam morte multari, unius usuram horæ gladiatori isti ad vivendum non *dedissem*.

(*c*) Etenim si summi viri et clarissimi cives Saturnini et Gracchorum et Flacci sanguine non modo se non *contaminarunt*

sed etiam honestarunt, certe mihi *verendum non erat.* Quodsi ea mihi maxime *impenderet*, tamen hoc animo fui semper, ut invidiam virtute partam gloriam, non invidiam *putarem.*

(*d*) Nunc intelligo, si iste, quo intendit, in Manliana castra *pervenerit*, neminem tam stultum fore qui non *videat* coniurationem esse factam.

III. Write notes on :

Prætor urbanus ; Saturninus ; malleolos ; qui te tam mature ad summum imperium per omnes honorum gradus extulit ; nonne hunc summo supplicio mactari imperabis ?

II.—English.

Language and Literature.

Word Formation and Literature.

(1) Explain the terms : hybrid, affix, secondary derivative, stem. Give examples of each.

(2) Mention suffixes (i.) of Teutonic, (ii.) of Romanic origin which form (*a*) diminutives, (*b*) augmentatives.

(3) Illustrate the force of each of the following prefixes : be-, dis- ; and of the suffixes, -en, -ard, -ism. What are doublets ?

(4) Distinguish between rhythm and rime. "Word-division has nothing to do with etymology." (Skeat.) Annotate this statement.

(5) Give some account of the various ways in which prepositions are formed.

(6) Which is the oldest English poem ? Write a brief account of it. What are the characteristics of Old English poetry ?

(7) What do you know of Cædmon, Bede, Chaucer, Hooker, Dryden ? Give approximate dates.

(8) Who were the writers of : "Hudibras," "Samson Agonistes," "Waverley," "Rape of the Lock," "Comedy of Errors." Briefly describe *one* of these works.

(9) What do you know of the source of the following quotations ?

(*a*) Coming events cast their shadows before.
(*b*) The quality of mercy is not strained.
(*c*) Full many a flower is born to blush unseen.
(*d*) The child is father of the man.
(*e*) Sunset and evening star,
And one clear call for me !
(*f*) My mind to me a kingdom is.

(10) Write an essay upon one of the following subjects :

(*a*) The Invention of Printing.
(*b*) Sea Poetry.
(*c*) John Milton.

History of England, with Geography relating thereto.

(1629-1700 A.D.)

(*Ten questions to be answered.*)

(1) What was "Thorough ?" Give some account of the active and passive opposition thereto.

(2) Tell the story of British colonisation till 1700.

(3) Describe the work of the Long Parliament in its first session.

(4) Give a military history of the wars 1642-51, illustrated by maps.

(5) State the principles of the various ecclesiastico-political parties 1642-60. By whom was religious liberty, by whom was religious toleration, advocated ?

(6) Describe the leading cases of impeachment and attainder in this period.

(7) What is a "written constitution ?" State the chief points in the three "constitutions" of the Commonwealth.

(8) Describe the Clarendon Code. Tell the story of "Dissenters" till 1700.

(9) Summarise the Dutch wars of the century. In what respects did they resemble each other, in which did they differ ?

(10) Describe the struggle over the Exclusion Bill. Was it ever virtually passed ?

(11) Discuss the legality of James II.'s actions.

(12) On what occasions did William III. use the "veto" ? What changes in the working of the Constitution were made in 1688-9 ?

(13) Summarise the story of Ireland, 1170-1700.

(14) What were the legal questions raised in the cases of : John Bate, Darnel, John Hampden, the seizure of the Five Members, the Seven Bishops.

(15) Explain : Barebones Parliament ; Short Parliament ; Commendams ; Self-Denying *Ordinance :* Agitators ; Whig and Tory ; Non-jurors. Write short comments where desirable.

III.—Mathematics.

Arithmetic and Algebra.

This paper includes, in addition to the work in Arithmetic necessary for the previous tests, Square and Cube Root, Areas and Volumes, and Quadratic Equations in Algebra. Read :

Arithmetic :—Pendlebury, chaps. xxxvii.-xl. Loney, chaps. xxiii., xxiv. Lock, chap. xvii. Hamblin Smith, chaps. xii., xiii., xxx., xxxi.

Algebra :—Hall and Knight, chaps. xxv.-xxvii., xxxvi. Hamblin Smith, chaps. xix.-xxi., xxvii. C. Smith, chaps. xiv.-xv. Todhunter and Loney, chaps. xxii.-xxv.

(1) Find the greatest number of spheres of radius 2 inches, which can be placed in a rectangular box whose internal measurements are 2 ft., 1 ft. 4 in., and 2ft. 8in.

If the space unoccupied by the spheres be filled with sand, find the weight of sand used, having given that 21 cubic feet of sand weigh one ton ? (Volume of sphere $= \frac{4}{3}\pi r^3$, and $\pi = \frac{22}{7}$.)

(2) Calculate the value of $\frac{\sqrt{7}-\sqrt{3}}{\sqrt{7}+\sqrt{3}}$ to five places of decimals.

(3) A and B have each a certain amount of capital ; if A's capital at the end of two years amounts to £4,410 at 5 per cent., compound interest, and B's capital at the end of three years to £4,485 at 5 per cent., simple interest, find the ratio of A's capital to B's capital.

(4) What is meant by a "symmetrical expression ?" Show that having found two factors of the expression $a^4(b^2-c^2)+b^4(c^2-a^2)+c^4(a^2-b^2)$ the remaining factors can be written down "by symmetry." Thence put the expression into its simplest factors.

(5) Simplify :—

(i.) $\dfrac{x}{x+3y}+\left(\dfrac{1+\frac{3y}{x}+\frac{9y^2}{x^2}}{1-\frac{2y}{x}+\frac{4y^2}{x^2}} \div \dfrac{x^3-27y^3}{x^3+8y^3}\right)-\dfrac{x+y}{x-3y}$;

(ii.) $\dfrac{4}{x+2}-\dfrac{3}{x+3}-\dfrac{4}{x-4}+\dfrac{3}{x-5}$.

(6) Solve the equation :—

(i.) $2+\dfrac{2+x}{2x}=\dfrac{1}{2}+\dfrac{2x}{2+x}$;

(ii.) $3xy+y^2=-14 \qquad x^2-xy=30$.

(7) Form the equation whose roots are -5 and $\frac{1}{2}$.

Find, to two places of decimals, the value of x which makes $x-\frac{1}{x}=2$.

(8) A number consists of two digits, one of which is four times the other ; and the product of this number and the number formed by reversing the digits is equal to ten times their sum increased by 24 ; find the original number.

Answers.

1. 192 ; 361 lbs. $3\frac{107}{867}$ oz. 2. ·20871. 3. 40 : 39.
4. $-(a-b)(a+b)(b-c)(b+c)(c-a)(c+a)$.
5. (i.) $\dfrac{x^2-2xy+3y^2}{x^2-9y^2}$; (ii.) $\dfrac{168}{(x+2)(x+3)(x-4)(x-5)}$.
6. (i.) $-\frac{2}{5}$; (ii. $x=\pm 5, \pm 3$; $y=\mp 1, \mp 7$.
7. $2x^2+9x-5=0$; 2·414 and $-$·414. 8. 14 or 41.

Geometry.

Euclid, Books I., II. and III.

(1) From a given point in a given straight line draw a straight line at right angles to the given straight line.

Any point on a diagonal of a rhombus is equidistant from the extremities of the other diagonal.

(2) If a straight line fall across two other straight lines so as to make the exterior angle equal to the interior opposite angle on the same side of the line, or the interior angles on the same side together equal to two right angles, then these two straight lines shall be parallel.

Prove also the converse of this theorem.

(3) In a right-angled triangle the square on the side subtending the right angle is equal to the sum of the squares on the sides containing the right angle.

Construct a square that shall be equal to five times the square on a given straight line.

(4) The rectangle contained by any two straight lines together with the square on half their difference is equal to the square on half their sum.

If a straight line be divided into any two parts, show that the rectangle contained by these parts is greatest when the point of section is the middle point.

(5) In a circle the straight line bisecting any chord at right angles passes through the centre.

Describe a circle cutting off two given equal lengths from two given finite straight lines.

(6) Draw a common tangent to two given circles. How many such tangents can be drawn?

Show that the circle described on the straight line joining the centres of any two circles as diameter, passes through the four points of intersection of the internal with the external common tangents.

(7) If two chords of a circle cut one another, the rectangle contained by the segments of the one shall be equal to the rectangle contained by the segments of the other.

(8) Equal angles standing on the same base and on the same side of it have their vertices on an arc of a circle of which the given base is the chord.

IV.—General Elementary Science.

Study Chaps. x., xi., xx. and xxi. of "Elementary General Science," by A. T. Simmons and L. M. Jones.

Chap. X.—The subjects in this chapter requiring most attention are "Distinction between Heat and Temperature" (pp. 142-144), and "Change of State" (pp. 151-155). Carefully work out the numerical examples at the end of the chapter.

Chap. XI.—Experiments 162 and 166, with the explanations given of them, deserve a considerable amount of time. Be sure you are able to reproduce Figure 90. This part of the work is on the whole straightforward.

Chap. XX.—Many students find the compounds of phosphorus difficult to understand, but if all the experiments are worked and each symbol is written down and thought over, the chapter should be mastered without much trouble.

Chap. XXI.—Is very important. Repeat Experiment 296 several times, and take the average of your results. The oxides of carbon generally appear on examination papers, and you must try to be quite sure of them.

(1) Describe carefully how to construct a common thermometer.

(2) Suppose that it requires 80 times as much heat to melt one ton of ice as would be required to warm one ton of water one degree of temperature on the centigrade scale, how much of the ton of ice would be melted by pouring into a cavity in its surface a gallon of boiling water? (A gallon of water weighs 10 lbs.)

(3) Describe exactly what happens to the direction and quality of the light when a narrow beam of parallel white light falls upon one face of a three-cornered prism, held in such a way that the light emerges through an adjacent face of the prism. What would you see if this beam of light, after thus passing through the prism, is received upon a sheet of white cardboard? What difference would it make if the beam of light before entering the prism is passed through a sheet of red glass?

(4) A thick layer of a transparent liquid floats on the surface of water. Trace the course of a ray of light from an object immersed in the water, through the floating liquid to the air.

(5) For what purposes may the higher oxide of phosphorus be used in chemical work, and to what property is its use due?

(6) Give an account of the preparation and characteristic properties of the lowest compound of phosphorus and hydrogen. What precautions must be strictly observed in its preparation?

(7) Why are some waters "permanently" hard, and others only "temporarily" so? If specimens of both kinds of hard water are (*a*) boiled, (*b*) mixed with lime water, (*c*) mixed with sodium carbonate, describe and explain exactly what happens in each of these cases.

(8) If a gas containing a mixture of the two oxides of carbon were given you, how could you determine the quantity of each present?

V.—French.

I. Translate into English:

(*a*) Il était minuit quand nous arrivâmes au kan (inn) de Ménémen. J'aperçus de loin une multitude de lumières éparses: c'était le repos d'une caravane. En approchant, je distinguai des chameaux, les uns couchés, les autres debout; ceux-ci, chargés de leurs fardeaux; ceux-là, débarassés de leurs bagages. Des chevaux et des ânes débridés mangeaient l'orge dans des seaux de cuir, quelques cavaliers se tenaient encore à cheval, et les femmes voilées n'étaient point descendues de leurs dromadaires. Assis, les jambes croisées sur des tapis, des marchands turcs étaient groupés autour des feux qui servaient aux esclaves à préparer le pilau (rice); d'autres voyageurs fumaient leurs pipes à la porte du kan, mâchaient de l'opium, écoutaient des histoires.

(*b*) En orient, quand on n'a rien à se dire, on fume du tabac de rose ensemble, et de temps en temps on se salue les bras croisés sur la poitrine pour se donner un témoignage d'amitié; mais dans l'occident on a voulu se parler tout le jour, et le foyer de l'ame s'est souvent dissipé dans ces entretiens où l'amour propre est sans cesse en mouvement pour faire effet tout de suite et selon le goût du moment et du cercle où l'on se trouve. Il me semble reconnu que Paris est la ville du monde où l'esprit et le goût de la conversation sont le plus généralement répandus; et ce qu'on appelle le mal du pays s'applique particulièrement à ce plaisir de causer que les Français ne retrouvent nulle part au même degré que chez eux.

II:

(1) Give the plurals of—caillou, trou, grand'mère, and the feminines of—neuf, créateur, jumeau, and mon.

(2) Compare the adjectives—bon, mauvais, petit. Give the rule as to the position of adjectives in French, with the chief exceptions.

(3) Give the present participle, 3rd plural present and imperfect indicative, 2nd singular future and imperative of—appeler, mouvoir, s'asseoir, venir, prendre, sortir, and suivre.

(4) Distinguish between the use of the imperfect and preterite tenses in French. Give examples and translate:—

(*a*) The house which we saw was built of brick.

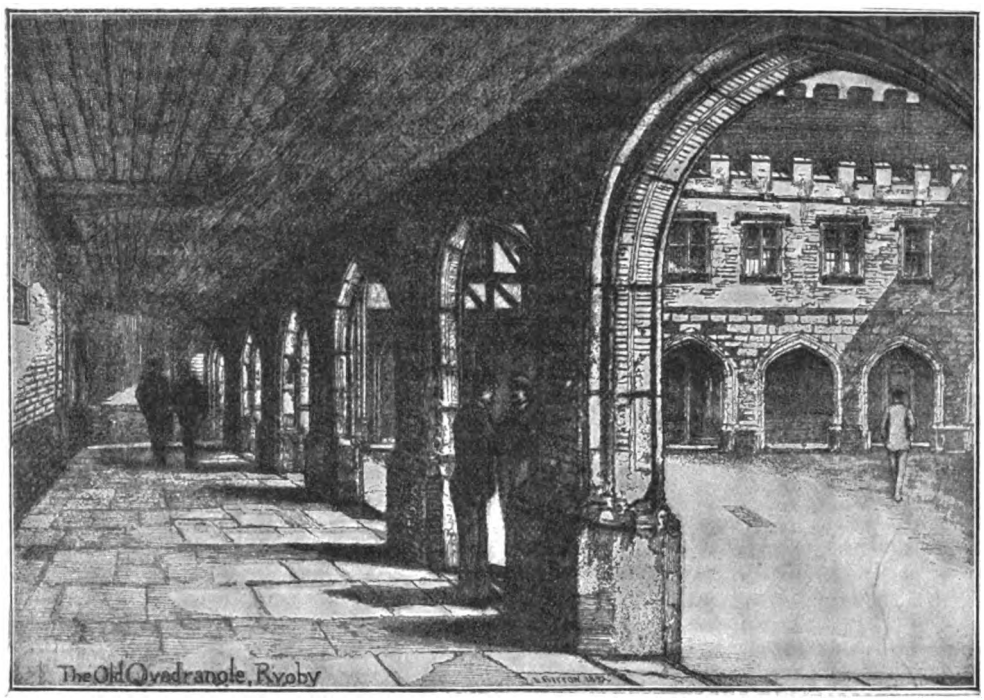
(*b*) They built that brick house in 1873.

(*c*) It was broad daylight when we entered Athens.

(5) What are the chief methods of constructing interrogative sentences in French? Give two examples of each method.

III. Translate into French:

The first person I met was a poor old woman gathering grapes into a large basket. On my asking her if there was a farmhouse in the neighbourhood where I could pass the night, she showed me the pathway through the vineyard which led to the village, and then added, with a look of curiosity: "You must be a stranger in these parts." "Yes, my home is very far from here." "How far?" "More than a thousand leagues." The woman looked incredulous. "I came from a distant land beyond the sea." "Why," she said, "have you come so far from home?" "To travel and see how you live in this country."



THE CLOISTERS.
(From an etching by E. J. Burrow.)

RUGBY SCHOOL.[1]

After reading this instructive and entertaining "History of Rugby School," the compilation of which has evidently been a labour of love, we feel it would have been well to have been educated there.

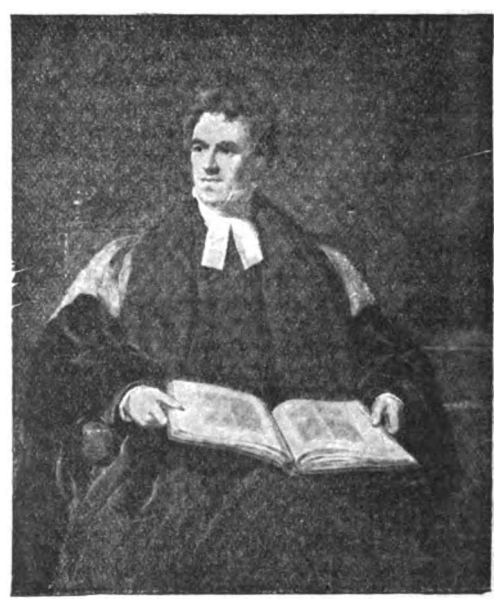
Founded in 1567, by the will of Lawrence Sheriffe, a grocer, the school was intended as a free institution for the boys of Rugby and Brownsover. For nearly a century its development was arrested by continual lawsuits arising out of the founder's will, but in 1653 the school had so far increased in numbers that the trustees enjoined its master to provide an usher.

Henceforth the growth of the school is almost continuous. In 1688 was appointed as master Henry Holyoake, the first of the three "makers" of Rugby School. We find it recorded that "the trustees hardly expect that such qualities as his will ever be seen in another master."

The nineteenth "master" and first "head master" of Rugby was Thomas James, an Etonian, an accomplished classical scholar, a firm disciplinarian, and an organiser for whose care no detail was too small. Under him we find not only the tutorial system in full swing, but praeposters, fags, dames' houses and other things which speak of James's Eton days. Of his principles of school government he writes:—"I have never governed boys by that secret information which some masters are thought to have derived from *their own* subjects. It would be a high crime and even treason against the virtue and honour of the school to induce boys to be traitors to their fellows. . . . I governed more by the principles of justice and what I called among the boys (my only law) the eternal rule of right and wrong."

James introduced a carefully devised course of studies and made wise rules for the division of time and for the internal government of the school. These are in the main still preserved, but it was left to Thomas Arnold—the best known head master of Rugby, whose portrait as a young man accompanies this notice—to quicken this perfected organism into new life.

When Arnold was prevailed upon to become a candidate for Rugby School he had had no experience of school-work. That he was a born teacher, however, soon became manifest.



THOMAS ARNOLD.
(From a painting by T. Philips, R.A.)

A head master's duty was, in his opinion, to get rid of unpromising boys. Those who either could not, or would not, conform to the rules of the school were removed. Their parents were informed that the boys would do better under a private tutor and were not suited to a public school. Arnold treated the

[1] "A History of Rugby School," by W. H. D. Rouse, M.A. 420 pp. (Duckworth). 5s.

elder boys as gentlemen and as reasonable beings at an age when their reason was beginning to develop and their natures to respond to a generous trust.

What he looked for was—(1) Religious and moral principle, (2) gentlemanly conduct, (3) intellectual ability. But as this is not an appreciation of Arnold's work we must refer the reader directly to Mr. Rouse's eulogium.

Want of space forbids to tell of the Great Rebellion—what school has not had its rebellion?—in which rebel schoolboys boldly but unsuccessfully faced constables with staves, farmers with whips, soldiers with swords, and one Mr. Butlin with the Riot Act.

The book is replete with similar interesting tales of deeds of daring, all of which have helped to make Rugby famous. We recommend it to anyone who wants a little pleasant reading.

SALADIN AND THE CRUSADES.[1]

"The Crusades" are a movement of perennial interest. From whatever point of view they are regarded, they present us with lessons in the history of Europe and of general civilisation. We may, for instance, see in them but a phase of the eternal contest between East and West—a contest which has its mythical period in the siege of Troy, whose earliest historical battle is that of Marathon, while the latest was fought only the other day at Omdurman.

Or we may dwell on the religious aspect which this contest began to wear when the followers of Mohammed went forth in the seventh century conquering and to conquer. To the thoughtful student of history there is much food for thought in the contemplation of the two religions, Christianity and Islam, warring for centuries to settle the geographical boundary between them.

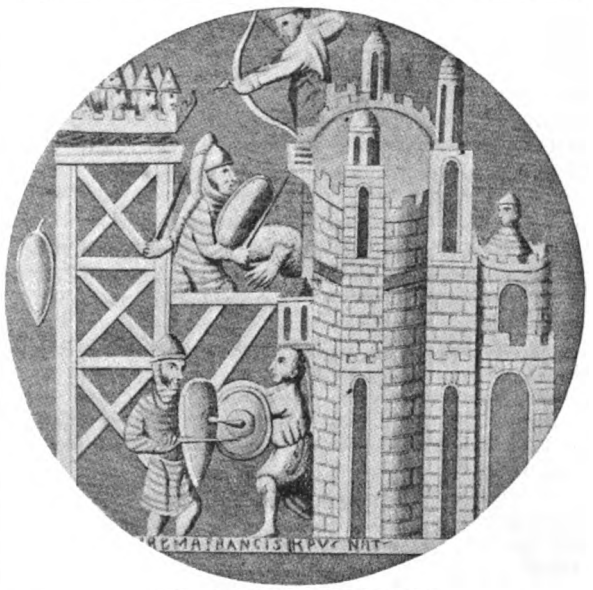
A study of the causes and results of the Crusades leads naturally into the history of the economics and the law of the Middle Ages, as well as into the nature and strength of the various governments of Europe. How towns grew into importance, how feudal nobles were weakened and national kings were strengthened, how new ideas of Law were introduced into every country of Europe, even, by indirect means, into England, can be learnt only by a study of the Crusading movement. But we must confine ourselves to two or three points in which the Crusades more immediately and specially affected the history of our own country.

The First Crusade, that which was preached by Urban VI. in 1096, and in which Peter the Hermit is the most popularly known leader, took Robert of Normandy away from his duchy, and thus shaped the course of the Norman dispute for the possessions of the family. The Second led to the divorce of Louis VII. of France from Eleanor of Aquitaine, and gave Henry of Anjou the opportunity to obtain the south-west of Gaul, which was for so long connected with the English crown.

The first of these expeditions had resulted in the establishment of the "Latin" kingdom of Jerusalem, and the second was designed to come to its relief. But nine years before this event (in 1138) there had been born to a Turkish commandant of a fort on the Tigris a child who was destined to unite under his personal will all the country which stretched from the upper waters of the Euphrates to the valley of the Nile, and to overthrow for ever the "Frankish" occupation of the Holy Land. Strangely enough, the life of Salah-ed-din (Honour of the Faith), as Yusuf came to be called, has never been written in English, and we have had only Sir Walter Scott's picture of the great Sultan. But now Mr. Lane-Poole has put his wealth of Oriental learning at our service, and has given us a sympathetic and therefore entirely good biography of the Saracen conqueror of Jerusalem.

In these pages we can trace his career. Born in 1138, he lived a quiet, retired life till he was twenty-five years of age, shunning all political careers and devoting himself to study. In 1164, he was forced by his family to accompany an expedition to Egypt on behalf of Nur-ed-din, King of Syria, and owing to the whirligig of politics in the palace of Cairo, Saladin found himself in 1169 Vezir to the Sultan of Egypt.

For five years he ruled that country vigorously and well, and in 1174 a greater career opened, for Nur-ed-din died, and Saladin found himself compelled, if Islam in Syria was not to fall in pieces, to force himself on the waning family of his master as ruler of Syria. District after district was conquered; Syria, Mesopotamia, and Damascus were successively brought



THE TAKING OF JERUSALEM.

under control, and in 1186, only the Christian kingdom of Jerusalem separated the dominions of Saladin into two parts.

Obvious motives of policy both political and religious led him to attack the Christians, and in the battle of Hittin, 1187, he virtually destroyed the whole of the "Frankish" military power. Only Tyre held out against the conqueror, but owing to the conditions of Eastern warfare, chiefly to his want of shipping, he could not reduce the fortress till news of the fall of Jerusalem had reached Europe, and the first arrivals of succour gave such strength to the coast towns that the later comers were able to make a serious attempt to undo Saladin's work.

How three European kings advanced against him, how badly their affairs were managed, how in spite of this they gave Saladin much to do, how they after all failed in effecting anything more than the slightest of success, may be read in this delightful book. The Christian reader will also find much that will pain him, and which, therefore, we will not repeat here. Suffice it to say that Saladin appears as a hero, a knight, and a gentleman, courteous, generous, and benevolent, even magnanimous, to friend and foe.

He did not long survive the "Third Crusade." In February, 1193, he was taken with a feverish cold, and rapidly grew worse. On March 4th "there was a divine with him, repeating the confession of faith and reading the Holy Word;

[1] "Saladin and the Fall of the Kingdom of Jerusalem." By Stanley Lane-Poole, M.A. xxiv.+416 pp. (G. P. Putnam's Sons.) 5s.

and when he came to the passage, 'He is God, than whom there is no other God—who knoweth the unseen and the seen—the Compassionate, the Merciful,' the Sultan murmured, 'True,' and when the words came, 'In Him do I trust,' the dying man smiled, his face lighted up, and he rendered his soul to the Lord."

The illustration from Mr. Lane-Poole's inspiring biography of this great chieftain has been kindly lent by the publishers to accompany this notice.

HOME LIFE AT BOARDING SCHOOLS.[1]

A good schoolmaster must needs be a many-sided man. The development of a boy's mind, and the proper training of his several faculties, are but a part—though a considerable part—of the teacher's work. A boy in due course becomes a member of a social circle, and should come to it suitably polished and properly equipped. He must eventually take his part as a citizen, and should enter upon those duties with sound ethical ideas and strong moral qualities. The chances are that the responsibilities of fatherhood will fall to his lot—how important, then, that he should have clear conceptions of other important truths. Mrs. Richmond is concerned with each and all of these phases of a complete education, and in an orderly sequence proceeds (sometimes to the disparagement of our public schools) to deal with them. We admire the healthy frankness of Mrs. Richmond's method of discussing vital considerations which it is a too common custom to slur over and avoid. Though the book sometimes suffers, in our opinion, from what may be called distorted perspective, with the result that some trivialities are unduly emphasised, yet we heartily commend the homilies to the notice of those of our readers whose work lies in boarding schools.

To indicate the practical nature of the subjects which the author has chosen, we need only state that difficulties like "the grub shop," "manners at table," "pocket-money," "should boys drink beer," are tackled in a way which shows that Mrs. Richmond has had much experience. As typical of the style of treatment, the following extract from p. 67 will serve:—"A boy home for the holidays the other day was asked why he put so much butter, jam, or marmalade, as the case might be, on his plate at once; why he did not take a reasonable helping and then more if he wanted it, and thus avoid so often leaving some. 'I'm afraid I get into that habit at school,' was his answer; 'if a fellow doesn't take the most he may want at first he won't get another chance.' This answer is as typical as one can want of the spirit that pervades the meals at school, 'everyone for himself, and the devil take the hindermost,' and his own fault when he does get so caught; that is to say, that if a boy be unselfish and courteous he will not get enough to eat."

Plain speaking is one of Mrs. Richmond's strong points. A few samples will abundantly prove this. "To call the average school meal a 'social function' would indeed be a misnomer; there is, as a rule, neither refinement nor courtesy to be seen. The way the meals are served is bad; the way they are received is worse" (p. 68). "It is difficult to make boys at school understand the art of spending money, because they get so few opportunities of spending it sensibly" (p. 76). "In any public school about half the boys owe money to the other half" (p. 84).

The subject of the concluding part of the book cannot be adequately and suitably dealt with here, but it is of such paramount importance that we hope that every house-master will sympathetically read it and study it with care.

1 "Through Boyhood to Manhood." By Ennis Richmond. 194 pp. (Longmans.) 2s. 6d.

RECENT SCHOOL BOOKS.

Modern Languages.

Alfred de Vigny, Cinq-Mars. Adapted and edited by G. G. Loane, M.A. xx.+157 pp. (Macmillan.) 2s. 6d.—We have long desired a good edition of this excellent historical novel in an abridged form, and are glad to find that Mr. Loane has done his work very well indeed. He supplies a useful introduction and notes, which give abundant evidence of knowledge and of skilful discrimination. There are the usual three appendices for retranslation; the fourth appendix deals with the "formation of adjectives."

Ch. Perrault, Contes des Fées. 133 pp. (Relfe.) 1s.—Perrault's Fairy Tales having been set for the Locals, this edition has been prepared by an editor whose name does not appear. The book is arranged in the same way as the Pitt Press edition: text, notes, vocabulary (inconvenient), and a list of irregular verbs. The binding is cheap.

Second German Exercises. By H. W. Eve, M.A., and F. de Baudiss. 140 pp. (Nutt.) 2s.—Based on the "Elementary German Exercises," but entirely rewritten. The first part deals with prefixes and prepositions; the second is arranged so as to illustrate the chief rules of syntax. The exercises are closely connected with Mr. Eve's grammar, which is extensively used in our schools, and are carefully compiled; they should therefore prove useful to many teachers, especially as the publishers supply a key.

German Test Papers. By J. A. Joerg. 116 pp. (Sonnenschein.) 2s. 6d.—This volume contains 70 passages for translation into German (no help of any kind is supplied), each followed by questions in accidence and syntax. The latter are typical examples of what is required in certain—though not in "all higher"—examinations, and will consequently prove useful to the crammer. There is an appendix with 17 questions on history, 20 on literature, almost all taken from Sandhurst papers, and a list of 70 "idioms" (English phrases and their German equivalents).

Classics.

The Medea of Euripides. By P. B. Halcombe, M.A. 124 pp. (Blackie.) 1s. 6d.—In order to render the play suitable to the requirements of preparatory schools and the lower forms of public schools, the speeches of the Chorus are given only in English, and the dialogue is split up into sections, each preceded by an outline. The introduction contains a short account of the Argonauts, the plot of the drama, and a description of a personally conducted visit to the theatre, Mr. Halcombe being showman. The notes and vocabulary are good.

On the Use of Classical Metres in English. By W. Johnson Stone. 59 pp. Paper. (Frowde.) 1s. net.—Mr. Stone has the merit of the courage, not to say the audacity, of his convictions in venturing (to use his own words) "upon a desert white with the bones of distinguished predecessors." This *brochure* is an attempt to prove the possibility of writing English quantitative verse, without any regard to accent, one of the writer's principles being that "accent in English does *not* lengthen the syllable at all." We confess that we are unable, equally with Ben Jonson, Matthew Arnold, and Munro, to feel any difference in point of metre between the words *quantity* and *quiddity*, an inability which drives Mr. Stone almost to despair. He declares that he knows he will "be looked upon as insane."

As specimens of his labours (whether sane or insane) we extract the following typical lines from a *tour de force* of 124 lines from Odyssey VI. :—

"When washing and rinsing were done, they brought the linen down
On to the sea-shore, and set it all out thereupon in rows."
"Glorying in the rapid-footed hinds and hardy-footed boars."
"So give him all that his heart craveth both of victual and drink."

These are quantitative hexameters. And this, from an epigram, is a pentameter:

"Else the coming ravisher will not ever set his hand."

Demosthenes. On the Crown. By Evelyn Abbott, M.A., LL.D., and P. E. Matheson, M.A. xxxvi. + 136 pp. (Clarendon Press.) 3*s.* 6*d.*—The introductory matter consists of an interesting account of the historical events which led to the Speech, remarks on the structure of the Demosthenic period, and a discussion of the documents contained in the MSS. The notes form a model commentary, and there are very full indexes and an analysis. The book is well printed, but we have noticed a few misprints, ὑτρεπῆ (p. 34) and *Marmara* (p. 111).

Cambridge Compositions. Edited by R. D. Archer-Hind, M.A., and R. D. Hicks, M.A. 496 pp. (Cambridge Press.) 10*s.*—We give a very hearty welcome to this book, which contains much of the choicest fruit of Cambridge classical scholarship. These Greek and Latin prose and verse copies, some 300 in number, contributed by thirty-nine Cambridge Fellows and lecturers, will provide students with an excellent training in literary taste and style, and will also be very useful to schoolmasters for the compositions of their highest forms. We extract the following elegiac rendering by Professor Jebb of O. W. Holmes's "Yes, dear departed, cherished days":—

"Tempora praeteritae penitus dilecta iuventae,
o si Mnemosyne vos revocare mihi,
si iubar ex aevo posset reparare sepulto
quod nova lux olim, quod moritura dabat;
sic trepidi demum cordis requiesceret angor,
clausa forent nisu lumina fessa suo,
ipsa fatigatas tum spes submitteret alas,
dum referens gratos surgeret umbra dies.
Sed, velut abreptus Neptuni amplexibus infans,
nil profecturi nitimur, aestus agit;
iamque remota magis, quo longius itur in altum,
laeta novis vitae fontibus ora micat;
iam minus apparent undantia messibus arva,
latius immensas iam mare volvit aquas;
fit nebula sublustre salum, sol vergit in aequor;
sol oritur: quo nos lux videt orta rapi?"

A Primer of Latin Grammar. Accidence. By W. Modlen, M.A. 115 pp. (Rivingtons.) 1*s.*—The three-declension system of nouns is here set forth: we fail, *pace* Dr. Jevons in the Preface and the "Committee of Headmasters," to see its advantages (contrast, *e.g*, *mensis* and *diebus*). On page 2 the representation of the sound of *eu* should be altered; it does not correspond to German *äu*, which is *not* "ay-oŭ (*sic*) pronounced quickly." The sections on Phonetics are meagre, and quite out of place at the beginning of the book (pp. 5, 6). We are told of an appendix to which irregularities of declension are relegated, but it is not to be found; presumably it is at the end of the *Syntax*, which is published separately. The spelling and etymology are antiquated, and altogether we fear the book will not supply the want stated in the Preface to exist.

We have also received: *Cicero de Officiis. Book III.* By W. J. Woodhouse, M.A. 120 pp. (Clive.) 3*s.* 6*d.* And *Vergil. Aeneid IX.* By A. Sidgwick, M.A. 112 pp. (Cambridge Press.) 1*s.* 6*d.*—These are characteristic examples of their respective series, "The University Tutorial Series" and "The Cambridge Series for Schools and Training Colleges."

Grammar and Composition.

English Literature. 1660-1832. By W. H. Low and A. J. Wyatt. 289 pp. (W. B. Clive.) 3*s.* 6*d.*—This volume completes the Intermediate text book in this subject, prepared for the use of the University Correspondence College. The writings of Milton alone are excluded from this part of the scheme, having found a place in the first part prepared several years ago. As a compendium for examination purposes this volume ought to take high rank. What has been done at great length both in the history and criticism of English literature in those well-known volumes prepared by Mr. Stopford Brooke, Professor Saintsbury and Mr. Edmund Gosse, is to be found here in a remarkably small compass. It is more than an annalist's record. The historical part is concise and clear, but the criticism is even more valuable, and a number of illustrative extracts contribute a most useful feature to the volume. It is not, we think, easy to find any volume of this kind in which the subject is so well dealt with in so small a compass. The chapter on the Eighteenth Century Novelists, for instance, is a mine of condensed information. The chronological table and synopsis are exhaustive.

One Hundred Short Essays in Outline. Professor Meiklejohn's Series. 108 pp. (A. M. Holden.) 1*s.*—Quite the best guide to practical essay-composition which has come into our hands for some time past. Each essay scheme occupies an entire page, and the subjects are clearly treated. Each heading of each essay is expanded by notes in smaller type, and these are sometimes further illustrated by quotations in smaller type still. The first thirty-four subjects are biographical, and include George Borrow and Judge Jeffreys, William the Conqueror and Oliver Goldsmith. Eight most useful sketches deal with towns and cities. This section deserves much fuller treatment. It opens up a fine field for the historic imagination, which in many young people is not hard to cultivate. The remaining essays are on miscellaneous subjects. One of the best of these is on novels. A wider or better selection, better treated, it would be hard to find. The book ought to be very widely used.

New Handbook of Composition Exercises. 128 pp. (Geo. Philip & Son.) 1*s.* 4*d.*—This useful little manual has been arranged to meet the suggestions of one of Her Majesty's Inspectors of Schools, but it is so well planned that probably nobody who wants to use a book of this kind could suggest anything better. The section which gives typical letters for imitation is a little stilted in style, but it is possible that those children who have no original knack in composition will learn best in this way what others more fortunately gifted will never need to be taught.

The Public School Spelling Card. 4pp. (Relfe Bros.) 6*d.*—Has now reached its twelfth edition and its thirtieth thousand. In itself this is a testimony to its usefulness, and in its present form it is a most handy compendium of the chief difficulties in English spelling. The general rules given on page 4 are all concise, and will meet the majority of cases of orthographic eccentricity, which in English is none too small.

One Hundred Stories for Composition. 143 pp. (Blackwood.) 1*s.* 3*d.*—There is a pleasant peculiarity about this volume which has, we believe, a distinct value in educational method. Each story is told twice; the second time in a more elaborate form than the first, and the advantage gained by thus varying the matter instead of leaving points to be explained by teachers without literary gift, or so destitute of fluency that children lose the real story in the sadly garbled form of its second repetition, is entirely an advantage on the right side. This little volume ought to be found immensely serviceable.

The selection of anecdotes is comprehensive enough, and they are all told in a pointed "literary" way and not in a pedantic style.

Edited Books.

The Works of Shakespeare. Vol ii. 572 pp. (Macmillan.) 5*s.*—In this second volume Professor Herford continues brilliantly to sustain the reputation which the first volume of this work secured for him. The plays included are *Taming of the Shrew*, *Merchant of Venice*, *Merry Wives of Windsor*, *Twelfth Night* and *As You Like It*. To each play is prefixed an introduction varying from eight to fourteen pages, which deals with its literary history in a brief, but full and clear manner. In dealing with Shylock, indeed, Professor Herford goes further and indicates the general trend of æsthetic criticism, and the last two or three pages of the introduction to *As You Like It* are in the same vein. The notes are very unobtrusive but serviceable. To say that this volume belongs to the well-known Eversley Series is a guarantee of excellent printing and binding. Altogether the book is as fine a tribute to the genius of Shakespeare as it is an exhibition of ripe scholarship.

Richard II. "Short Studies of Shakespeare's Plots." By Cyril Ransome, M.A. 35 pp. (Macmillan.) 9*d.*—The first twenty pages of this little booklet are given to a minute and careful account of this play, to the point where Richard really fails either to escape from England or to make any attempt at good government at home. The remainder is taken up with a careful criticism of his conduct in adversity, in which Shakespeare's insight into the essential femininity of the unfortunate king's nature is brought out with the scholarly clearness to which the other studies in this series have accustomed us.

Childe Harold's Pilgrimage. Edited by Professor Edward E. Morris. Cantos i. and ii. 115 pp. (Macmillan.) 1*s.* 9*d.* Also Cantos iii. and iv. 168 pp. 1*s.* 9*d.*—These little volumes are very well done, although the introduction is all too short. For this very pardonable fault it makes amends by presenting a most lively and taking sketch of the poet himself, and a very careful estimate of this particular poem. The notes are, for the most part, brief and pointed, and in some cases where fuller information is necessary, the hand of a master is visible in the management of the material at hand. The note on J.-J. Rousseau, for instance, is a model of concise biography and criticism combined. A map is affixed to each volume, which will be of material assistance in examination work.

Poems. By Alfred Lord Tennyson. 112 pp. (Macmillan.) 6*d.*—This edition includes *In Memoriam* as well as the *Juvenilia* and the *English Idyls*, and it is a most valuable addition to this now considerable series of sixpenny editions. It is well and clearly printed, and will bring some of Tennyson's very attractive early work within reach of the masses.

History.

Cameos from English History. Ninth Series, The Eighteenth Century. By the author of "The Heir of Redclyffe." 352 pp. (Macmillan.) 5*s.*—To judge from this volume, a cameo of history is a string of paragraphs more or less loosely connected, chosen according to the taste of the author—a taste which in this instance tends towards anecdotal stories. In the 18th century, such stories are more abundant or more commonly accessible in French than in English history, and accordingly, out of the forty "cameos" here presented, Nos. 6, 25, 26 and all the last ten are entirely composed of stories of our neighbours across the Channel. So that we might fairly complain of the title of the book as misleading. The student of serious history will be disappointed and partly misled. Still, for those who know enough of the 18th century to be on their guard, this volume will prove an entertaining and even instructive relaxation.

Translation of a French Metrical History of the Deposition of King Richard the Second. From a MS. formerly belonging to Count Charles of Anjou. By the (late) Canon Webb, M.A., F.A.S. Edited by Dorothea Beale. (George Bell & Sons.) 1*s.*—A timely reprint of an interesting contemporary, which should be useful to teachers studying Shakespeare's play on the subject. They will learn, again, from this how mediæval thought and expression were *always* consciously religious, and that the Puritans were only following universal custom in their use of religious phraseology.

History of England in Three Parts. Part III., 1689—1897. By Geo. Carter, M.A. 296 pp. (Relfe Bros.) 2*s.*—A careful summary of all important matters in English history within these dates. There are exceedingly few mistakes, yet the book is as a whole weak. Each event taken singly is well written, but there is no connection between them. We cannot see the wood for the trees; hence such manuals should never be used by themselves. And above all, it would be a pity if the teacher should confine his teaching to what is contained within the covers of such a book. Specially do these defects occur in the treatment of the foreign history. Either the Continental history should be entirely neglected, and the writer confine himself to the bare statement that Great Britain was opposing this or that country, or space should be given to telling, however briefly, the story of European diplomacy, introducing Great Britain in its due importance and position, which was often not first class. Mr. Carter seems to fall between the two stools.

Geography.

Aldersgate Atlas of Modern and Ancient Geography. Second Edition, revised. 72 coloured maps. Index of more than 5,000 places. (Relfe Bros.) 3*s.*—For ordinary school purposes this atlas is somewhat overcrowded. Among the most notable features are maps of the environs of chief towns and a commercial chart. The latter is up-to-date, although the Atlantic route from America to Asia is not shown. For purposes of reference it is a cheap and useful work.

Spain. (W. and A. K. Johnston's Geographical Hand Books.) 32 pp. 3*d.*—A very useful pamphlet. It will supply a distinct want for teachers who are sending pupils in for the forthcoming Oxford Junior Local Examination.

Mathematics.

The New Science and Art of Arithmetic. A. Sonnenschein and H. A. Nesbitt, M.A. x. + 500 pp. (Swan Sonnenschein.) 4*s.* 6*d.*—This is a revised and remodelled edition of a work which has been so long before the public that its merits are generally known; as a rational and lucid treatise it has deservedly won a good reputation. The only serious blemish we have detected is the note on p. 141, which involves a vicious circle by (1) assuming that any common measure of two numbers is a factor of their greatest common measure; (2) then using this to show that if m divides ab and is prime to a it must be a factor of b; and thence (3) that a number can be resolved into prime factors in only one way. This last fact is tacitly assumed on pp. 132 and 133, to which the authors refer for the proof of their initial proposition. It is to be feared that the preface will not impress everyone as a model of good taste.

We have also received *Answers to Examples in an Arithmetic for Schools.* S. L. Loney, M.A. (Macmillan.) 6*d.*

An Introduction to the Differential and Integral Calculus and Differential Equations. F. G. Taylor, M.A., B.Sc. xxiv.+568 pp. (Longmans, Green.) 9*s.*—This book contains much that is useful and instructive, especially in the way of geometrical applications and illustrations of theory; but it is unfortunately marred by a number of careless and even quite inaccurate statements. Thus it is said that "a rational algebraic function of x is one which contains only integral powers of x, or of expressions involving x;" in example 5, p. 55, it is stated, but not proved, that dy/dx is 0 and ∞ at the origin; on p. 100 it is stated that for a continuous function y to have a maximum or minimum value dy/dx must change sign *in passing through zero*, and this although the figure on p. 98 shows the inaccuracy of the assertion. Printers' errors are rather more frequent than they ought to be; a very serious one (k for x) occurs on p. 2, but this has been noted in the table of errata. In the hands of a competent teacher the book will be useful, but it can hardly be recommended to students who have to begin the subject by themselves.

Geometry for Young Beginners. F. W. Sanderson, M.A. x.+132 pp. (Cambridge University Press.) 1*s.* 4*d.*—As an introduction to the use of instruments and a collection of exercises in geometrical drawing, this is likely to prove very useful. Whether it is a suitable book to be *read* by or to young pupils is a more doubtful question; there is a frequent suggestion that properties of figures have been proved when in fact they have only been stated. This is very likely to encourage the fatal idea that geometrical truths can be proved by experiment; and for this reason Mr. Sanderson's book does not compare favourably with Prof. Minchin's excellent "Introduction to Geometry."

The Junior Euclid. Books I. and II. S. W. Finn, M.A. viii.+148 pp. (Clarendon Press.) 1*s.* 6*d.*—This edition is distinguished by several good features: (1) the clearness of the print; (2) the introduction of definitions and axioms when they are first wanted; (3) the marking of corresponding angles and segments in such figures as that of I. 4. Those abbreviations are used which are allowed in the Oxford and Cambridge Local Examinations. The exercises are really easy and not oppressively numerous, and there is an appendix on the geometry of the triangle. In treating of parallels the author adopts Playfair's axiom.

The Principles of Book-keeping. J. E. B. McAllen, M.A. 142 pp. (Methuen.) 2*s.*—A clear and well-written introduction to the subject, with numerous papers, several of which are worked out. The author begins by explaining the Ledger; we are inclined to agree with him in thinking that this is the proper course. Mr. McAllen's book certainly deserves a favourable reception, and seems admirably suited for its purpose.

Science and Technology.

A History of Physics. By Professor Florian Cajori, Ph.D. 322 pp. (Macmillan.) 7*s.* 6*d.*—Every teacher of physics, and the library of every school in which physics is taught, should possess a copy of this book. Nothing is more stimulating to students of science than a familiarity with the methods and results of the great investigators who have built up the vast edifice of natural knowledge; and it would be almost impossible to produce a volume containing a more concise statement of these researches, from the time of Aristotle to the present day, than is given by Prof. Cajori. The first twenty-six pages include a survey of the physical science of the Greeks, Romans and Arabs, and the state of natural philosophy in Europe during the Middle Ages. The sixteenth century saw the physicist abandon scholastic speculation, and commence the study of nature by experiment. The seventeenth century was a period of great experimental, as well as theoretical, activity, the progress of physics during the first eighty years of it being truly extraordinary. In the eighteenth century there came a slight reaction, no great experimental physicists like Galileo, Huygens, and Newton being producnd. The science of the present century may, indeed, be said to be largely built upon foundations laid during the seventeeth century rather than upon the theories of the eighteenth century. Prof. Cajori deals in succession with the periods referred to, and traces the progress of various branches of physics in each of them. More than a half of the volume is concerned with the progress of physics in this century, and the development of physical laboratories. The numerous references to original papers given throughout the work will be of extreme value to students of the history of science.

Twenty-four Test Papers in Practical, Plane and Solid Geometry. By George Grace, B.Sc. (Macmillan.) 2*s.*—These test papers are printed on sheets of cartridge paper, on which spaces are left, thus providing a suitable surface for the careful drawing of the solutions. The examples have been well chosen and graduated. Though intended for candidates preparing for the Elementary Stage of the Science and Art Department's Examination, the first twelve papers seem to be just the thing that is required by teachers coaching for the Woolwich and Sandhurst Entrance Examinations.

Miscellaneous.

Kant on Education. Translated into English by Annette Churton. Introduction by Mrs. Rhys Davids, M.A. xix.+121 pp. (Kegan Paul.) 2*s.* 6*d.*—The first English translation of *Immanuel Kant über Pädagogik* is that by Miss Churton now before us. Kant's ideas of education are thus presented to the British teacher in his own tongue, nearly a hundred years after their appearance in Germany. These "Thoughts on Education" assumed their present form in the hands of Rink, one of Kant's pupils, and were first published in 1803. The ultimate ideal of education was, for this speculative thinker, nothing less than the perfection of human nature and not merely a goal to be attained by the select few. The little volume consists of some six chapters. The first is introductory, and is full of short generalisations on education which would almost do for copy-book headings; *e.g.*, "Discipline changes animal nature into human nature." "Man needs nurture and culture." "Neglect of discipline is a greater evil than neglect of culture." Chapter II. deals with Physical Education, and is more suitable for young parents than schoolmasters. Chapters III. and IV. are concerned with culture in the ordinary sense, moral culture being treated of in Chapter V. The last chapter is called Practical Education, which is said to include (1) skill, (2) discretion and (3) morality. There is more than an interest which is historical attaching to this little book, so satisfactorily translated; many of the sections can with advantage be put into practice in the modern class-room without an alteration, so slowly does human nature change.

Brushwork Studies of Flowers, Fruit and Animals, for Teachers and Advanced Students. By Elizabeth Corbet Yeats. Plates xxvii. and explanatory text. (G. Philip & Son.) 6*s.*—It would be difficult to produce a more attractive collection of brushwork studies than is given by Miss Yeats in this volume. The simply coloured illustrations are beautiful pictures of natural objects. The paintings are not, however, intended to be copied, but only as a guide to the effects which pupils ought to produce by working from the

objects themselves. The work should be given attention by every teacher of drawing, and teachers of botany may learn from it how their lessons may be illustrated.

Quentin Durward, by H. W. Ord, B.A., and *Battle-Pieces*, by J. Higham, M.A. 1s. net.—Are recent additions to Messrs. Blacks' Sir Walter Scott Continuous Readers. They are well printed and suitably illustrated.

Manual of Spelling. By J. D. Morell, LL.D. 128 pp., (Cassell.) 6*d*.—A book which has reached its 113th thousand needs no commendation.

JUNIOR OXFORD LOCAL EXAMINATION.

JULY, 1899.

Guide and Monthly Test Papers.—No. 3.

English Grammar.

Syntax.

(1) Correct (if necessary) the following sentences, giving your reasons in each case:—

(*a*) The entire regiment of Sikhs were defeated.
(*b*) These three pens are totally different to the rest.
(*c*) We shall try and finish our work before the evening.
(*d*) On the King appearing the troops cheered.
(*e*) Those kind of tales do not appeal to my sympathies.
(*f*) Nobody in this town exert themselves.
(*g*) This boy wants his hair cutting.
(*h*) Who do you think it was?
(*i*) Whatever he says, we shall go home on Thursday next.
(*j*) The General was a son of the Khalifa's.

(2) Give the chief rules for the sequence of tenses in English, and illustrate them by a few examples.

(3) Distinguish between the uses of *that* and *who* as relative pronouns.

(4) Explain the following terms: apposition, euphony, idiom, syntax, nominative absolute, verb of incomplete predication.

(5) Distinguish between the meanings and uses of: *later* and *latter; older* and *elder; unless* and *without; as* and *like; point at* and *point to; differ with* and *differ from*.

(6) Put the following passage into the form of a reported speech: "I am determined," remarked the leader, "that you shall have no occasion to complain of my neglecting your interests. Entrust yourselves and your fortunes to me! We shall soon arrive at our destination, and then all will be well. The spies tell me that we are not expected."

(7) Give examples of: (*a*) omission of the antecedent; (*b*) simple infinitive with *to*; (*c*) the use of *as* as a pronoun; (*d*) the retained object; (*e*) the objective genitive; (*f*) nominative of address.

(8) Write an essay on one of the following subjects: (*a*) Balloons; (*b*) Cycling; (*c*) Fire Brigades.

History of England.

(1509—1558 A.D.)

(1) What wars were fought with France and with Scotland in this period? Name the principal battles and other events.

(2) Give an account of Cardinal Wolsey, and his conduct towards foreign Princes, the Parliament, and in Church matters. What was the reason for his fall?

(3) Name and briefly describe the chief Acts of Parliament made against the Pope in Henry VIII.'s reign.

(4) Write brief notes on the following: Dean Colet, Thomas More, Thomas Cromwell, Cranmer, Aske, the Earl of Surrey, the Duke of Somerset, Lady Jane Grey.

(5) Against what evils did Ket revolt? Give some account of the general distress in the reign of Edward VI. and Mary.

(6) What were the varying opinions of English rulers (1536-1558) on religious questions? Name any important Acts of Parliament on these matters.

Geography.

Spain.

(Illustrate by sketch maps whenever possible.)

(1) Draw a map of Spain, inserting the following names, and no others: (Rivers) Ebro, Guadalquiver, Guadalaviar; (Mountains) Sierra Morena, Pyrenees; (Towns) Alicante, Barcelona, Granada, Cadiz, Almeria, Chinchilla, Bilbao; (Capes) Ortegal and Gata. Also mark the boundaries of Andalusia.

(2) Madrid is in the same latitude as New York. Name their latitude, and account for the difference in climate between these two places. What advantage is it to the country (as far as climate is concerned) that the Sierra Nevada is close to the south coast?

(3) Give an account of the mineral products of Spain, and name the locality where each is most abundant.

(4) What foreign possessions has Spain? What are our chief imports (i.) from Spain, (ii.) from her colonies?

(5) Describe the physical features of Spain. What are the names of the chief passes in the Pyrenees?

(6) Name the chief seaports of Spain, and describe the trade of each.

(7) Describe Gibraltar, accounting for its importance from a strategic point of view.

(8) Account for the direction of the current through the Straits of Gibraltar. The Mediterranean is usually described as being tideless. Comment upon this.

(9) Compare England and Spain as regards their coasts.

Latin.

VIRGIL.—ÆNEID VI.

Ll. 337-628.

(1) Translate:

(*a*) Ll. 405-416. Si te nulla . . . . exponit in ulva.
(*b*) Ll. 461-468. Sed me iussa . . . . ciebat.
(*c*) Ll. 566-579. Gnosius haec . . . . Olympum.

(2) Give the English of—cortina, navita, patrui, exsortes, calles, caduci, laniatum, stragis, palla, offa.

(3) Translate and add notes where necessary:

(*a*) iam tuta tenebam
ni gens crudelis madida cum veste gravatum
prensantem unces manibus capita aspera montis
ferro invasisset.
(*b*) nec magis incepto vultum sermone movetur,
quam si dura silex aut stet Marpesia cautes.
(*c*) inceptus clamor frustratur hiantes.
(*d*) Quis tam crudeles optavit sumere poenas?
cui tantum de te licuit.
(*e*) et fors omne datum traherent per talia tempus.

(4) Write brief notes on—Phaedra, Evadne, Laodamia, Deiphobus, Lugentes Campi.

(5) Parse and give the principal parts of—peperere, perosi, populata, iecur, toris.

CÆSAR DE BELLO GALLICO.—BOOK IV.

Ch. XVII.-XXVI.

(1) Translate:

(*a*) Ch. XVII. Tigna bina . . . . conversa statuebat.
(*b*) Ch. XXIII. Cuius loci . . . . administrarentur.

(2) What constructions follow—obtemperare, hortor, polliceor, imperitus, noceo.

Make up or quote from these chapters sentences to illustrate your answers.

(3) Translate and explain the construction of words in italics:

(*a*) *Diebus decem*, quibus materia *coepta erat* comportari, *omni opere effecto*, exercitus traducitur.
(*b*) Cæsar navibus transire neque suae neque *populi Romani dignitatis* esse statuebat.

(*c*) *Huic* imperat, quas *possit*, *adeat* civitates, *seque* celeriter eo venturum nuntiet. Volusenus perspectis regionibus omnibus, quantum ei *facultatis* dari potuit, qui *navi* egredi ac se barbaris committere non *auderet*, *quinto die* ad Cæsarem revertitur quaeque ibi *perspexisset* renuntiat.

(4) Briefly describe in your own words Cæsar's passage to Britain, and give, as near as possible, the point from which he is supposed to have started and the point at which he landed.

French.

I.

(1) Translate into French:—

(*a*) He says he would like to speak to you.
(*b*) Your trying is useless; it cannot be done.
(*c*) These are fine trees; who planted them?
(*d*) He can walk a mile in ten minutes.
(*e*) She can play on the harp.

(2) Translate into French:—

As soon as King Henry I. was dead his nephew Stephen (*Etienne*), who was very handsome and brave, was proclaimed king. A great many Norman barons and English lords went with him to Westminster Abbey (*Abbaye*), and then the Archbishop of Canterbury (*Cantorbéry*) put the crown upon his head, and they all promised to obey him as their sovereign. But some noblemen and bishops, who had sworn (*jurer*) to recognise the Empress Maud as Queen of England and to keep the kingdom for her young son Henry, sent messengers to bring them from Anjou, which was their own country.

II.

(1) Translate into English:—

Quoique j'eusse à peine alors neuf ans accomplis, je sentais déjà le plaisir d'être libre et maître de mes actions. J'étais sans argent et sans pain: n'importe, je n'avais point de leçons à étudier ni de thèmes à composer. Après avoir marché pendant deux heures, mes petites jambes commencèrent à refuser le service. Il fallut m'arrêter pour me reposer. Je m'assis au pied d'un arbre qui bordait le grand chemin; là, pour m'amuser, je tirai ma grammaire, que j'avais dans ma poche, et la parcourus, puis, venant à me souvenir des coups de fouet qu'elle m'avait fait recevoir, j'en déchirai les feuillets avec colère.

(2) Give the feminine of—poli, cher, franc, roux, sujet, chanteur; and the plural of—boeuf, gaz, caillou, aïeul (two forms).

(3) Compare the adjectives—haut, petit; and form adverbs from—facile, doux, patient.

(4) Illustrate the use of the partitive article by putting into French the following sentences:—

(*a*) There are some dogs who love their masters.
(*b*) There are no dogs that can speak.
(*c*) There are some fine dogs in that kennel (*cabane*).
(*d*) That man has some perfectly white dogs.

(5) What are the primitive tenses of French verbs?

Give the primitive tenses of—être, apercevoir, connaître, lire, and avancer.

Write, in full, the imperative of—s'en aller.

(6) What are the meanings of the following pronouns?—Autrui, tel, on, rien, aucun. Construct sentences containing these words.

III.

For those who offer "L'abbé Constantin" (pp. 111-164).

(1) Translate the following passages:—

(*a*) p. 111, ll. 8-20; (*b*) p. 126, l. 12-p. 127, l. 5; (*c*) p. 149, ll. 6-20.

(2) Write short notes on—s'engourdir—l'almanach Bottin—faire le guet—monnaie blanche.

For those who offer "La Mare au Diable" (pp. 31-47).

(1) Translate the following passages:—

(*a*) p. 32, ll. 27-35; (*b*) p. 37, ll. 11-24; (*c*) p. 43, ll. 10-24.

(2) Write short notes on—Marie n'en pouvait plus—jappé à nuitée—faire une somme—tutoyer.

PRIZE COMPETITION.

No. 3.—The Six Greatest British Teachers.

IT has been found impossible to award either of the prizes we offered last month for the best list of great British teachers. The examination of the replies shows that no competitor has given more than four of the names of the six teachers voted the greatest of the century. Moreover, there are eleven competitors who have each named four correctly.

We have come to the conclusion that the terms of the competition were not sufficiently explicit for some competitors. Certain lists sent in contained the names of continental teachers; others include names like Tennyson, Browning, Wordsworth, &c., who are, it is true, teachers in a broad sense, but not in the more restricted way in which the word was meant.

These considerations have further decided us not to publish the final list, as, though the number of competitors was large, yet, in consequence of the confusion which has arisen, and the comparatively small number of votes awarded to any one of the 47 teachers named, the final list is not sufficiently representative. We shall return to this subject in a future competition.

Competition No. 4.

A well-educated gentleman has decided to take a voyage round the world. He has arranged to stay for a few weeks at each of the **12 most interesting places** *en route*. He starts from London and travels eastwards. Write down, in the order they should be visited, the names of the twelve places you would advise him to stay at.

We offer **two prizes** of books, each of the published price of one guinea, to be chosen from the catalogue of Messrs. Macmillan & Co., Ltd., for the two best lists. The twelve most interesting places will, for the purposes of this competition, be those which are named most frequently in the replies sent in. The lists of places must be accompanied by the coupon printed on p. iv., and must reach the editors of THE SCHOOL WORLD, St. Martin's Street, London, W.C., on or before Monday, May 1st, 1899.

CORRESPONDENCE.

The Editors do not hold themselves responsible for the opinions expressed in letters which appear in these columns. As a rule, a letter criticising any article or review printed in THE SCHOOL WORLD *will be submitted to the contributor before publication, so that the criticism and reply may appear together.*

IN your article on "The Schools of Public Men," you seem not to have included Colonial Bishops. Had you done so, you would have drawn attention to the fact that the present Bishops of Toronto, North Queensland and Likoma are Old Boys of University College School. We are, perhaps, proudest of the late Bishop Steere, who was the first Bishop of Central Africa, and did so much for the Universities' Mission. The library here contains his own copy of his "Essay on the Existence and Attributes of God," which he took with him to Africa and in which there are his own MS. corrections.

TEMPLE ORME.

University College School, London,
March 20th, 1899.

[Colonial Bishops were not included in the article referred to. Had they been, not only would Mr. Orme's additions have been made, but several others; *e.g.*, the names of the Bishop of Calcutta (Dr. Welldon) and the Bishop of Adelaide would have appeared among distinguished Etonians. Similar additions would have been necessary in the case of other schools.—EDS.]

OUR CHESS COLUMN.

No. 4.

The School World Chess Millennium—an annual congress! Meanwhile, let more schools play matches in the usual way, as in cricket and football. The suggestion was made that the present Inter-School Competition should be decided in this manner, but geographical conditions rendered this impracticable.

Will secretaries please let me know if their clubs are willing to play home and away matches this term with neighbouring schools?

The two copies of the "B.C.M. Guide to the Openings," which I offered last month, are awarded to

A. Plowman,
Bexley Heath College,
Bexley Heath.

and

A. V. Poyser,
Grammar School,
Wisbech.

Correct solutions were also received from:—R. S. Pratt, N. P. Wood.

A. V. Poyser sent a correct solution to the problem in the February number; unfortunately, it was too late.

The mate in the March game is as follows:—

White.	Black.
1. R—R8 (ch.)	1. K—Kt2
2. R—R7 (ch.)	2. K x R
3. Q—B7 (ch.)	3. K—Rsq
4. Kt—Kt6 mate.	
or	
4. Q—Kt6 mate.	3. K—R3

I shall give a special prize at the end of the year to the competitor whose name has most frequently occurred in the lists of solvers.

At the time of going to press the following are the leaders:—N. P. Wood, 3; W. O'Kuffe, 2; F. G. M. Beck, 2.

White.	Black.
1. P—K4	1. P—K4
2. KKt—KB3	2. P—Q3
3. B—B4	3. P—KB4
4. P—Q4	4. P x KP
5. Kt x P	5. P x Kt
6. Q—R5 (ch.)	6. K—Q2
7. Q—B5 (ch.)	7. K—B3
8. Q x P on K5	8. P—QR3
9. P—Q5 (ch.)	9. K—Kt3
10. B—K3 (ch.)	10. B—B4
11. B x B (ch.)	11. K x B
12. P—QKt4 (ch.)	12. K x P
13. Kt—Q2	13. P—QKt4
14. R—QKtsq (ch.)	14. K—B4
15. Kt x P (ch.)	If 15. K x B
White mates in three. (*a*).	
	If 15. K—Kt3
16. Q—Q4 (ch.)	16. K—Kt2
17. Kt—B5 (ch.)	17. K—R2
18. Kt x RP (dis. ch.)	18. K x Kt
White mates in four. (*b*.)	

Competitors are to send in solutions to both (*a*) and (*b*). There will be two prizes—Messrs. De La Rue's Pocket Chess Board and Men. Postcards must reach me before the 29th inst.

Rules.

I.—Write on postcards only.
II.—Give name, date, and school address.
III.—Address all communications to

The Chess Editor,
The School World,
St. Martin's Street,
London, W.C.

CALENDAR.

[*Items for the May Calendar should be sent in by April 30th.*]

April, 1899.

Saturday, 15th.—Evening Examinations of Science and Art Department begin.
Tuesday, 18th.—Apply for forms for Edinburgh Local Examinations.
Wednesday, 19th.—Examination for Scholarships, Downing College, Cambridge.
Saturday, 29th.—Return forms for Cambridge Higher Local Examination.
Return forms for Girton College Entrance Examinations.
Last day of Entry for Scholarships, University College, Liverpool.

May.

Monday, 1st.—Return forms &c. for London University June Matriculation Examination.
Scotch Education Department. Latest day for returning forms for Teachers' Certificate.
Apply for permission to sit for Exams. for Certificates and Scholarships at Training Colleges (Education Department).
Latest day for returning forms for Army Exams. (Sandhurst and Woolwich).
Return forms of entry for Scholarship Examinations, Yorkshire College,
Thursday, 4th.—Mathematical Association. General Meeting at University College, 8 p.m.
Saturday, 6th.—Send notice and fees for June Preliminary Examination of Institute of Chartered Accountants.
Wednesday, 9th.—(about).—Return forms for Higher Certificate of Oxford and Cambridge Schools Examination.
Thursday, 10th.—Last day for returning forms for Edinburgh Local Examinations.
London University Presentation Day.
Friday, 11th.—Return forms (with fees) for Oxford Local Examinations.
Monday, 14th.—Return forms for Cambridge Teachers' Training Syndicate.
Tuesday, 15th.—Return forms for Matriculation Examination of Royal University, Ireland.
Scholarship Examination at Dulwich College.
May number of The School World published.

The School World.

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The School World

A Monthly Magazine of Educational Work and Progress.

No. 5. MAY, 1899. SIXPENCE.

THE TEACHING OF GEOMETRY.

By PROFESSOR G. M. MINCHIN, M.A., F.R.S.

I.

THERE is no such onerous occupation in the world as that of a teacher of the young; and in the daily work of such a person there is nothing which makes such great demands on patience, perseverance, and good temper as the teaching of Euclid. Were it not that our social system is such a hotch-potch of absurdities, I should expect to find the highest rewards that the State can offer conferred upon those who have to teach us all—men of science, lawyers, and statesmen alike.

Yet, while the work of the teacher is essentially difficult in the highest degree, the most wearisome part of it is easily avoidable, because it is the result of a blind, unreasoning attachment to a method of teaching geometry which has been hallowed by ages, but which seems to have been instituted with a view to making the progress of the beginner as slow and as difficult as possible.

EUCLID IN EARLY EDUCATION.

Let us consider for a moment the state of affairs in the early education of boys. Before they come to Euclid they have made some progress in arithmetic, and, indeed, have advanced pretty far therein without causing a very great deal of trouble to their teacher. There is a certain amount of abstract (or abstruse) reasoning involved thus far; but it has not proved a very serious trouble. The teacher's complaint is not usually against the inability of the boy to *understand*: it is against his persistent *inaccuracy* in work—which is a very different thing.

If algebra were taught as soon as boys had learned the processes of arithmetic (addition, multiplication, &c.), I believe that the result would be the same—understanding would not be wanting: our complaint would be against inaccuracy, which time and practice alone can cure.

Why, then, is it that the teacher, when he comes to the teaching of Euclid, is confronted with such great difficulties that his belief in the rationality of human beings almost disappears with the last vestiges of that good temper which he himself once possessed? The reason is simply that Euclid's book is not suitable to the understanding of young boys. It fails signally as regards both its *language* and its *arrangement*. Let me say here that I know some excellent people who, looking back on their school days, tell me, with the utmost self-satisfaction, that "Euclid is a delightful book," that they "never had the slightest difficulty with it," that "it would never do to get rid of it," and so on. These people are more influenced by a feeling of satisfaction with having got over a difficulty than by a desire to recall the accurate state of affairs. For myself, I confess that, to the best of my belief, I had been through the six books of Euclid without really understanding the meaning of an *angle*. I had never seen a protractor, and the use of mathematical instruments was a thing not to be mentioned. Of the right lines and the circles which we drew it can be most truly said that not by suggestion or otherwise did they ever lend any assistance to the perception of a geometrical truth; and, indeed, I believe that there can still be found people to maintain that Reason should be thus exercised without assistance from well-drawn pictures. So far as I am able to learn by enquiry, Euclid is taught in all our schools without the aid of rule, compass, protractor, or scale. This is quite in accordance with the traditional method—the classical method which, unfortunately, so greatly dominates English education—and quite conducive to long-delayed knowledge of the subject.

USE OF SIMPLE INSTRUMENTS.

Now the use of the above simple instruments for all beginners in geometry is the first change that I advocate, whether we continue to teach from Euclid's book or from one proceeding on simpler and better lines. Well-drawn figures possess an enormous teaching power, not merely in geometry, but in all branches of mathematics and mathematical physics. This is a fact which I find University men—especially those who are most distinguished—very prone to ignore. The typical University mathematician who, in some question of hydrodynamics or electromagnetics, is content to keep his knowledge wrapped up in symbols which he never arithmetically realises is hampering himself in pretty much the same way as that in which we now hamper boys in geo-

metry by refusing to give them the means of constructing accurate figures. I was told by one of my students at Coopers Hill that, so far from using instruments in the construction of figures, the boys at his school were often presented with figures purposely misleading in order that they might learn to perceive some geometrical truth *in spite of the figure*. Surely—in the case of beginners, at any rate—this is a needlessly severe test of the reasoning power, and one which is calculated to delay progress. Ask a boy (even a very intelligent one) who is being taught Euclid, and has got once through the six books, at what angle two roads which he meets on a journey cut each other, and the chances are very many to one that he will show a deplorable ignorance, even if he can make an attempt at an answer at all.

Closely allied to this want of accurate drawing and measurement is the almost complete banishment of arithmetic from Euclid. In the boy's mind arithmetic is one subject and Euclid is quite another one, whereas the second should receive perpetual illustration from the first—just as, in several modern presentations of the second book of Euclid, the various propositions receive illustration from elementary algebra.

The great difficulty, however, in the way of reformation is the scholarship competition of the public schools. The preparatory schools are tied hand and foot by the necessity for preparing their young pupils for the scholarships of the schools above them. Hence they will not tolerate for a moment any departure from Euclid's language and order. They will merely teach some alternative proof of a proposition which does not violate the orthodox order. Now the result of this system is that for many months (may I say a year?) boys are kept oscillating backwards and forwards between the first and the twentieth propositions of Book I., and that the process is mainly an exercise of memory unaccompanied by any appreciable amount of understanding. Does anyone seriously defend such a result as this?

Euclidean Phraseology.

Let us now enquire particularly into the circumstances which render Euclid so difficult to beginners, apart from the neglect of the use of protractors and other instruments. The causes are mainly two: firstly, the language is strange and somewhat inflexible; and secondly, the statement of a proof often involves a multitude of details, many of which are not worth mentioning —as, for instance, when the pupil proposes to draw a right line from one given point to another, and he is expected to quote his authority for such a step: Postulate i., "Let it be granted that a right line may be drawn from any one point to any other." It may be contended that this perpetual quoting of authority for the various steps in a proof is conducive to logical thought. I maintain, on the contrary, that it is exceedingly wearisome, and that it is calculated to impede thought and originality by its mere mechanical action.

What, then, should be our procedure if we wish to interest a beginner in the nature of geometry, and to facilitate his progress in the subject? The main thing is to admit that Euclid's order of axioms, postulates, and propositions must be abandoned, and that many of the propositions in his first book may be omitted as being of merely secondary importance.

Exercises in Practical Geometry.

We begin, of course, as Euclid does, with the definition of a *point*; but instead of presenting it in the unintelligible form, "a point is that which has no parts," or in the (if possible) more objectionable words, "a point is that which has *position*, but no magnitude," we should, as a first approximation, define it as the mark made on the paper by the sharp end of a needle or a pencil, and then give the beginner the notion of a *limit* by desiring him to imagine the end of the needle or the pencil to be finer and finer. Every pupil has, to begin with, a much better notion of a *point* than of such an abstract conception as *position*.

Next should come the notion of a *line* as the trail of a moving point. The line may be of various shapes—it may be curved or *straight*; and a *straight line* should be at once defined as *the shortest of all the various paths that may be drawn between two points*.

Here we come into direct conflict with Euclid, who does not tell us this truth until we have waded through nineteen propositions, some of them of great difficulty to a beginner. With me, then, Euclid's Prop. xx. becomes a fundamental definition.

The pupil should now be exercised in drawing a right line from one assigned point to another by means of a ruler, and in attempting to draw one without this aid. He should also be taught to designate points by letters, or numbers—the point A, the point P, and so on; and he should measure by means of a scale the lengths of lines drawn for him, guessing at half, third, or quarter divisions. Indeed, his notion of *a fraction* is thus developed and strengthened, and the *representation* of lines 5, 8, 10, &c., inches long by lines containing corresponding numbers of his *scale divisions* will give him a notion of pictures of objects on different scales.

The *circle* should come next as the path traced out on the paper by one end of a tight thread, the other end of which is held fixed. If the movable end is allowed to leave the paper and to go wherever it can (the thread being always tight), the notion of a *sphere* is given.

Various exercises in drawing circles with given centres and numerically assigned radii by means of scale and compass should follow.

And now the notion of an *angle*, and the way in which it is measured (by dividing the circumference of a circle into any number of equal parts) may follow; but it may be well to postpone this, and to pass to a *triangle*, illustrating this by various shapes—equilateral, isosceles, &c.—and always emphasising the fact that any one side must be

less than the sum of the other two. Arithmetical examples should here follow in abundance—the construction of triangles whose three sides are numerically assigned, some of the constructions being impossible owing to the fact that two of the given sides when added together do not equal or exceed the third. After a few impossibilities of this sort (boys call them "sells") the wits get sharpened, and the pupil carefully examines the figures given to him to see whether it is worth his while or not to try to construct the triangle.

Thus early, then, we have Euclid's Prop. xxii. fixed in the mind as one of the most simple items of knowledge.

At this stage Euclid's first proposition will, of course, be learned, and the statement of its proof is the first piece of formal reasoning in words that is required of the pupil. I would insist on this piece of formalism, although the mind of the pupil really does without it, because it is so simple.

But we should not be content with the problem, "on a given right line to describe an equilateral triangle"; we should also require the solution of the problem, "on a given right line to describe an isosceles triangle," and bring out the fact that it has an infinite number of solutions, many of which should be shown in one figure.

(To be continued.)

METAL WORK IN SCHOOLS.

By. H. K. FREW, B.Sc. (Lond.)

Headmaster of the Waverley Road Higher Grade School, Birmingham.

THE manual training classes in our school have now been in progress for some years, and the course of instruction has been evolved as the result of experience with boys of from ten to fifteen years of age. The object that we have kept before us has been the formation of good habits; but there has been no attempt to teach a trade. Nevertheless, it seems clear that boys who have had a few years' training possess such a foundation as will enable them to learn a trade more quickly and more efficiently than would otherwise be the case. In the manual training classes their attention has been so constantly directed to principles that there is much less risk of their after work being done merely by rule of thumb.

VALUE OF MANUAL TRAINING.

Every kind of manual training, when properly carried out, should produce, or tend to produce, certain effects on the pupil. By constant exercise his power to observe and reason should be strengthened, while his love for accuracy—which is another name for truth, truth embodied in a truly-made article—and his pride in neatness and order should be carefully cultivated. He should learn to use material with wise economy, avoiding unnecessary waste, and his manual skill, or the power to co-ordinate the efforts of hand and eye, as well as his general bodily vigour, should steadily grow under its influence. Claims on all these counts have been advanced, and reasonably established, for wood work. On that subject, therefore, I shall say nothing; but I shall try to show that working in metal is, in some ways, a more perfect means of training.

COMPARISON OF WOOD WORK AND METAL WORK.

Speaking roughly, wood work may be summed up as sawing, planing, chiselling, and certain subsidiary processes connected with the building up of a whole from its parts. Metal work embraces a large number of operations, and these require as much thought and as much skill for their proper performance as is necessary in the operations of wood work. Among the many operations in metal working to which boys are usually introduced are metal cutting, chipping, filing, scraping, drilling, riveting, turning, soldering, brazing, forging; and the tools used are most varied and interesting. The different metals used, and their varieties, demand careful observation. The processes by which they are obtained are full of interest, while their proper treatment is generally founded on some property which escapes merely casual observation, but fully repays close examination.

The points of contact between a boy's world, including all his studies in physical science, and his work in metal, are very many; while to the student of machine drawing and applied mechanics the workshop bears pretty much the same relation that the chemical laboratory bears to the student of chemistry. The degree of accuracy required is necessarily much greater in metal work than in wood work; and it is possible and reasonable to insist on a high degree of accuracy because the work proceeds at a slow rate, and the pupil has, therefore, a fair chance of seeing and avoiding sources of error. There can be no "squeezing" or "swelling out" to secure a good fit with metal work. It is sometimes said that metal work is necessarily hard labour, much harder than wood work, and therefore unsuitable for small lads. Our experience here does not accord with this view. Small boys of ten and eleven have considerable difficulty in using a jack plane, because the least effective pressure for cutting with it is fairly large. On the other hand, our smallest boys can use a file. There is a wide range of effective pressure with this tool, the only difference being that with a low pressure the work proceeds slowly.

The stooping position in wood work does not seem so healthy as the more upright position usually maintained at the vice; and when boys are beginning there are fewer complaints about backache and headache among the metal workers than among the wood workers. Perhaps it will be found that the slight knowledge of machines gained by the pupil, and especially the knowledge that they are dangerous to the thoughtless or careless,

will be in the future a kind of "insurance" against accident. This is, in the light of recent legislation, a matter of some importance to both employers and employed.

General Method of Work.

A careful drawing of the work is made under the direction of the manual instructor. The tools to be employed in the work, the method of using them, and the reasons for the method are next explained. Practical demonstrations are frequently given, while pitfalls and dangerous methods of working are specially dwelt upon. If the material which is to be used is new to the boys, its properties are described, and an elementary account is given of its manufacture. The work is "marked out" and finished at the bench under the constant supervision of the teacher, so that bad methods of working are checked, and good habits fostered. Finally, all work is submitted to the teacher's inspection, and none is passed which is not accurate to the given dimensions.

Drawing.

It seems necessary to say that there is not a "special" manual training drawing. The instruments used should be those commonly required in a drawing office, viz., drawing board, T-square, set squares, scales, compasses, and dividers. As far as possible, the exercises should illustrate and enforce principles of geometrical drawing, although it should always be borne in mind that workmanship is the first consideration. There is little doubt in my own mind that the drawing for many exercises in filing, &c., may very well involve ideas on *loci*, on methods of describing regular polygons, and so on, without interfering in any way with the due practice in the proper use of tools.

Practical Demonstrations.

Even such simple work as is done in the manual training shop will often be greatly furthered by a good knowledge on the part of the teacher of the newest and best methods of operation in large shops. As a rule, these are the result of great experience, and generally speaking, are the best. Everything, however, must be taught rationally; that is, a pupil should not work in a certain way because he is told to do so, but because the reasons for working in that way have been made clear to him.

Outline of Course of Instruction.

The following course of instruction has been found to answer fairly well with most boys, but all such courses should be interpreted liberally. There are born workmen as well as born poets, and unfortunately, there are people born whose fingers seem mostly thumbs. Both classes should be fairly treated in the manual training shop, and should not be made slaves to any course. Apart from the personal factor, which is not by any means small, the amount of time given to the work will generally determine the extent of the course. In every case, one can, with perfect fairness, insist on accuracy, and on the production of evidence that the work is being done with both head and hand.

The first exercise set is to file a straight edge on a piece of thin sheet metal. As a rule, we use mild steel for exercises in sheet metal because it bends much better when cold than sheet iron. Next follows two edges at right angles, then parallel edges, then a rectangle. The rectangle may be used as the basis of a rule, the marking of which gives good practice with the scribing block and marking-off table. A great variety of useful exercises may be set in sheet metal. Exercises are frequently set in the making of external templates or gauges, followed by others in the making of internal templates or gauges, so that by checking one piece of his work with another a boy may have an object lesson in the meaning of accuracy. In all cases the work is carefully marked, the lines centre popped, the metal cut to within one-sixteenth of an inch of the centre pops, and then straightened before the file is used. Photographs of a few exercises of this kind are shown below (Fig. 1).

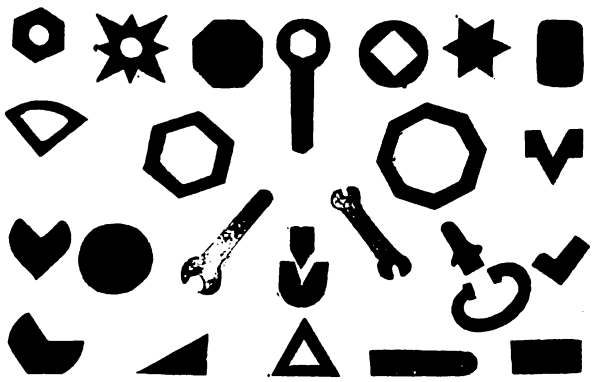

Fig. 1.—Preliminary Exercises in Metal Work.

The next series of exercises involves the use of the drilling machine. The lathe is also used as a drilling or boring machine, and the use of soap and water, or oil, is explained. Before drilling a hole, the centre is carefully centred, a circle the size of the hole to be drilled is scribed with the dividers, and a few centre pops made round the circumference, so that the drill may be kept true to the centre. Many of the exercises involve the building up of an article from the parts which have been filed up, drilled, and cold riveted together. Where bending is necessary, the pupils are required to make allowance for the thickness of the metal. Joints of various kinds are formed by cold riveting as single-riveted lap-joints, single or double-riveted butt joints with single or double straps. Plates are connected at right angles to each other by flanging, and by the use of an angle bar.

The next photograph (Fig. 2) shows the various steps in a somewhat elaborate exercise in sheet metal, viz., the making of a flower-pot vase. There are thirty-one pieces in this article; and there is no doubt that the pupils enjoy the work more when they feel that they are making something.

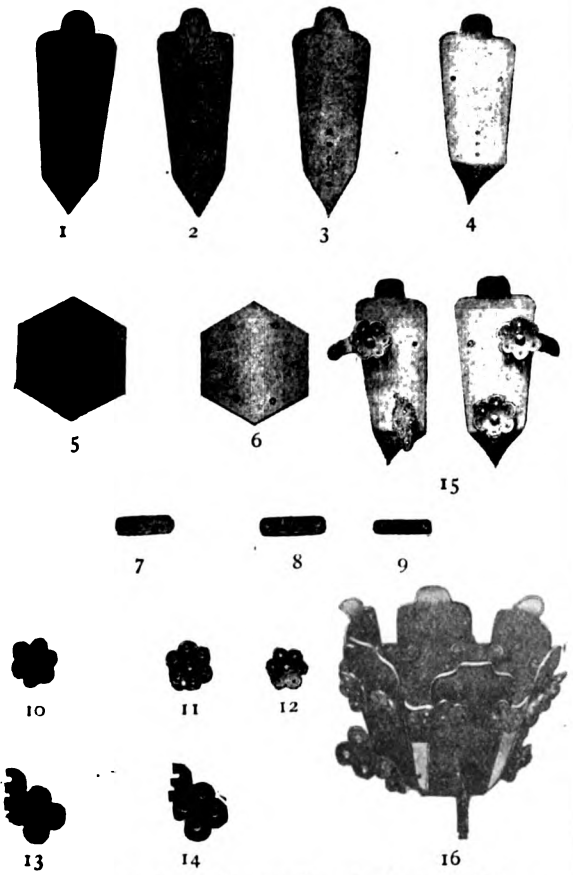

FIG. 2.—Steps in the Construction of a Flower-pot Vase.

SIDES (6). — 1. Marking and cutting out. 2. Drilling. 3 and 4. Drilling and Bending.
BASE (1).—5. Marking and cutting out. 6. Drilling.
COUPLINGS (6).—7. Marking and cutting out. 8. Drilling. 9. Bending.
ROSES (15).—10. Marking and cutting. 11. Drilling and Chamfering. 12. Pressing.
FEET (3).—13. Marking and cutting out. 14. Drilling and Chamfering.
15. Building up. 16. Complete vase.

Up to this point the work is done pretty well in the order stated; but the exigencies of a shop make it impossible to keep the whole of a class at the same work throughout the course, so that the order from this point is a matter of convenience. Exercises are set involving chipping and filing, the filing being of a much more exacting kind than that done on sheet steel, and leading up to scraping and surfacing, *e.g.*, making a cube of given dimensions, or a small surface plate from a casting. Forging of an elementary kind is done, such as drawing out a flat chisel or a punch, bending and welding a ring, making a simple holdfast, and so on, while the method of tempering and hardening tools is explained and practised. A few simple exercises in moulding and casting are given, and the examples, if in brass, are afterwards finished at the bench. At first the casting is done in lead for the sake of the practice in moulding. It has been found practicable, however, to obtain good castings in brass by means of a very simple furnace. Casting in iron seems impracticable without special arrangements, which are not suitable for a manual training shop.

Exercises are set involving tapping, drilling and screwing with stock dies and taps, *e.g.*, a bolt and hexagonal nut, a carrier for the lathe, and so on. Some turning is done on the lathe, both by hand and slide rest, and there is also some screw cutting of a fairly simple kind. A few simple exercises in soft soldering and in brazing form a part of the regular work. The photograph below (Fig. 3) will

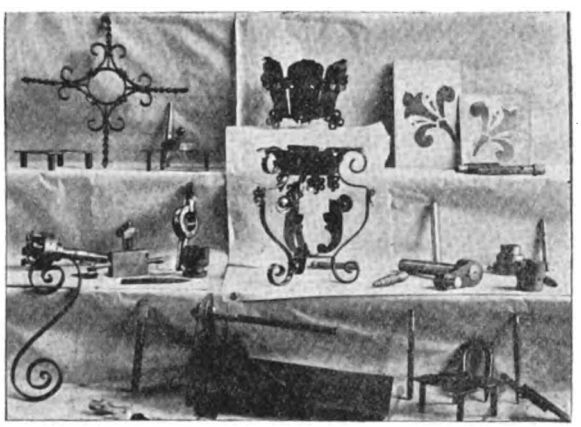

FIG. 3.—Specimens of Metal Work.

perhaps show the kind of exercises done more clearly than any merely verbal explanation. Special work has occasionally been done with good boys, as for example, the machining and fitting together the castings to form a small gas-engine; but this is not fairly considered a part of the course of manual training, although clearly a very valuable bit of work when possible.

THE WORKSHOP.

One serious objection I have to my own workshop, viz., that the forges are in the main room. They are better placed in a separate room, as, in summer especially, they are apt to make the room uncomfortably warm for everybody. The noise also is sometimes very great. It is most important that the shop be well lighted, from the roof if possible; and the light should come from the right of the worker. Otherwise, it is apt to dazzle, and make it hard for him to see the lines which he has scribed. The most important furnishing is the fitter's benches. Those in this shop are made of red pine centrally, the outside planks being American birch, a wood which stands a good deal

of jarring. To the birch planks the vices are bolted, while the whole top rests on iron trestles. There is a distance of three clear feet between each vice. It is not necessary to have the heavy vices commonly used by fitters. Lighter vices will do for boys. As a rule, the vices should be of a size suitable for the bigger lads, as it is a very easy matter to make a few broad, firm stools for the smaller boys.

Each bench is provided with a separate set of tools; and we have found it convenient to have them arranged in a lockfast drawer, somewhat after the manner of the sketch below (Fig. 4), in which the tools are shown lying at the bottom of the drawer, which has been separated into compartments by lengths of ¾-inch wood. It is then easy for the teacher to take a rapid look round to see

Fig. 4.—Drawer with Tools.

that everything is in its place before locking up. The responsibility for losing or misplacing tools is soon fixed in this way. Each drawer contains a square, a straight edge (which should show tenths, as well as the common English divisions), a 10-inch hand file, a fitter's hammer (about 1lb.), a scriber, a centre punch, compasses, outside and inside calipers, and a flat chisel.

Additional tools are required, and a supply of these is always kept at hand for the use of the class, and given out when needed, *e.g.*, various kinds of files, crosscut and flat chisels, larger squares, small surface plates, &c.

Of the larger tools and machines which are used the following are the chief, and the quantities given are sufficient for a class of twenty-four boys:—

Two lathes (fitted for screw cutting).
One drilling machine.
One shearing machine.
One fly press.
Three surface tables with scribing blocks and accessories.
Two moulding troughs with moulding boxes and moulder's tools.
A set of stocks, dies and taps,
Blowpipe and foot-blower for brazing.
Two forges, with sets of smith's tools.

The teacher should have a complete set of smith's tools; but as the boys can do only elementary forging, the tools for that purpose alone are necessary.

With a metal-working shop there is a large initial expense. This is unavoidable if the work is to be done under good conditions. Probably the initial expense is four times as great as that of a wood-working shop for the same number of boys. The maintenance is, however, much more reasonable, averaging little more than one-third of the cost for wood work, so that, in course of time, the iron work would be, for many places, not only the better form of training, but also the cheaper. However, that condition will only be brought about in the course of years. After watching the work here with a good deal of care and interest, I feel that it has been not only good in itself, but that it has reacted beneficially on all the work in the school, brightening much of it, and lifting it out of the region of the theoretical, while helping to leaven everything with the spirit of accuracy.

As the aim of manual training is twofold, first to train, and secondly to train in the direction most likely to be helpful when school life is over, it is probable that the course of work and the arrangements described here will be unsuitable in a good many cases. Under different conditions, work in metal might take quite another direction; but here in Birmingham mechanical engineering is of such importance that in a metal shop its processes are naturally adopted as the most fitting instrument of training.

Scholarship Examinations.—The movement which was already afoot last year for the unification of a large number of scholarship examinations, especially of those which are intended to serve for the award of County Council, Trust and School Scholarships, continues to develop. The management of the scheme is in the hands of the Joint Scholarships Board instituted by the Incorporated Association of Head Masters. This Board include representatives of thirty-two educational aud administrative bodies, and, through three committees for major, intermediate and minor scholarships respectively, tested the fitness of more than 7,000 candidates in the year 1898. The bulk of these candidates competed for minor scholarships, offered by no less than eighteen County, four Borough, and three Urban District Councils, by twelve Educational Trusts, and by thirty-six secondary schools. The Intermediate Scholarships Committee have this year examined on behalf of six County Councils—Essex, Hertfordshire, Kent, Leicestershire, Surrey and Wiltshire; while the Major Scholarships Committee have conducted examinations for the County Councils of Kent and Surrey, for Holloway College, and for a Board of Trustees.

THE PROBLEM OF TEACHING TO READ.

By A. SONNENSCHEIN.

"She could read any English book without much spelling."
—OLIVER GOLDSMITH.

THE problem of teaching to read has in this country occupied the attention and taxed the ingenuity of teachers for more than one generation, and in different countries abroad for more than 150 years, and it is very gratifying to notice that very great progress has been made. In the present discussion of the problem let it be understood that we are dealing solely with the skill of "instant recognition of words," or with mere mechanical reading.

THREE METHODS AVAILABLE.

There are three, and only three, methods of teaching to read:—

(1) The literal method; or, reading by spelling.

(2) The syllabic method, commonly called the "phonic" method.

(3) The verbal method; or, "the look-and-say" system.

Which of these three we are to adopt depends on the language we have to teach. A language like Italian, the orthography of which is phonetic, or German, which is largely phonetic, is best taught on the literal method (provided reading be derived from speaking), because the letters are the true elements of the language. In a language like English or French, where simple sounds are often represented by combinations of letters, the true elements[1] of the language are syllables, and the syllabic method alone is applicable.

THE VERBAL, OR "LOOK-AND-SAY," METHOD.

The verbal, or "look-and-say," method is only fit for Chinese, where every word has a symbol of its own. Of its disastrous effects in English the reader can judge from the evidence of Mr. T. Hopper, B.A., head-master of the Wornington Road, North Kensington, School, given before the Committee of the School Board for London on October 29th, 1877, and of Mr. Mackenzie, H.M.I., given on Monday, November 12th, 1877. Mr. Hopper is asked (No. 499): "You teach really by a combination of systems?" and he answers: "I do not trust much to the 'look-and-say' system; in fact, I do not find that when children have been taught on that system they are really able to read when they come to me. If they happen to have been reading books that I am using, I find that they have so learnt the lesson by heart as to be able to say it without looking at the book, and if they are stopped in the middle of their reading and asked to point out the word they stop at, they are lost, and have no means of discovering it."

Mr. Mackenzie says (No. 648): "A few years ago the reading was not at all satisfactory (in the Finsbury Division), and it was found that this was mainly owing to the very general adoption of the 'look-and-say' method of teaching, and the use of elementary lesson-books not constructed on correct principles for teaching reading."

ITALIAN WORDS EASILY READ.

Take, for example, the Italian words, *finestra* and *buco*; the German words, *Ast*, *Ente*, *Kind*, *Hof*, *Uhu*; the French words, *maison* and *bienvenu*; and the five English words, *bat*, *bet*, *but*, *pot*, *but*. These are all words of *regular notation* in their respective languages, the anomalies requiring to be dealt with separately, partly during, but mainly at the end of the course.

If the Italian teacher points to the window and asks its name, the child will answer, "*finestra*." Being required to pronounce the word slowly, he will say, "*fi-ne-stra*." Pursuing this analysis still further, the teacher can easily resolve these three syllables into their ultimate elements, f', i, n', e, s', t', r', a; similarly from *buco* (hole) he obtains *b'u*, *c'o*. Thus from two familiar words the child can be taught the functions of five vowels and of seven consonants, viz.: *b*, *c*, *f*, *n*, *r*, *s*, *t*. From these the teacher can form scores of words, and even sentences, such as *fata*, *ante*, *asino*, *bene*, *battere*, *naso*, *casa*, *cosa*, *con*, *contra*, &c.; *io sono a casa*, *tu non sei a casa*; *con un asino non si fa niente*, &c. By the introduction of three or more familiar words, the child can be taught all the letters of the alphabet; first, of course, functionally, and nominally afterwards. Then the teacher has only to deal with the two sounds of *c* and *g*, with a few easy combinations, such as *gn*, *gl*, &c., with the difficulty of the two sounds of these in such words as *scaldare* and *scegliere*, with the *w* sound of the *u* in *uomo*, *guanto*, &c., and the silent *h*.

Italian children are reported to learn to read in three or four months, and this seems quite credible, seeing that the problem is all but free from complications.

COMPARATIVE SIMPLICITY OF GERMAN.

Teaching to read German is nothing like as easy, but still, compared with French and English, it is a simple problem. The five words given above teach the five simple vowels and seven consonants, viz.: *s*, *t*, *n*, *d*, *f*, *h*, *k*, and from these many words and some sentences can be formed, *e.g.*: *Hund*, *Hand*, *Hanf*, *Henne*, *Kanne*, *Tanne*, *Tenne*, *Hut*, &c.; *finden*, *fand*, *kann*, *kennen*, *kannte*, *konnte*, &c.; *das Kind ist da*; *es ist da*, *ist es da*? *Das Kind fand den Hund*, *es kann den Hut finden*, &c. By the introduction of a few more words the whole alphabet is taught functionally, not nominally; but this by no means solves the whole problem placed before the German teacher. He has yet to deal with the lengthening of the vowels, which with

[1] "Les véritables éléments des mots sont les syllabes." Lamotte, Perrier, Meissas and Michelot's "Méthode de Lecture sans Epellation," ouvrage adopté par l'Université Royale de France.

four of them is done in *two* different ways, with the modified vowels, viz., *ä*, *ö*, *ü*, with the vowel combinations or diphthongs, and the consonantal combinations such as *ch*, *sch*, *sp*, *st*, &c., and lastly, with a large number of anomalies.

Literal Method Inapplicable to French and English.

When we come to French and English, the literal method *pur et simple* is wholly inapplicable. The German teachers found that out when in Alsace-Lorraine they tried to apply the literal method to French. By no contrivance could they resolve the two-lettered word *on* into more than one elemental sound. "Maison" can be resolved into *m'ai*, *s'* and *on*; "*bien*" into *b'* and *ien*, and so on. And then there come numerous anomalies, such as: *o*, *oh*, *os*, *au*, *aux*, *eau*, *eaux*, all having the same sound. Again, *au* has two sounds, as in "Paul," which rhymes with *doll*, and *épaule*, which rhymes with *toll*, and so on. Next the French teacher has to deal not only with silent letters, but even with silent syllables, which moreover are not always silent; thus "*ent*" is read in "*parlement*" but not in "*parlent*." Then comes the difficulty of the liaison, which is peculiar to French; thus in "*à lui et à moi*," the *t* of *et* is not carried on, and in "*c'est à moi*" the *t* of *est* is carried on. In fact, to surmount some of these difficulties thoroughly requires already some knowledge of grammar, a study belonging to a later stage. Verily the French elementary teacher has a far more difficult task set him than his English colleague.

The Syllabic Method Applied to Teaching to Read English.

Now we come to our own problem—to English. It will be seen that the syllabic method is the only possible foundation from which most of our words can be built up.

The suffixes *tion*, *sion*, *ous* and others must admittedly be treated as wholes, analysis into letters being out of the question; but in simpler words, such as *girl* and *sash*, it is clear that *i*, *r*, *l*, no more than *e*, *a*, *r*, *l*, lead to the sound *earl*, nor do *a*, *s*, *h*, lead to *ash*, and so on; *ir* and *irl*, and *ash* are the molecules from which the words must be constructed. Even the five monosyllables *bat bet*, *bit*, *pot*, *but*, given above, cannot possibly be built up from the letters, not only because the names of the letters are misleading, but principally because it is impossible for an untrained ear to differentiate between the short *a*, *e*, *u*, in *at*, *et*, and *ut* without the retention of a terminal consonant. We are thus driven to admit that the English elementary teacher has to deal mainly with the combinations of letters called syllables. This is a more complex problem and a more protracted process; but it is gratifying to think that the anomalies that present real difficulties to the teacher constitute an unexpectedly small percentage of the language.

If my readers have gone with me so far, they will agree with me that the syllabic method must be adopted in teaching to read English; and we should do so, not only at the beginning of the course, but right through whenever a difficult word presents itself. A few instances will exemplify the process.

Selected Applications of the Syllabic Method.

Let us suppose that in the early part of the course the word "midshipman" occurs, and that the child, scared by the long word, stops. The painstaking teacher will not tell the child the word, for *mere telling is not teaching*, but he will proceed somewhat in the following manner: He will write on the blackboard *id*, and the child or class (as the case may be) reads *id*; next the teacher prefixing *m* writes *mid*, and the class reads *mid*; next the teacher adds the syllable *ip*, thus *mid-ip*, and the children read only *ip*; next prefixing *sh* to *ip* the blackboard shows *mid-ship*, and the children read *ship*, *midship*; next the teacher adds the syllable *an*, and the board exhibits *mid-ship-an*, and the children only read *an*; next the teacher adds *m* to *an* and the board shows *mid-ship-man*, and the children read "*man*, *midshipman*." The word then grows thus: *id-mid*, *ip-ship*, *midship*, *an-man*, *midshipman*. Similarly "appendix" will grow thus: *ap*, *en-pen*, *appen*, *ix-dix*, *appendix*. Thus the teacher should by direct synthesis lead the child to build up the word, and to vary the process the teacher may occasionally give the whole word and ask the child analytically to justify his reading. Of course, with unfamiliar words there will still remain the question of the accent; thus I knew a child that in *appendix* laid the stress on the first syllable. In the matter of the accent I am afraid the teacher can only *tell*, not *teach*. In the division of the words into syllables the teacher will have to guide himself by the sound rather than by the etymology of the word; thus in "edification" the division into syllables for our purpose must be *e-dif-ic-a-tion* and not *e-di-fic-a-tion*. Similarly "Polish" may be the adjective of "Pole," and then the *o* being long, the word should be divided into *Po-lish*, but if it be the verb *polish* (to make bright) or its noun, the syllables are *pŏl-ish*.

Being agreed on the method to be adopted, we have yet to establish some general principles. We may agree on a few simple canons for our guidance.

Summary of Principles.

(1) Before the child is taught to read, he should be taught to observe correctly, and above all, to speak with great distinctness.

(2) We must deal with only one difficulty at a time.

(3) The difficulties must be carefully graduated accordingly.

(4) The simple constructions must be taught

and fully mastered before the complex are taken in hand.

(5) Regularity must precede irregularity; in other words, anomalies must, with few exceptions, be taught at the end of the course; and lastly—

(6) It is, though not indispensable, yet very desirable, that reading and writing print should be taught simultaneously, because these are studies complementary to each other, and mutually helpful. A clear and precise knowledge of the shape of the letters is secured by imitation only.

A METHOD OF MARKING.

By W. J. GIBSON, M.A.

Nicolson School, Stornoway, N.B.

THE necessity of adopting some system of marking presents itself to most masters of secondary schools. It is a part of the teacher's work which is beset by many difficulties. An acquaintance with the various systems in use gives one an opportunity of recognising in them the points which are bad and appropriating those which are good. Thus, by a judicious eclecticism each may gradually perfect the system which suits his particular needs.

Mr. Eve's contribution to the literature of the subject, in his lecture "On Marking" (Pitt Press), is well known to teachers for its statement of the difficulties of this branch of the master's work and of how they may best be overcome.

It is becoming increasingly interesting to teachers to hear how their brethren in other countries deal with the problems that are common to all, and it is proposed in this article to give a short account of the system of marking followed in the Boys' Latin School, Boston, Mass., one of the best of the American secondary schools. The writer's acquaintance with the school was made several years ago, but he does not anticipate that there has been any material change since that time.

BOYS' LATIN SCHOOL, BOSTON, MASS.

The school is one of the oldest in the United States, dating from 1635. It is thus only some seventy years younger than Rugby and Harrow, and has an unbroken tradition of 260 years. It has always been closely associated with Harvard University, which was founded one year later than the school. It is a day-school attended by about 500 boys, who are all understood to be preparing for the universities. The boys join the school at the age of twelve, and remain for six or seven years. The course is a classical one, with instruction also in English literature, mathematics, French and practical science. The magnificent building in which the school is now housed is a model of what a school edifice should be. Each class-room accommodates from 30 to 40 boys, who are seated at "individual" desks. Place-taking, therefore, forms no part of the system of marking. Every lesson taken orally is marked by each master at the time, and written exercises are corrected by the masters either during study-time (one hour *per diem*) or after school hours.

A METHOD OF MARKING ORAL WORK.

The method of marking the oral work is as follows:—One boy is taken; he construes and answers whatever grammatical or other questions may be put to him on the passage; the master then enters on his mark-sheet his judgment on the exercise, expressed on a scale of 5. If the boy shows that he has prepared his work satisfactorily he receives the mark 3; if commendably, 4; if with conspicuous excellence, the full 5. So, on the downward scale, if the work is barely up to pass mark, 2 is awarded; if poorly done, 1; if badly done, or not prepared, 0. All the boys in the class cannot be "put on" during the duration of an ordinary lesson, but those omitted one day are taken up at next day's lesson, or the next. It would, however, be discouraging for a boy who had carefully prepared his work for the day to have no opportunity of showing that he had done so.

BRIEF WRITTEN TESTS.

This difficulty is obviated, and careless preparation prevented, by a system of brief written tests that is a conspicuous feature of the work of the school. If the lesson is to last, say, fifty minutes, forty of these will be occupied with the oral testing of individual pupils and with the teacher's explanation of difficulties; the remaining ten minutes are devoted to a written test on a few of the conspicuous points of the lesson. The teacher gives such questions as can be answered in a few words—an idiomatic phrase may be asked for, the meaning of a mythological allusion, the explanation of some syntactical peculiarity. He waits until each has written his answer, then gives the next question. The answers are numbered in order as given, and seven or eight such answers can be written in as many minutes. Such a test, judiciously selected, necessarily detects careless preparation. The master collects the slips of paper, and examines them after school. The whole exercise is understood to carry 5 marks, and when the questions have all been of about equal value, 1 is deducted for every wrong answer. If one question is of greater difficulty than the others it may carry a double mark. As there are seven or eight answers in all, those who have only two or three correct out of the whole receive, as they deserve, a zero mark. If an exercise has been given of considerable difficulty a possible mark of 10 may be given; but such marks would be recorded in two columns in the master's mark-sheet; for example, 7 would be entered as 4 and 3.

In this way the marks are kept on a uniform scale of 5. The exercises are returned at the next lesson with their values marked. If a boy wishes to see what mark has been awarded to him for the work taken orally, he may do so by coming to the master at any interval. Written exercises of a more elaborate kind, such as compositions, may carry a higher mark than those of the kind already mentioned, *e.g.*, 20, but the maximum taken is always a multiple of 5. These will be marked by their general excellence rather than by deduction, but blunders of a gross kind naturally have their weight in determining the value by general impression. The frequent written exercises entail a good deal of correction work on the masters, but the gain is considered sufficient to make it well worth the pains, and a batch of short answers of the kind indicated can be corrected quickly.

Reduction to Percentages.

The marks obtained in each subject are summed at the end of each month, and reduced to percentages. These are entered in the reports which are issued to the parents at the end of each month. The standard of marking is such that less than 50 per cent. in a subject indicates weakness, 60 to 69 per cent. is regarded as "good," 70 to 79 as "very good," 80 and over as "excellent." The reports, after being filled up by the form-masters, are all seen by the headmaster before being issued, and are compared with the previous month's, to see whether the boy's work is improving or deteriorating. If several subjects have fallen below the pass-mark (50 per cent.) an entry is made on the report to the effect that the boy is "on probation" because of deficiency in those subjects. If after a month's probation his record shows no improvement, he is, on the vote of the masters who are responsible for his work, either sent down to the next lower class or given another month of probation.

Approbation Cards and Leaving Certificates.

In order to encourage those who are doing conspicuously good work, "Approbation" Cards are issued each week to those who during that time have not, on any occasion, in any subject, fallen under 3 out of the possible 5. At the end of the school year, examinations on the work of the year are held to determine promotions and the award of the "diploma," or Leaving Certificate, to members of the highest form.

The system of marking works very well, and gives due recognition, not only to the clever boy, but to the plodder who conscientiously prepares his daily lesson. The same method of marking is used by all the masters, and they try to keep a uniform standard. In this way, by the common use of a constant scale, considerable uniformity of judgment is attained, and a definite standard of value becomes established in the minds both of masters and boys.

Merits of the System.

The chief merits of the system are its simplicity, its uniformity, the readiness with which five grades of value can be held in the mind—quite impossible for a large number of grades—and the ease with which the marks can be recorded. In a school where importance is attached to monthly or other periodic examinations, the system described could readily be adapted by having the percentage of the daily marks count for half, and the percentage obtained in the monthly examination for half, in finding the total. It would suit just as well for Reports issued each term as for those issued each month, the only difference being that the marks would be continued over a longer period, and that the results of the several examinations in each subject would be summed and reduced to one percentage before being combined with the daily marks.

THE SCHOOLS OF PUBLIC MEN.

IV.—Men of Science.

A CONSIDERATION of the early training of men of science impresses upon us two facts: first, the large number who received an education of a private or semi-private character; second, the small number educated at any one centre. Indifferent to latitude and longitude, oblivious of the glamour of the great public school, the genius of Science grows apace on his native heath—thriving the better, no doubt, if his environment is favourable; but, even when all around is apparently to his disadvantage—still thriving. The more unfettered his position the more vigorous his development. In a small private school, with but one mind to dominate him, he pursues more surely the scientific method than where confused by the conflicting leadings of many preceptors. But under a carefully selected private tutor he does best of all. In such circumstances he progresses, perhaps, by but "slow degrees," yet by "more and more" towards the goal of the knowledge of things as they are.

Of 250 representative men of science, we find that 48, or nearly one-fifth, received their early education either in private schools or at home under tutors. In Mr. Herbert Spencer we have an instance of the latter. He was educated partly at home and partly by an uncle, Rev. Thomas Spencer, M.A. Another example of home training is that of Professor G. H. Darwin, who was educated under Rev. Charles Pritchard, himself subsequently F.R.S. and Savilian Professor of Astronomy, University of Oxford. Among others educated at home or at private schools we may specially note:—

The Duke of Argyll; Mr. Shelford Bidwell, Vice-President of the Physical Society; Prof. R. B. Clifton, Professor of Experimental Philosophy, University of Oxford; Rev. W. H. Dallinger, Past-President (4 years) Royal Microscopical Society; Prof. G.

F. Fitzgerald, Professor of Natural and Experimental Philosophy, University of Dublin; Sir Joseph Fayrer, Hon. Physician to H.R.H. Prince of Wales; Sir J. Norman Lockyer, Professor of Astronomical Physics, Royal College of Science, London; Prof. R. Meldola, Professor of Chemistry in Finsbury Technical College, London; Prof. E. B. Poulton, Professor of Zoology, University of Oxford; Prof. H. G. Seeley, Professor of Geology and Mineralogy, King's College, London; Sir Henry Thompson, Consulting Surgeon to University College Hospital, London; Prof. T. E. Thorpe, Director of Government Laboratories, London; Sir William Turner, Professor of Anatomy, University of Edinburgh; Prof. S. H. Vines, Sherardian Professor of Botany, University of Oxford; Sir E. Leader Williams, Consulting Chief Engineer, Manchester Ship Canal.

There are two ladies who have earned a place in our list of celebrities, viz:—Dr. Elizabeth Garrett Anderson and Dr. Elizabeth Blackwell. Both were educated privately, and both are distinguished as pioneers in the cause of medical degrees for women.

Amongst the schools, the first place is taken by **Edinburgh High School,** which contributes 10 well-known men of science.

Of these may be noted:—

Prof. A. Crum Brown, Professor of Chemistry, University of Edinburgh; Prof. J. Cleland, Regius Professor of Anatomy, University of Glasgow; Sir Archibald Geikie, Director-General, Geological Survey of United Kingdom; Sir D. Maclagan, Ex-President, Royal Colleges of Physicians and Surgeons, Edinburgh; Sir T. Grainger Stewart, President British Medical Association.

Edinburgh Academy runs a close second with nine names, including—

Prof. I. Bayley Balfour, Professor of Botany, University of Edinburgh; Prof. J. Chiene, Professor of Surgery, University of Edinburgh; Prof. P. G. Tait, Professor of Natural Philosophy, University of Edinburgh; Sir J. B. Tuke, President Royal College of Physicians, Edinburgh.

Aberdeen Grammar School follows with seven names, and among them—

Prof. G. Chrystal, Professor of Mathematics, University of Edinburgh; Sir J. Reid, Physician-in-Ordinary to H.M. the Queen; Prof. J. W. H. Trail, Regius Professor of Botany, University of Aberdeen.

The **City of London School** and **King's College School,** London, have each six distinguished men of science. From the former come—

Sir William Huggins, Astronomer; Dr. W. H. Perkin, distinguished for numerous researches in Chemistry; Dr. W. H. Perkin, Junr., Professor of Organic Chemistry, Owens College, Manchester; Prof. W. J. Sollas, Professor of Geology and Palæontology, University of Oxford.

From King's College School we have quite a number of great even among the great. Several other men of science who give King's *College* as their place of education are, we suspect, also *alumni* of the *School*. But six we know to be from the latter, including:—

Mr. W. H. M. Christie, Astronomer-Royal; Mr. W. H. Preece, late Electrician and Engineer-in-Chief, General Post Office; Sir W. T. Thiselton-Dyer, Director Royal Gardens, Kew.

Eton, Harrow, and **Rugby** succeed with five names each. We are indebted to Eton for—

Rt. Hon. Sir John Lubbock; Prof. H. A. Miers, Professor of Mineralogy, University of Oxford; Prof. G. R. Murray, Professor of Pathology, University of Durham.

From Harrow comes—

Sir H. W. Acland, Regius Professor of Medicine, University of Oxford.

And Rugby furnishes—

Mr. R. H. Scott, Secretary Meteorological Council; Mr. V. H. Veley, Public Lecturer and Demonstrator in Chemistry, University of Oxford.

Three other schools follow with four names each, viz:—**Liverpool College, Royal Institution School (Liverpool),** and **St. Paul's**:—

Principal Glazebrook, Physicist, of University College, Liverpool, is from Liverpool College, as is also Prof. A. R. Forsyth, Sadlerian Professor of Pure Mathematics, University of Cambridge. Prof. S. Young, Professor of Chemistry, University College, Bristol, is from the Royal Institution School. From St. Paul's comes Prof. E. Ray Lankester.

Each of the following schools has three names to its credit:—Belfast Institution, Dollar Academy, Edinburgh Institution, Glasgow High School, Grove House School (Tottenham), Perth Academy, Rossall, and St. Peter's School (York):—

Prof. J. Dewar, Professor of Experimental Philosophy, University of Cambridge, is from Dollar Academy. Prof. E. B. Tylor, Professor of Anthropology, University of Oxford, is from Grove House School, Tottenham. Sir J. D. Hooker, late Director of the Royal Gardens, Kew, is an *alumnus* of Glasgow High School. Sir William McCormac, Surgeon-in-Ordinary to H.R.H. Prince of Wales, is from Belfast Institution. From Rossall we have Captain W. de W. Abney, Director for Science, Science and Art Department; Prof. W. Boyd Dawkins, Professor of Geology and Palæontology, Owens College, Manchester; and Sir H. H. Howorth, Vice-President Society of Antiquaries.

Sixteen schools furnish two leading men of science each. They are Ackworth (Yorks), Addiscombe, Bedford, Bristol College (Dublin), Cheltenham College, Cheltenham Grammar School, Clapham Grammar School, Dundee High School, Glasgow Academy, King Edward's School (Birmingham), King's School (Canterbury), Marlborough, University College School (London), Uppingham, Westminster, and Winchester. The following are some of the principal *alumni*:—

Prof. W. A. Tilden, Professor of Chemistry, Royal College of Science, London (Bedford); Sir G. Gabriel Stokes, Lucasian Professor of Mathematics, University of Cambridge (Bristol College, Dublin); Prof. A. W. Rücker, Professor of Physics, Royal College of Science, London (Clapham Grammar School); Prof. J. A. Ewing, Professor of Mechanism and Applied Mechanics, University of Cambridge (Dundee High School); Prof. W. Ramsay, Professor of Chemistry, University College, London (Glasgow Academy); Mr. Francis Galton, Anthropologist (King Edward's School, Birmingham); Prof. W. E. Ayrton, Professor of Physics, City and Guilds' Technical Institute (University College School); Prof. Michael Foster, Professor of Physiology in the University of Cambridge (University College School and Huntingdon Grammar School); Rev. Prof. T. G. Bonney, Professor of Geology, University College, London (Uppingham); Sir Clements R. Markham, President Royal Geographical Society (Westminster).

At least fifteen of our leading men of science received their early education abroad. Among them we note :—

Dr. Ludwig Mond, Vice-President Royal Institution, educated at Cassel Polytechnic School, Germany ; Dr. Albert C. L. G. Günther, President Linnæan Society, educated at Stuttgart Gymnasium ; Dr. Sprengel, inventor and discoverer, educated at a school in Hanover ; Sir John Murray, who began his education in Victoria College, Ontario, and continued it at Stirling High School, Scotland.

Some seventy leading men of science were educated at as many separate schools. The following are among them :—

Sir W. H. Broadbent, Physician-Extraordinary to H.M. the Queen (Huddersfield College) ; Sir E. Frankland, Hon. Foreign Secretary, Royal Society (Lancaster Grammar School) ; Sir R. Thorne Thorne, Principal Medical Officer to Local Government Board (Mill Hill Grammar School) ; Sir Robert S. Ball (Abbot's Grange, Chester) ; Mr. Charles J. Joly, Royal Astronomer of Ireland (Galway Grammar School) ; Sir H. E. Roscoe (Liverpool High School) ; Prof. J. W. Judd, Dean of Royal College of Science, London (Camberwell) ; Dr. A. Russel Wallace (Hertford Grammar School) ; Prof. Silvanus P. Thompson (Bootham School, York, and Flounders' Institute, Pontefract) ; Sir J. Wolfe Barry (Glenalmond) ; Sir F. J. Bramwell (Palace School, Enfield) ; Sir John Evans, Past-President British Association (Market Bosworth School) ; Prof. Oliver J. Lodge, Professor of Physics in University College, Liverpool (Newport Grammar School, Salop).

By the courtesy of Lord Lister, President of the Royal Society, we are able to state that he was at two schools of the Society of Friends : that of the accomplished scholar and excellent master, Isaac Brown, at Hitchin, Herts, and that of Thomas Binns, of Grove House, Tottenham, which we have already mentioned. He was at the former from the age of 11 to 14, and at the latter for three years immediately subsequent.

The school training proper of Lord Kelvin was very brief, as he entered Glasgow University at the age of eleven.

INTERNATIONAL CORRESPONDENCE AS AN AID TO LANGUAGE TEACHING.

THE study of modern languages naturally divides itself into two parts—the spoken language and the written ; and there is no royal road to learning for either. The dictum of the old professor still holds good : If you want to speak—talk ! If to write—practise writing ! The question which concerns us just now is :—whether to write a language well, it is preferable to keep to exercises such as are to be found in the usual class books, or to add to this another kind of practice in composition ? To those who think that no student can become proficient in a language unless he somehow learns to express his thoughts in it, an exchange of letters between French or German and English boys will need no recommendation. Yet even these may answer : of course it would be a good thing, but boys never can be persuaded to write letters. The fact that during the last two years, owing to the good offices of the *Review of Reviews* and the *Revue Universitaire*, more than 2,000 boys and 1,200 girls in British secondary schools have been placed in correspondence with foreign scholars, shows that even a boy often prefers a letter to an exercise. There are several reasons for such a preference. Boys like to learn something of the lives of other boys. Moreover, our boys regard it as fun to receive the laughable attempts made by the over-the-sea boy to express himself in English—as, for example : "I come to receive your address and I am very happy of you have like correspondent, of this manners we shall learn to correspond with facility. I am a pupil of the middling school and I should like to know written and speech the English language. There is two years that I have visit London for 4 days and I am very well amused my self. There is more movement than here. I hope to return in few years and then I shall you render a visit. In waits a answer, I am to you."

In addition to such considerations it must be borne in mind that some boys do really want to improve, and a boy will often ask a comrade a question which he would not ask a teacher. There is little room to doubt the utility of this system of International Correspondence. The very fact that from secondary schools in this country every term brings new lists from the same masters is a fair proof of the popularity of the system. The letters which have been received by those who are in charge of the interchange, too, from teachers of modern languages, testify to its usefulness. The following are typical :—

"Our students who have been fortunate enough to secure correspondents are quite enthusiastic and are envied by those who are less fortunate. The circle is growing wider, however, as some have secured correspondents through the kindly offices of French boys to whom their names were sent by those who were first put into communication through the *Review of Reviews*. So far as I have been able to observe, I think the effect of the scheme has not been confined to those who are now carrying on this correspondence. I have noticed a growing interest in the subject of French, especially among our junior pupils, who hope some day to be able also to correspond with their French comrades, and who, therefore, are more desirous of fitting themselves to do their part creditably. The French exercises are becoming less of a task and more of a pleasure. Of those who are actually corresponding, our French teacher says that he notices not only added interest but a marked improvement in the character of the work done in class. There is much greater attention to details than before, and the necessity for this is often accentuated by the errors in the use of English sometimes made by the French boys. Many other good results are flowing from this plan, of which I mention but a few : (1) a more exact knowledge of foreign peoples ; (2) a greater sympathy with those not of our kin, and a greater toleration of 'foreigners' ; (3) a wider outlook ; (4) a deeper humility at their own ignorance."

"Occasionally I found it profitable to read out to the class a letter (from a French boy) written in English, with traces of French idiom running through it. In this way two things could

be taught: (1) the particular idioms in the French pupil's mind at the time of writing; (2) the all-important general fact that we must not be satisfied with being able to write a foreign language with grammatical correctness, but must read widely and constantly to attain to the correct turns of expression required."

Other advantages derived from an exchange of letters are that scholars gain a great deal of geographical, topical, and commercial knowledge, for, if there are fifty boys in a school, each boy gets a letter from a different place. Interest is thus stimulated in the outside world, and in the languages used by that world. Our boys, too, learn to know their own language better.

Of course, it is fully recognised that such a correspondence as is here indicated cannot supersede thorough grammatical teaching, but it certainly does supplement it in an admirable fashion. The idea is not new. Modern-language masters have often used it; but until an enthusiastic French teacher begged the *Revue Universitaire* and the *Review of Reviews* to undertake the organisation of a scheme drawn up by him, it was only possible for a few favourably circumstanced teachers to find foreign correspondents for their scholars.

Teachers who wish to give the plan a trial should send the names and ages of pupils they wish to correspond with foreign boys or girls to Miss Laurence, Cambridge House, Wimbledon Park, Surrey. It should be noted that foreign letters are only sent to School addresses.

ON THE EARLY TEACHING OF FRENCH.

By PROFESSOR WALTER RIPPMANN, M.A.

VIII.

FIRST STEPS (*Continued*).

WE have supplied the names of persons on the picture of *Le Printemps;* we now proceed to say what they are doing. It is simplest to divide them into two classes, those who are at work, and those who are playing. These verbs may be taught in the following way: the teacher points to the father and says, "I am now going to tell you what his occupation is: *travailler.*" The pupils repeat; as they have not seen the written form of the word, the pronunciation will give no difficulty. He points to Charles and says: *jouer.* He then points to all the other persons whose names have been learnt, and the children say *travailler* or *jouer*, whichever is appropriate. When the infinitives have been learnt, the 3rd singular and 3rd plural of the present indicative are taught: *le père travaille; le père et la mère travaillent.* [The difference between these two forms is not noticed until the written words are seen.] Attention is now drawn to the ducks and ducklings, which are prominent in the foreground; *canard* and *caneton* are given, as well as the verbs *nager* and *plonger.* When the children have no more difficulty in framing suitable sentences when the object is pointed to, they may again be asked questions (*qui est-ce qui joue?* etc.), or they may be told to ask each other questions. They very soon get into the way of doing this; the teacher merely listening and correcting if necessary, or suggesting the names of pupils which have not yet been asked.

In several popular First Courses the whole of *être* and *avoir* and of some verb like *porter* is taught at the very beginning: and whenever a new class of verb appears, the whole of it is always given. This puts an unnecessary strain on the memory of the pupil, and it seems more reasonable to confine oneself at first to the present tense only, but to give it for all common verbs, even the "irregular" ones. Some of the participles may be taught a little later on, and the *parfait.* The *futur* might follow next; and then the *imparfait* and *passé defini.* I notice that M. Veyssier, in a book[1] which deserves careful perusal, also says; "Nous nous contenterons au début des trois temps principaux: *présent, passé indéfini, futur.*"

It will be noticed that declension and conjugation are taught side by side. The reason for so doing is put simply by M. Kuhff, in a book[2] which would be much better if it were much shorter. He says on p. 17:

"Pourquoi la conjugaison du verbe, réduite à deux ou trois temps, doit-elle être apprise simultanément avec la déclinaison? Et pourquoi ne faut-il pas 'épuiser la conjugaison du verbe avant de mentionner un nom'? Parce que le verbe ne se détermine pas seulement par la personne, le temps, le mode; mais encore par son objet, puis par le nom du lieu, du temps, de l'instrument, et que ces déterminations sont plus pressantes, plus importantes au début, que les déterminations modales."

M. Kuhff is of opinion that at first the conjugation should be "réduite à deux ou trois temps"; on p. 10 he mentions the imperative as one of these, in a passage which also deserves quoting:

"Dans la méthode des langues mortes cette division et cette étude successive n'avaient pas, jusqu'à ces derniers temps, été pratiquées; l'élève apprenait la conjugaison en son entier. Elle lui servait à reconnaitre les formes verbales, dans les textes à traduire, avant qu'il apprît à les manier lui-même avec sûreté. C'est la méthode des langues vivantes qui, la première, a arrêté la conjugaison aux deux formes de l'indicatif présent et de l'impératif" [and he adds the following, with which I altogether disagree] "pour se rapprocher, dans son imitation, de cet adulte apprenant une langue étrangère en pays d'origine, lequel s'arrête, sans souci de la correction, à l'infinitif présent."

The imperative may be taught early, but not in connection with the picture. It will naturally be used by the teacher when he tells his pupils to

[1] "De la méthode pour l'enseignement scolaire des langues vivantes." Par E. Veyssier. (Paris: Belin Frères. 1898.)

[2] Les langues vivantes parlées. 2e Partie. La Méthode. Par Ph. Kuhff. (Paris: Société d'éditions scientifiques. 1898.)

open their books, sit down, etc. Here again the use of "irregular" forms like *lève-toi, assieds-toi, viens, va*, &c., need not be avoided; but care must be taken that they are gradually introduced and often repeated.

The pronouns of the 3rd person are next supplied: "We need not always say *le père travaille*; if we have been speaking about *le père*, it will be sufficient to say *il travaille*." [The question whether the *l* of *il* should be pronounced or not may be left to the discretion of teachers; most of them will probably prefer to do so, though M. Paul Passy condemns it as altogether contrary to the usage of educated Frenchmen.] Then similarly, *elle, ils, elles*. Some more substantives and verbs follow: *chien, poule, sauter, marcher*; then also *l'abeille* and *l'hirondelle*, and *voler* in connection with these. The children notice the shortened form of the article; and are then also taught the plural of the article in its two forms (with and without the sound of *z* at the end, *e.g.*, *les garçons, les abeilles*), and at the same time the most common form of the plural of substantives.

A simple exercise at this stage would be to give a number of sentences of the type *le chien saute*, and let the children put them into the plural (*les chiens sautent*, etc.).

Some adjectives may now be introduced; and it will be best to begin with those which have the same form for both genders, *e.g.*, *fidèle, utile, agréable, jeune*. In words of this kind, which do not designate objects or actions represented on the picture, the children may at first be puzzled as to the meaning, and the teacher may be tempted to supply the English. It has been pointed out that this may occasionally be done when a word appears for the first time, and the pupils cannot be conveniently led to find out the meaning for themselves. But in most cases they can be made to do so by means of suitable questions and suggestions. Thus, "la poule est *utile*" may not be clear at once; *utile* might refer to the colour or the size of *la poule*; but if we point to some other objects on the picture which are also useful, and add that *poule* has this quality in common with them, one or the other of the children will soon suggest "useful" as the meaning. Numerous questions can now be asked, *e.g.*, *qu'est-ce qui est utile? qui est-ce qui est jeune?*

Further objects on the picture follow: *eau, arbre, pré, herbe, église, colline, montagne, clocher, village, bouquet*; and in connection with them certain adjectives which add *e* in the feminine, such as *haut, vert, petit, grand*, where there is a difference in sound, and adjectives like *joli*, where the difference is one of spelling only. The plural of all these adjectives will give no difficulty, as the addition of *s* to form the plural has been observed in the case of the substantives and the personal pronouns.

Some common adjectives which do not form their feminine in the usual way are taught next, *e.g.*, *le papier* [hold up a sheet of paper] *est blanc; la neige* [on the picture] *est blanche*. Similarly, in connection with persons on the picture, *heureux-euse, laborieux-euse, joyeux-euse; bon, bonne; beau, belle*.

In many books all "exceptions" to any particular rule are given *en masse*, whether they be words of frequent occurrence or not. These lists are crammed, mainly for examination purposes. It seems more reasonable to teach at first only such "exceptional" forms as are in common use, and to postpone the learning of *coi, coite; caduc, caduque; muscat, muscade*, &c., to a much later stage.

Dr. Breul, in his valuable book on "The Teaching of Foreign Modern Languages in our Secondary Schools," gives the same advice:

> "Do not burden the memory of your pupils with too many rules, still less with numerous lists of words following their own rules, those words which we call 'exceptions,' and which are as a rule so very largely utilised by a vast number of examiners whom I wish I could call exceptions also. All we want to teach and to impress firmly on the memory of the children is a number of ever-recurring facts, certain rules, briefly and clearly expressed, deduced from the texts before the eyes of the children [still better, by the children themselves], and in addition to these only a very few of the most noteworthy exceptions. Most 'practical' school grammars contain far too much; they should chiefly be used as books of reference."

There should be a full revision of the adjectives at this point, by means of questions and answers, and then also by some such exercise as the following: the teacher supplies sentences of the type *le pré est joli, le garçon est petit*; the pupils (*a*) put the sentences in the plural, (*b*) substitute feminine substantives, (*c*) put these sentences in the plural.

If the generic terms, *homme, femme, animal, oiseau*, are now given, we can add *qu'est-ce que* to our forms of question.

It will be convenient next to teach a few prepositions. This can be done very conveniently by means of the picture: *où est la mère? elle est dans le jardin*. In uttering these sentences the teacher rather exaggerates the intonation; the children then have no difficulty in understanding *où* and *dans*. *Devant, derrière, sur*, which also preserve a distinctly local meaning, can be taught in a similar way.

It will here be convenient to teach the genitive case of the article: "This is a door; this is a house. How can we say briefly that the door is a part belonging to the house?" "This is the door of the house." "Well: *c'est une porte, c'est une maison; c'est la porte de la maison. Qu'est que c'est?*" "*C'est la fenêtre de la maison, le toit de la maison.*" The teacher points to the roof of the church: "*Qu'est-ce que c'est?*" If care is taken to ask a fairly intelligent pupil, he may be relied on to give the right answer: "*C'est le toit de l'église.*" Similarly, "*C'est la porte de l'église.*" Pointing to the garden door, the teacher may himself supply the form *du*, which the children could not obtain unaided; and then also *des*.

Some common pairs of substantives may be given next, such as *paysan, paysanne, un* and *une enfant, frère* and *sœur, fils* and *fille*, also *parents, mari*. *Grand-père* and *grand'mère* appear on the picture. The children can now be introduced to them; the

brighter ones will express surprise at the *grand'* of *grand'mère*, but the time for an explanation has not yet arrived. They should be commended for noticing this peculiarity, and told that some day they will learn the reason why it is not *grande*.

The cardinal numerals should also gradually be learnt; in the beginning one might be given at each lesson, the earlier numbers being constantly repeated.

In dealing with the genitive, the children should be led to see that there is a difference in the relation between *le toit* and *la maison* in *le toit de la maison* (the part and the whole) and that between *la maison* and *le paysan* in *la maison du paysan* ("possessive" genitive). It does not in the least matter at this early stage whether the children can furnish the grammatical labels without a moment's hesitation, or know nothing about them; but it is of great importance that they should be taught to think about the relation of words to each other in the sentence. Too often the learning of grammatical terms has led to the stifling of all thought about grammar.

The "partitive article" is also taught, but the term itself need not be used; it is a poor one anyway. The form presents no difficulty; the meaning may be suggested in the following way: "*Le paysan a* [*a* and *ont* may be taught here] *trois fils*. We may not wish to say how many he has, but simply that he has them, leaving the number unsettled. Then we shall say: *il a des fils*." The brighter children will probably express surprise; they cannot fail to compare English usage, which will appear to them simpler, as it undoubtedly is. A little digression, couched in simple words, on the ways in which languages diverge, just as nations diverge, might form a suitable reward for this case of critical observation on their part.

The "idiom" *il y a* can be conveniently introduced in connection with the "partitive article." The "idioms" are an important feature of a language, and make considerable demands on the memory; nothing, however, can be more depressing than the "cramming" of idioms, unless, perhaps, it be the learning of lists of disconnected words. Only a few idioms need at first be taught; they must be slowly introduced, and rendered familiar by constant repetition. Gradually, as the pupil comes to read easy books quickly, the common idioms occurring again and again will present no difficulty.

Questions have so far been asked by means of such forms as *qui est-ce qui*, etc. The "interrogative form" of verb and pronoun, *est-il*, *joue-t-il*, can now be supplied; and then also the "negative form" with *ne* or *n'* . . . *pas*.

Severe Education.—A hard bed is much more healthy than a soft one; and, generally speaking, a severe education is very helpful in strengthening the body. By a severe education we must understand merely that which tends to prevent one from taking one's ease.—KANT.

ELEMENTARY EXPERIMENTAL SCIENCE.

BY PROFESSOR R. A. GREGORY and A. T. SIMMONS, B.Sc., Associate of Royal College of Science, London.

XIII.—EFFECTS OF HEAT.

Lesson 1.

Things required.—An iron or brass rod about 5 inches long, fitting into a "gauge" cut out of brass, as shown in Fig. 1, Spirit lamp or laboratory burner. Flat bar of iron about 1 foot long. Two wooden blocks. Heavy mass. A straw about 9 inches long, fixed at right angles to the eye of a sewing needle by means of sealing wax. 4-oz. flask fitted with stopper and glass tube. Jug of hot water. Air ball or paper bag. Ice. Porcelain dish or beaker. Tripod stand. Iron spoon. Wax (a piece of a wax candle will do) or butter.

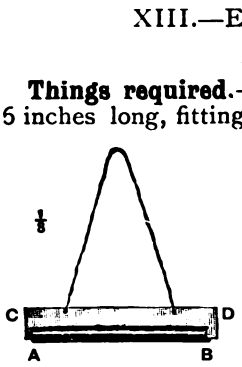

FIG. 1.—The rod AB will fit into the gauge CD when it is cold, but it is too large when hot.

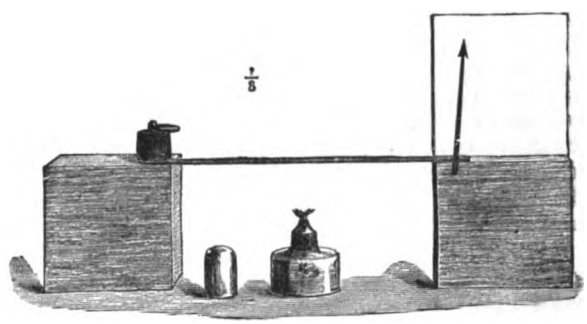

FIG. 2.—When a flat bar of metal, having one end kept from moving by a heavy mass, is heated, the other end moves the pointer, because the bar gets longer.

Practical Work for the Class.—Show that the metal rod just fits the gauge. Then heat the rod by a spirit lamp or laboratory burner. Show that it will not now go into the gauge.

Place the heavy mass on one end of the iron bar resting upon one of the blocks, as in Fig. 2. Let the other end bear upon the needle placed upon the other block and having the straw pointer fixed to it. Heat the bar with a flame and notice that the pointer moves on account of the expansion of the iron.

Procure a 4-oz. flask and fit it with a cork. Bore a hole through the cork and pass through it a long glass tube which fits tightly. Fill the glass with water coloured with red ink. Push the cork into the neck of the flask and so cause the coloured water to rise up in the tube. (Fig. 3.) See that there is no air between the cork and the water. Now dip the flask

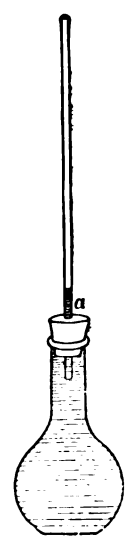

FIG. 3.—An arrangement for showing that liquids get larger when heated.

into warm water, and notice that the liquid gets larger and rises up the tube. Take the flask out of the warm water, and see that the coloured water gets smaller as it cools and that it sinks in the tube.

Select an air ball or a well-made paper bag and tightly tie a piece of tape round the open end. Hold the ball or bag in front of the fire, and notice that the air inside gets larger and inflates the bag. Or, obtain the flask with a cork and tube, as in Fig. 4. Remove the cork and tube, and, by suction, draw a little red ink into the end of the tube near the cork. Re-insert the cork and warm the flask by clasping it in your hands. Notice that the air in the flask gets larger and pushes the red ink along the tube.

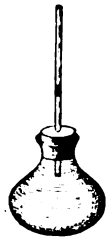

Fig. 4.—When the flask is warmed the air in it gets larger, and pushes up the drop of liquid in the tube.

Melt wax or butter in an iron spoon.

Procure a lump of ice, and notice that it has a particular shape of its own, which, as long as the day is sufficiently cold, remains fixed.

With a sharp bradawl or the point of a knife break it up into pieces, and put a convenient quantity of them into a beaker. Place the beaker in a warm room, or apply heat from a laboratory burner or spirit lamp. The ice disappears, and its place is taken by what we call water. Notice the characters of the water. It has no definite shape, for by tilting the beaker the water can be made to flow about.

Replace the beaker over the burner and go on warming it. Soon the water boils, and is converted into vapour, which spreads itself throughout the air in the room and seems to disappear. The vapour can only be made visible by blowing cold air at it, when it becomes white and visible, but is really no longer vapour, but has condensed into small drops of water, or, as it is sometimes called, "water-dust."

XIV.—Thermometers.

Lesson 2.

Things required.—Three basins, containing hot, luke-warm, and cold water. (Fig. 5.) Flask fitted with stopper and tube. Empty thermometer tube, with bulb. Small cup of mercury. Spirit lamp or laboratory burner. Beaker. Flask.

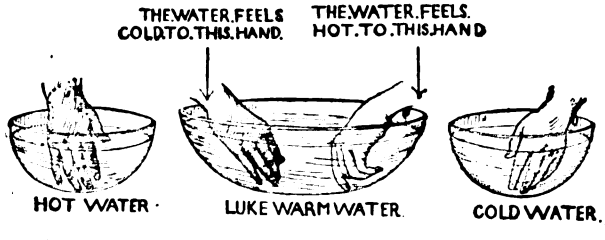

Fig. 5.—The sense of feeling cannot be depended upon to tell the temperature of anything.

Practical Work for the Class.—Arrange three basins in a row; into the first put water as hot as the hand can bear, into the second put luke-warm water, and fill the third with cold water. Place the right hand into the cold water and the left into the hot, and after half a minute put both quickly into the luke-warm water. The left hand feels cold and the right hand warm while in the same water.

Place the flask of water, with fitted tube, used in the last lesson, in hot water (Fig. 6), and notice the height of the liquid in the tube. Transfer it to cold water, and observe that the liquid in the tube sinks.

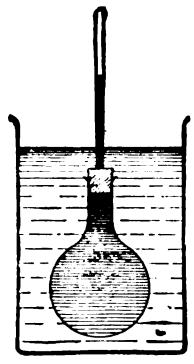

Fig. 6.—When the flask is put into warm water the liquid in it rises in the tube.

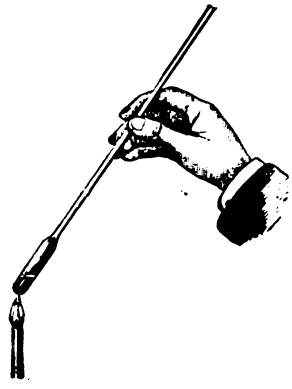

Fig. 7.—After heating the bulb as shown, the open end of the tube is placed in the mercury, which rushes in and fills the bulb and tube.

Procure an empty thermometer tube, with a bulb at one end. (If a blow-pipe is available, a bulb can easily be blown upon one end of the tube by melting the glass in the flame, and blowing down the open end while it is molten.) Heat the bulb (Fig. 7), and while it is hot dip the open end in mercury. As the bulb cools, mercury will rise in the tube to take the place of the air driven out by the heat. Repeat the operation until the mercury fills the bulb and part of the stem.

Place in hot water the bulb of the instrument just constructed, and make a mark at the level of the mercury in the tube. Now place the instrument in cold water, and notice that the mercury sinks in the tube. The mercury is thus seen to expand when heated and contract when cooled, and if the glass were marked, the degree of heat or cold could be shown by the position of the top of the mercury.

Examine the thermometer supplied. Notice that it is similar to the simple instrument already described, but the top is sealed up, and divisions or graduations are marked upon it, so that the height of the mercury in the tube can be easily seen.

XV.—Graduation of Thermometers. Fixed Points.

Lesson 3.

Things required.—Beaker. Flask. Test-tube fitted with stopper and exit tube, as in Fig. 8. Ice. Salt. Unmounted thermometers, with Centigrade and Fahrenheit graduations.

Practical Work for the Class.—Take some pieces of clean ice in a beaker or test-tube and plunge a thermometer amongst them. Notice the reading of the thermometer; it will be either no degrees (0°) or very near it.[1] Warm the beaker or test-tube, and observe that as long as there is any ice unmelted the reading of the thermometer remains the same.

Repeat the experiment with some other pieces of ice, and observe the important fact that the temperature of clean melting ice is the same in all your tests.

Add salt to the melting ice, and notice that the mercury indicates a lower degree of temperature.

Boil some distilled water in a flask, test-tube (Fig. 8), or beaker, and plunge a thermometer in the boiling water. Notice the temperature. Raise the thermometer until the bulb is just out of the water and only warmed by the steam. Again record the temperature. In both cases the reading is the same. It is either[2] one hundred degrees (100°) or very near it. Repeat the experiment with a second lot of pure water, and note that the temperature of boiling water is again 100°. Add salt to the water. Hold a thermometer in the steam of the boiling water, and notice that the temperature is the same as before, namely, 100°. Push the thermometer into the water, and notice that a higher degree of temperature is indicated.

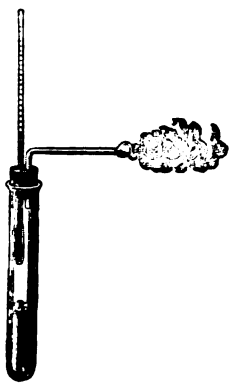

FIG. 8.—The water in the test-tube is boiling. Steam is coming out of the tube, and the thermometer is being heated by it.

Again place the thermometer in clean ice in a test-tube or flask. Gently heat the vessel, and notice the following changes:

(1) The mercury remains at 0° until the ice is all melted.
(2) When the ice is melted, the mercury rises gradually until it reaches 100°.
(3) The mercury remains stationary at 100° until all the water is boiled away.

Arrange three basins of cold, lukewarm, and hot water side by side. Place the thermometer in the cold water and then in the lukewarm water. Notice the temperature indicated in the lukewarm water. Now place the thermometer in the hot water, and when it has been there a minute or two put it into the lukewarm water. Notice that the temperature indicated is practically the same as before. It is thus seen that, unlike our sense of feeling, a thermometer is not deceived by being made hot or cold before using it to indicate temperature.

Notice the temperature of the room indicated by the thermometer.

Place the thermometer in your mouth, and notice the temperature indicated.

XVI.—SOLUBLE AND INSOLUBLE SOLIDS.

Lesson 4.

Things required.—Sugar. Salt. Washing-soda. Flasks or tumblers with water in them. Spoon. Sand. Camphor. Shellac. Spirits of wine. Flowers of sulphur. Carbon bisulphide.

Practical Work for the Class.—Place a piece of sugar in water; note that it soon disappears and gives a sweet taste to the whole of the water, so that in some way the sugar must have spread throughout the water.

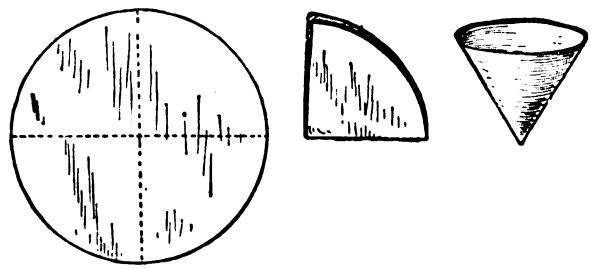

FIG. 9.—If a circular piece of blotting-paper is folded as shown by the dotted lines, it can be made into a cone which may be placed in a funnel for filtering.

Repeat the experiment with salt, and similarly notice that the salt can be recognised everywhere in the water by its taste.

Add sand to water and stir it up with the water.

FIG. 10.—How to pour water into a paper filter in a glass funnel.

Let the water stand for a short time, and notice that the sand sinks to the bottom.

Stir up camphor with water. Notice that the camphor does not disappear; it is insoluble in water. Shake up a small lump of camphor with

[1] A Centigrade thermometer is supposed to be used. If a Fahrenheit thermometer is used the reading will be 32°.
[2] A Fahrenheit thermometer would record 212°.

some spirits of wine in a small bottle. It gradually disappears, just like sugar does in water.

Shake up flowers of sulphur with carbon bisulphide, and notice that it disappears. Be careful to keep the stopper in the bottle of carbon bisulphide, and do not bring the bottle near a light.

Fold a piece of clean white blotting-paper or a filter paper in the manner explained in Fig. 9. Insert the folded paper into a glass funnel and place the funnel into a flask.

Make some muddy water by stirring some mud into a tumbler of water, or by putting powdered charcoal into it. The mud or charcoal remains suspended in the water for a long time.

Pour the muddy water carefully on to the filter paper in the funnel in the manner shown in Fig. 10, and observe that the water which drops through is quite clear. The mud is left on the paper.

Similarly, filter a solution of sugar or salt, and observe that the solution is unaltered by passing through the paper.

XVII.—Soluble Liquids and Gases.

Lesson 5.

Things required.—Alcohol, olive oil, mercury, ether. Bottle of soda-water or other aërated water. Taper. Test-tubes.

Practical Work for the Class.—Pour some water into a bottle and then some alcohol,[1] and shake them up together. Observe that the alcohol disappears in the water or dissolves in it.

The same experiment can be performed with oil of vitriol, if great care is taken to pour a *small*

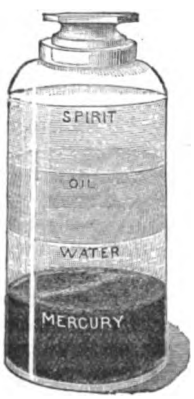

Fig 11.—The liquids in the bottle do not mix, and, if undisturbed, they separate into layers—the densest at the bottom and the lightest at the top.

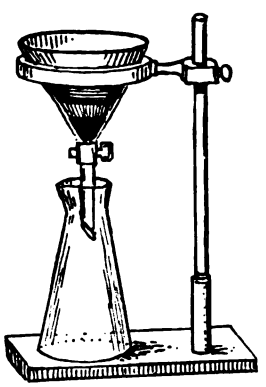

Fig. 12.—A funnel with a tap, for drawing off the liquids in it one after the other.

quantity of the vitriol into water and not water into the acid. The acid is dissolved in the water.

Shake up together some olive oil and water, and allow the mixture to stand for a short time. Notice that the liquids separate into two liquids, the lighter being on the top (Fig. 11). Which is the lighter?

[1] Ordinary methylated spirit will not do, as it forms a milkiness with water. If pure alcohol cannot be obtained, whisky or brandy will do.

Repeat the experiment with quicksilver and water, and if possible with ether and water. Shake two or three of the liquids mentioned together, pour the mixture into a funnel like that shown in Fig. 12, allow them to settle, and then run them off in order.

Examine a bottle of soda-water. Notice that it appears clear and bright, and seems to have nothing dissolved in it. Uncork, or otherwise open it. Bubbles of gas escape (Fig. 13). A lighted taper held to the mouth of the bottle has its flame put out by the gas which is given off.

Fig. 13.—Bubbles of gas escape from a bottle of aërated water when the cork comes out.

ON THE TEACHING OF HISTORY.

By A. Johnson Evans, M.A.

V.—Dante and the Thirteenth Century.

". . . . . Cive
Di quella Roma, onde Christo è Romano."

WHAT does the modern British reader make of the following argument? "We are sinners condemned justly by God for our sins; we can be saved only because Jesus Christ died in our stead, *i.e.*, as a criminal. A criminal is a person put to death by lawful authority; therefore, if we are to be saved, the authority by which Jesus was put to death must have been lawful, and is therefore binding on all Christians. Now that authority was the Roman Empire, which has existed continuously from that day to this; therefore all Christians are bound to obey the Roman Emperor as a lawful authority." This is a summary of the main thesis in Dante's "De Monarchia," a prose work written about the year 1315, against the claims of the Popes to be the sole rulers of the Catholic Empire-Church.

For there had been a **conflict between Emperors and Popes**, in which the "spiritual" power had triumphed. They had destroyed the family of the Hohenstaufen who had opposed them in Germany and in Naples. The German kingship had been for a time vacant or filled with shadows, of which Richard Duke of Cornwall, King of the Romans, was one. The kingdom of Naples was in the gift of the Pope.

The struggle had been between two rival systems of law. The Canon law of the Church began with the texts of the New Testament which gave judicial authority to Christian communities, and had since grown into an extensive system of jurisdiction. The Civil law was the codification of Roman law which had been embodied by Justinian in the sixth century in Digest, Pandects and Institutes. As Justinian ruled only over the East, this code was long unknown to Western Christendom. But it had been discovered by the Crusaders of the eleventh century, studied by University scholars

in the twelfth, and was now, in the thirteenth, adopted by the emperors and kings of Europe.

It is in this **adoption of the Civil law**, which in all its texts assumed the right of the lay authority —and that authority an absolute prince—to legislate on all subjects, lay and spiritual, that we find the origin of the theory of the Divine Right of Kings, a doctrine which has now so passed away that we find it difficult to imagine that any sane person could ever have held it. It was set up at first against the claims of the Papacy; not for many years afterwards was it used against Parliaments.

The Popes triumphed; the organisation of Western Europe, which centred in the Papacy, and which we call the Catholic Church, proved, within its own domain, stronger than the local kingships of Europe. All that these could do was to retain certain departments of life under their own control, and these only with varying degrees of difficulty.

What was the reason for this triumph? Because all Western Europe was consciously Christian, because the first thoughts of men were that they were members of the Christian Church, and only in their second thoughts were they subject to this or that feudal lord. (We were about to say "to this or that national king," but so early as this national ideas were not.) Realise the meaning of the sentence from Dante's Vision (Purg. xxxii., 101-2) which we have taken as a motto. The poet is expressing the common aspiration to go to Heaven. But he speaks of Heaven, not as Jerusalem or Zion, but as Rome! He wishes to be "a citizen of that Rome where Christ is a Roman." To Dante, this world is the earthly, imperfect "Rome"; yonder is the true Rome, where the Roman, Christ, lives and reigns. Was He not a member of the Roman Empire?

Go with Dante to the nethermost Hell; three men are suffering there the worst agonies which the seer can imagine. Two of them are Brutus and Cassius, who killed a Roman Emperor; the third is Judas Iscariot, who betrayed the spiritual head of the Holy Roman Empire. Till we cease to find this combination strange, till we think it natural to find Brutus and Cassius in the Christian Hell, we have not begun to understand the Middle Ages.

All that we have said, and more, should be in the teacher's mind who attempts to explain the reigns of **Henry III.** and **Edward I.** It will help him to understand the relations between the Pope and the English, which were part of the "grievances" of 1258. The title of Henry's brother Richard, and of his son Edmund "of Apulia," will get their natural explanation. We shall understand the full significance of the barons' declaration at **Merton in 1236**. *Nolumus leges Angliae mutare.* They would not change the maxims of the English common law for those of civil or canon law, which were "foreign." But, above all, we shall in this way get light on the **Mise of Amiens** of January, **1264**. The king was quarrelling with his barons, led by Simon de Montfort. Simon, we all believe, was one of those "brave patriots who fought for our liberties, and laid the foundation of our present glorious constitution." The decision of Louis IX. of France was against the barons, and we explain this by supposing that kings naturally sympathise one with another—that one tyrant is, of course, supported by another.

But on reflection, we find ourselves asking, why did the barons consent to Louis' arbitration? What was his character among his contemporaries? And then we remember that he was canonised after his death, and unless we object to all "Romish saints" we wonder in respect of what virtues the French King received this posthumous honour. Turning to our French histories, we find that Louis IX. was pre-eminently just; that he began his reign with restoring territory which his father had wrongfully acquired. He was also profoundly religious. He died on a crusade, the last of the expeditions commonly called by that name.

But our increase of knowledge only augments our trouble. We are left wondering why this just and pious king should decide so completely and emphatically against these English "heroes." The remedy for evils of this kind is only more knowledge. And when we learn that the "justice" of S. Louis was that of the Civil Law then adopted in France, that this system of law knew nothing but the "will of the prince" as possessing the "vigour of law," our state of puzzledom ceases, and we understand more than we expected to.

Dr. Maitland has recently collected into book form some articles he had previously contributed to the *English Historical Review* and other periodicals, and has published them under the title of "Canon Law in the Church of England." Therein he seems to have proved how thoroughly the English Church was part of the Holy Catholic Church; how completely Papal law and jurisdiction were established in England as elsewhere, and how it was not the Clergy, but the State, *i.e.*, the King, either with or without Parliament, that resisted the Papal claims, and that only partially.

Read, too, Dr. Jessopp's little volume of essays called "The Coming of the Friars," specially those on the "Black Death in East Anglia," to realise what were the powers of the Pope in the later Middle Ages. Green's chapters on the Friars, the Universities, and the Towns, in his "Short History of the English People," are most enlightening.

With all your getting, get *understanding*, not mere knowledge of the driest facts. To attain this, sympathy is necessary. To be sympathetic, we must strip ourselves of modern ideas, of modern knowledge. Our predecessors were not more foolish than we, nor more "superstitious" (whatever that term of reproach may mean). No keener intellects ever existed, no freer thought was ever expressed, than in the scholastic discussion of what ignorant people call the "Dark Ages." They were only more ignorant than we are.

LEISURE-HOUR PURSUITS: PHOTOGRAPHY.

By H. E. Hadley, B.Sc. (Lond.), A.R.C.Sc. (Lond.)
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I.—Selection of a Camera.

THE selection of a camera suitable for a young beginner is a point of considerable importance, and a decision should only be arrived at after a careful review of the future work which is to be carried out.

The apparatus should be (i.) portable, (ii.) designed in such a manner as to impart a correct knowledge of first principles, and (iii.) as simple as possible. The lens is even more important than the camera, and its selection should be considered quite independently of the camera; indeed, it is scarcely an exaggeration to say that a good lens with a cigar box as camera is a better equipment than an elaborate camera with a cheap lens.

Hand cameras should only be handled by an experienced photographer. A hand camera in inexperienced hands inevitably leads to great waste of time and material, and certainly fails to impart a knowledge of first principles such as may be acquired by using a stand camera. The "subject" to be photographed is only one of several factors which should be fully considered and argued out before the photograph is taken; other important factors are "quality of light," "direction of light," "colour of the subject," the "size of diaphragm" which is best suited to the subject, the "plate rapidity," the "position" of the image on the plate, and the resultant "time exposure" which is dependent on nearly all of the other factors. The novice cannot possibly weigh all these points in his mind simultaneously and rapidly as is really required in hand-camera work.

Another point to remember is the temptation which a hand camera offers to indiscriminately "snap-shot" everything and everybody. If the enthusiastic beginner has twenty-four films in a hand camera he does not mind risking the loss of several, and takes snap-shots at random without giving much thought to any individual photograph, whereas, if he is miles away from home with only four plates, their present value is very great, and no plate is exposed without the application of all his experience and knowledge in order to ensure a satisfactory photograph.

As a rule it may be regarded as unwise to allow a beginner to use a hand camera. It should only be allowed to a student who has previously acquired a good practical knowledge of the subject by means of a stand camera.

Stand Cameras.—The required condition of portability does not allow much choice to be made as to the size of the camera. The larger the photograph obtained, within certain limits, the more satisfactory is the result from the pictorial point of view—a ½-plate camera (taking plates 6½ × 4¾ ins.) will give greater satisfaction than a ¼-plate camera (taking plates 4¼ × 3¼ ins.). But a ½-plate camera is somewhat burdensome to carry, and a boy cannot, without discomfort, carry more than a ¼-plate camera for a distance.

Assuming, then, that the ¼-plate camera is the most convenient size for a boy to use, it is always possible to fall back upon *enlarging* as a means of obtaining a larger photograph from any particular negative which is deemed interesting and good enough to justify an enlargement. Special appliances are required for enlarging, and the material used does not necessarily correspond with that used in ordinary photographic processes. For this reason it is an advantage for the amateur to be able to dispense with this branch of the work, and the matter is simplified by sending the negative to a professional photographer, who will supply an excellent enlargement on bromide paper, at a nominal cost.[1] An average ¼-plate negative does not give a good enlargement for sizes greater than 10 by 8 ins., since, as a rule, a larger print will show great want of detail in the shadows.

Unfortunately, the ¼-plate negative is not favourably regarded by any Photographic Survey, and it is strongly urged that the student of photography should make it one of his chief aims to take some part in the collection of photographs which would be acceptable to the Survey. One method of overcoming this difficulty would be for each member of a school camera club to have his own ¼-plate camera, and for the club itself to possess a ½-plate, or even whole-plate (8½ by 6½) camera. When any subject of sufficient importance is found in the neighbourhood, the members of the club might share the burden of carrying the larger camera to the subject when the weather and light are suitable. Of course, it would be advantageous for the members to make a previous study of the same subject with their own cameras in order to determine the best point of view and time of day.

The next question is, *what make of stand camera to obtain?* This is difficult to answer, since many firms in this country have placed good cameras on the market, and it is impossible for one individual to become practically acquainted with the merits and demerits of each pattern.

The cost is a question which each individual purchaser has to consider. It does not follow that the most expensive camera is the best, but it may be accepted as a general rule that a very cheap camera is unsatisfactory, and that the purchaser of such an instrument will soon become dissatisfied with his progress. If the members of a camera club are unanimous in their choice of a camera, it is scarcely unreasonable to anticipate that a manufacturer might be prepared to allow special terms on an order being given for several cameras of the same pattern.

There are certain features which are essential to a satisfactory camera:—

(i.) The front of the camera (which carries the lens) should have an independent rise, so that the lens may be raised or lowered from its normal position relatively to the focusing screen at the back.

(ii.) The back should be reversible, so that horizontal or vertical views may be taken.

[1] Messrs. Fallowfield, 146, Charing Cross Road, W., will supply a single enlargement, 8½ by 6½ ins., for 2s., or 10 by 8 ins. for 2s. 6d.

(iii.) Both back and front should be capable of being inclined backwards or forwards on horizontal hinges.

(iv.) The camera should be connected to the tripod by means of a turn-table, so as to enable the camera to be pointed in different directions without moving the tripod.[1]

The Thornton-Pickard Manufacturing Company (of Altrincham, near Manchester) make an admirable ¼-plate camera—the smallest of their "Amber" series—which contains all essential features. Messrs. Reynolds & Branson (Commercial Street, Leeds), Messrs. Chapman (Albert Square, Manchester), and Messrs. Middlemiss (Alice Street, Bradford) are makers of thoroughly good cameras.

An extremely useful adjunct to the camera is a Thornton-Pickard Time and Instantaneous Shutter, which allows any exposure to be made from $\frac{1}{60}$ second and upwards. The shutter should be permanently fixed to the front of the camera, and the lens should be screwed into the front of the shutter.

The cost of a Thornton-Pickard "Amber" ¼-plate camera, with three double-plate holders, is about £3 14s. 6d.; the tripod and turn-table, time and instantaneous shutter, velvet focusing cloth, and waterproof case, will bring the total cost to about £7 12s. A very useful addition to the camera is a small circular spirit-level, which can be carried in the pocket, to adjust the base-board of the camera into a horizontal position before taking a photograph. An excellent level can be purchased from Messrs. Taylor, Taylor and Hobson (Slate Street, Leicester) at a cost of 1s. 6d.

A good feature of the "Amber" camera is that it can be used as a hand camera by supporting it by means of a strap slung over the shoulders, and might be used as such after the beginner has had experience in stand-camera work: the only additional requisite would be a bright "finder" (cost 8s. 6d.) fixed to the top of the camera-back.

The cost of a Reynolds & Branson "Phœnix" ¼-plate camera, with three double dark-slides, is £4, and it is a thoroughly good article. A turn-table does not appear to be fixed to "Phœnix" cameras smaller than ½-plate size.

Selection of a Lens.

It may safely be said that the lens should be the best part of the apparatus. An inferior lens would be found to give a picture well defined in the centre but blurred at the edges, or if focused for the edges then the centre would be blurred.

In selecting a lens the chief consideration is quality and focal length. The most suitable focal length depends upon the purpose for which the camera is to be used. If large buildings or interiors are to be taken, then a short focus lens should be used; a lens of this kind is generally termed a "wide-angle lens" (W. A.), since the angle of view taken in by the camera is considerable. If landscapes and groups are to be photographed it is better to have a lens of longer focal length, *e.g.*, a rapid rectilinear lens (R. R.). The best arrangement is to have a thoroughly good R. R. lens and a cheaper W. A. lens, but the question of cost often restricts the beginner to one lens only, in which case it is best to dispense with the W. A. lens. For a ¼-plate camera, a rapid rectilinear lens should have a focal length of not less than 4¾ins., and not more than 5¼ins. The following lenses may be strongly recommended as being capable of producing excellent results:—

	Focal Length.	Price.
Thornton-Pickard "Ruby" R. R. Lens...	4¾	£2 10 0
Taylor, Taylor and Hobson R. R. Lens...	5	2 16 0
" " " "Cooke" Lens..	5	4 0 0
Ross R. R. Lens	5	3 5 0
Zeiss Anastigmat F/8	4¾	3 5 0
R. & J. Beck "Autograph" R. R. ...	5	3 10 6
Voightlander Collinear Lens, Series III....	4¾	4 10 0
Wray "New Platystigmat"	5	4 5 0
Ross-Goerz "Double Anastigmat" ...	5	4 10 0
Dallmeyer Stigmatic, Series II.	5·3	5 15 0

From experience, the writer is able to strongly recommend the "Cooke" lens (made by Taylor, Taylor and Hobson), but one of the cheaper lenses might be purchased with confidence if the cost of this is too high. The most popular lenses at the present time are the "Cooke," the "Wray," the "Dallmeyer" and the "Goerz."

The diaphragm, which serves to cut off the action of the outer edges of the lens, and thereby to improve the definition of the photograph, is an important feature. The diaphragm may be fixed inside the lens-case (*e.g.*, the *Iris* diaphragm), or the various sizes may be made of separate pieces of metal bored to various diameters, and placed as desired through a slot in the lens case. The latter (which are sometimes termed "stops") are liable to be lost or mislaid, so that it is always advisable to have an Iris diaphragm in the lens.

The camera manufacturer will, as a rule, fit to the camera any lens which the purchaser may select; or the purchaser may remove the camera front and send it to the lens manufacturer to be fitted.

[1] Some makers condemn the turn-table as a source of loss of rigidity. In the writer's opinion, this depends entirely upon the workmanship, and a well-made turn-table is undoubtedly an advantage but not an absolute necessity.

THE EDUCATION OF THE PUPIL TEACHER.

THE necessity for a sound general education, such as is provided by the better secondary schools of the country, for pupil teachers in elementary schools is being more and more recognised. The time seems happily past when pupil teachers began to teach at thirteen or fourteen years of age, and to devote the whole of the school day to this work of instruction, depending upon their evenings, and what energies were left after the arduous work of the class-room, for improving their own very inadequate education and preparing themselves for the Queen's Scholarship examination. It is true that the head teacher of the elementary school to which the pupil teacher was attached was expected to look after the instruction of his young appren-

tices out of school hours, requiring them to come early or stay late; in the former case unfitting the boy or girl for the strain of the daily contest with still more juvenile ignorance, in the latter goading already over-taxed faculties to further effort.

Many considerations have together resulted in the present improved outlook. The Training College authorities have repeatedly complained of the lamentable want of knowledge and lack of culture which have hitherto characterised the students presenting themselves to complete, in two years, an education intended to fit them to take charge of the administration of a public elementary school. Her Majesty's Inspectors have reiterated again and again that the inadequacy of the education of elementary school teachers results in a slavish adherence to the rules of this or that teacher of method, and in a sad want of resourcefulness and a too meagre intellectual stock-in-trade. The public also have seemed dissatisfied. Boys altogether dependent upon the teaching in the standards, it is urged, are lacking in general intelligence, and acquire little besides a mechanical skill in the application of a few arithmetical rules, a wooden style of reading and a fair handwriting. Whether there is much truth or little in these and similar allegations, it is not for us to decide, but that they have all directed attention to the pupil-teacher system seems fairly certain.

One of the most hopeful signs that these inadequate arrangements are doomed is the growth in recent years of the plan of instructing pupil teachers in centres. In London and in most large towns throughout the country the pupil teacher no longer spends the whole of the day in teaching. Part of his time he attends a school where, with other pupil teachers, he is instructed in some of the subjects of an ordinary secondary education. The actual subjects he studies are decided by the Education Department and laid down in Schedule v. of the Code. But until quite recently a small percentage only of the total number of pupil-teachers in the country were able to benefit by such central schools. With a view to a correct estimate of the present provision for this instruction of pupil teachers, it must be pointed out that the majority of urban school boards have provided suitably staffed centres, in which, too, many of the recommendations to which reference will immediately be made have been adopted. The financial condition of many voluntary schools, with other considerations, still place the pupil teachers in these primary schools at a serious disadvantage as regards their own education.

The pupil-teacher centre is at present, however, far from perfect. As the Report, to which reference is made below, says:—"The best of them are provided with all the necessary apparatus and staff for excellent secondary training which the conditions of their existence prevent them from giving; whilst many of them are merely classes brought together for the purposes of 'cram.' It is inevitable that they should tend to produce professional and social narrowness of aim, and to subordinate educational aims to pressure of examinations. The cultivation of a healthy corporate life in them is a matter of extreme difficulty. In many cases the scanty staff is imperfectly qualified and narrowly trained, though if it is admitted to be desirable for pupil teachers to pass through secondary schools, it is even more important that those who instruct them should have had ample means for securing a liberal education. We look forward to the ultimate conversion of those centres which are well staffed and properly equipped into real secondary schools, where, although perhaps intending teachers may be in the majority, they will have ampler time for their studies, and will be instructed side by side with pupils who have other careers in view."

In December, 1895, the Lord President of the Council appointed a committee, of which the Rev. T. W. Sharpe, C.B., M.A., was chairman, "to inquire into the working of the Pupil Teacher System in England and Wales, and the supply of teachers as affected by that system; and to report whether any, and if so what, alteration is required in the existing regulations of the Department as regards pupil teachers." This committee of twelve included ladies and gentlemen intimately acquainted with every aspect of the question. Inspectors of schools, inspectors of training colleges, principals of training colleges, head teachers of pupil-teachers' centres, and head teachers of elementary schools were all represented. In January, 1898, the Commission issued their Report, from which a few selections will suffice to indicate the general tendency with which we are dealing. Under the recommendations having reference to the admission of pupil teachers it is amongst other things laid down that:—

"Candidates should be required to pass either an examination conducted by the Education Department . . . . or the Oxford or Cambridge Local Examination for Junior or Senior Students."

"Candidates who have passed an examination in the subjects prescribed for candidates, or for the first, second, or third year, should be admitted for an engagement of four years, three years, two years, or one year respectively; candidates who have passed the Junior Oxford or Cambridge Local Examination should be admitted for an engagement of three years or two years; candidates who have passed the Senior Oxford or Cambridge Local Examination should be admitted for an engagement of two years or one year; provided that in each case the termination of the engagement falls beyond the end of the candidate's eighteenth year."

In summarising their work as far as the conditions of employment in schools are concerned, the committee recommended *inter alia*:—

"The time for which pupil teachers are employed in schools should not exceed four meetings a week in the case of first and second year pupil-teachers, or six meetings a week in the case of third and fourth year pupil-teachers."

"A longer time of employment might with the sanction of the inspector be permitted in the case of pupil teachers who are admitted for one year, or who have been wholly under instruction in secondary schools for a part of their engagement."

The commissioners decided that managers ought to be required to see that the pupil teachers under their charge are properly instructed, for at least five hours a week, in accordance with a syllabus approved by the Department. Such instruction should, where possible, be given in a centre or in a secondary school under arrangements sanctioned by th Department.

The Departmental regulations for the instruction of pupil teachers in a secondary school might include an arrangement whereby the pupil-teacher should attend wholly at the secondary school for a certain portion of his engagement, and in such cases the conditions above specified as to the employment of the pupil teacher in school might with the consent of the Department be relaxed during the remainder of his engagement.

The managers of the school in which the pupil teacher is engaged should in all cases be required to provide for the supervision of the studies of the pupil teacher, for the examination of any reports that may be sent from the centre or secondary school in which the pupil teacher is instructed, and for the special instruction of the pupil teacher in all the obligatory subjects of the pupil-teacher's course in which instruction is not otherwise provided; and the Department should refuse to recognise pupil teachers in any school where they are satisfied that these duties are not properly performed.

These recommendations are already beginning to be translated into regulations. The Code of Regulations for Day Schools, 1899, issued by the Education Department, includes

several advances in the direction of recruiting the ranks of pupil teachers from secondary schools, and in that way eventually raising the standard and tone in elementary schools. Thus it has been decided that pupil teachers may receive their instruction in secondary schools under conditions approved by the Department. Graduates of any University in the British Empire, and not only those of Universities in the United Kingdom, may be recognised as assistant teachers in elementary schools.

Similarly, in the revised instructions issued to Her Majesty's Inspectors and applicable to the Code of 1899, the following paragraph occurs:—

"The collective system of instruction of pupil teachers has now been largely adopted, and arrangements have been made by many managers for restricting the employment of the younger apprentices in teaching to half of the day, and thus setting them free to pursue their own studies more systematically. You will point out to managers the advantage of both of these expedients, whenever circumstances allow. In the case of pupil teachers attending central classes on Saturdays, attendance in the afternoon as well as in the morning cannot be permitted unless the managers allow one half-holiday at least on some other day of the week. Two half-holidays in the week, however, are desirable."

Concerning the staffs of pupil-teacher centres, Her Majesty's Inspectors are instructed, "the centre should be under the charge of a responsible principal, who should be, as a rule, a person of University qualification, and should give his whole time to the centre while the classes are being held. A staff consisting of more than two persons should, as a rule, include one or more persons who have had some training or experience of teaching in places of secondary education."

Such progressive administration must result in the gradual disappearance of "the great gulf fixed" between teachers in secondary and those in elementary schools. It opens up a new profession for the bright boys and girls in secondary schools who feel themselves possessed of the pedagogic passion, and who are continually warned by their own disappointed teachers to avoid the profession of secondary teaching as bringing, for the great majority, little else than the merest modicum of necessary board and lodging. There will for many years be satisfactory and sufficiently remunerative posts in elementary schools for those secondary pupils who will go through the by no means extensive preliminary training. But a warning of the Commission, already spoken of more than once, calls for repetition:—

"We think it desirable, however, at this point to place on record a protest against the idea entertained by some heads of secondary schools that the less capable boys and girls from such schools are good enough for primary though not for secondary teaching. The mistake is probably due to ignorance of the conditions, duties, and prospects of work in primary schools; nor does it indicate a proper and liberal view of the teaching profession."

THE PHYSICAL EXAMINATION AND DEVELOPMENT OF SCHOOLBOYS.

AT the annual general meeting of the Medical Officers of Schools Association, recently held in London, Mr. Cecil Hawkins, M.A., of Haileybury College, read a valuable paper on "The Physical Examination and Development of Schoolboys (10-18): with Notes on its Methods and Results, founded on an analysis of over 50,000 observations." In his paper Mr. Hawkins dealt only with the schoolboy's development in height, weight, and chest girth. After pointing out to his audience the advantages of measuring regularly, uniformly, and systematically, and of keeping a continuous record of such measurements, Mr. Hawkins called attention to the fact that all physical quantities are measured by comparison with a standard quantity of the same kind, which is in almost every case more or less abitrary. The standard fixed for the purpose of investigations like those under consideration is generally *the average boy*, but a large number of boys differ too widely from him for the comparison to be of value.

The construction and comparison of curves of distribution having been illustrated, the necessity for a large number of observations, and for the careful exclusion of any sort of selection, direct or indirect, was insisted on, and the advantage of constructing curves on the basis of a classification by age rather than by height was discussed. It was clearly shown that a large mass of boys may be divided into a series of classes or grades of equal size by means of curves of distribution, and Mr. Hawkins went on to give the reasons he had for adopting twenty grades for his own inquiries. The growth of *the standard boy* of each grade may be represented graphically by means of curves of grades, and tables can be constructed from these curves, giving the limits of height, weight and chest girth, for each grade at every month of a boy's age. This system practically secures a series of twenty standard boys, and the growth of any boy observed may be readily compared with that of the standard boy he most nearly resembles. A comparison of these curves, for the ages of 10½ to 18½, constructed for height, weight, and chest-girth from a large number of observations, shows that the rate of growth of the standard boy is not uniform in any one grade, and that the periods of maximum growth are not coincident in the different grades; the maximum rate of growth in grade 19 being equal to that in grade 2, but occurring three years later, and lasting for a much shorter period; it also appears that the plan of growth of the standard boy in any grade differs as regards weight and chest-girth from that of his growth in height.

The difficulties which attend the adoption of any standard in chest-girth, which shall be at all approximate to the actual growth to be expected from any boy, was illustrated by a comparison of the curves of grades for various different schools where the conditions under which the boys live are very diverse. Physical training and geographical position are probable factors in causing the difference observed; but the method of measurement is largely responsible. A uniform system of measurement is most desirable.

How far does the growth of the standard boy of any grade correspond with the mean growth of the ordinary healthy boy? The actual growth of a number of boys of the same school has been investigated by Mr. Hawkins by means of their grades, and an analysis attempted of their various plans of growth. One hundred and sixty-one boys were examined, their records showing an average of nine half-yearly measurements in each detail, between the ages of 12½ and 18½. The analysis shows that the growth of the boys examined may be *roughly* classified as follows:—

(1) Following the growth of a standard boy within moderate limits of variation—31 per cent.
(2) Showing a steady rise throughout the period examined, relative to the standard boys—17 per cent.
(3) Showing a similar fall—10 per cent.
(4) Showing a period of rise followed by one of fall, or *vice versa*—18 per cent.
(5) Erratic—9 per cent.

The remaining 15 per cent. do not appear to fall into any of these groups; they probably belong to class 1, for the most part, but not within the limits of variation allowed.

In 68 per cent. the general type of figure, as indicated by the maintenance of a constant relation between the grades of height, weight and chest-girth, remained fairly stable throughout the

period examined, though in about one-fourth of these the chest-girth was relatively considerably improved during the early part of the period, probably owing to suitable physical exercises being insisted upon.

About 50 per cent. of the whole corresponded within fairly narrow limits with the same standard in height and weight; but in the remaining 18 per cent., whose type of structure was stable, the grades of height and weight showed an appreciable difference throughout. The mean difference in the most extreme cases in which the type was stable amounted to as much as 8 grades.

This appears to show that under similar conditions a boy's structure as indicated by the relation of his weight and chest-girth to height is fairly persistent, though liable to be very unstable; and that the plan of growth varies considerably with different boys. The conclusion drawn is that, in order to form a correct judgment of the physical progress of an individual boy during any limited time by observations on his measurements, it is absolutely essential to have access to a record of his previous growth, in order to determine what the general plan of his structure and its development has been and may be expected to be.

Mr. Hawkins made a strong appeal (i) to masters of private chools to measure regularly and uniformly, and to hand their results in all cases to the school doctors, house masters, or other officials at the schools to which their boys go; (ii) to school doctors to agitate for universal, regular, and uniform measurement according to some settled plan, and to keep the results constantly under their own supervision. He insisted upon (*a*) the importance of a regular form for recording measurement and suggested a form; (*b*) the importance of the column for "Remarks." It is futile to leave this column to be filled in by the Gymnastic Instructor.

In conclusion, a few of the points to be regularly recorded were suggested, and an appeal made to the Medical Officers of Schools Association to authorise a fixed form of record, and to issue an authoritative guide to its use, which will enable the observer to keep a record which shall be useful and thorough, without being too cumbrous for practical work.

SECONDARY EDUCATION IN SCOTLAND.—ITS PRESENT CONDITION AND FUTURE PROSPECTS.

Dr. John Kerr, late H.M. Chief Inspector of Schools and Training Colleges, in a recent address to the Western Branch of the Secondary Teachers Association in Scotland, dealt with several points, on many of which he said there was an absolute consensus of opinion. These points are described in the subjoined abridged report of the address

(1) Better Organisation Necessary.

The large funds intended for the promotion of secondary education are administered by a variety of independent authorities with consequent overlapping and dissipation of stimulative effort. These funds are in the hands of County Councils and Secondary Education Committees, and over them the Education Department has very limited control. Attempts have been made by the Department to get these two bodies to work into each other's hands, but with comparatively small success. To effect a union between them legislation is necessary.

(2) How far beyond this ought Legislation to go?

If it is certain that a counsel of perfection as to secondary education has been reached, that the competing claims and relative importance of its literary and technical (or scientific) sides have been exhaustively considered, and that there is a general agreement as to what should be done and what avoided, thorough-going legislation is desirable in order to secure definiteness and permanence. But if not, may not definiteness and permanence be on such lines as would hinder rather than help a liberal secondary education? The trend of popular sentiment seems at present strongly towards scientific, rather than literary, culture, and will almost certainly find effective expression in the House of Commons, and it should be borne in mind that it is much more difficult to amend an Act of Parliament than alter a minute of the Education Department. Legislation should therefore be delayed till it is seen how Parliament deals with the Duke of Devonshire's bill. The Association may rest assured that their interests are safe in the hands of Lord Balfour and Sir Henry Craik, who cannot allow secondary education of a broad and liberal type to be injured without completely stultifying the efforts they have made for the last twenty years. No one who has read Lord Balfour's Paisley address can have a shadow of doubt as to the profound interest, the mastery of detail, the breadth of view, and the sense of responsibility which characterise it throughout. It is the result of opinions gradually formed during long years of devoted attention to, and yeoman service in, the cause of education by Lord Balfour, and of constant interchange of ideas between him and Sir Henry Craik. It has no doubt been subjected to a certain amount of unfavourable criticism. This is only to be expected. What great educational scheme ever escaped such criticism? Modification may be necessary, as in all wide-reaching schemes which deal with complicated subjects, but it will as a whole hold the field as one of the most important educational deliverances of modern times.

(3) An Advisory Council unnecessary.

At present any educationist or association of educationists has, through the proper channel, free access to the Secretary for complaint or suggestion. The Educational Institute and many members of the Association of Secondary Teachers claim that their representations have been carefully considered, and have had a large share in many of the improvements that have been made. It is the practice at Dover House that all letters received and important papers read about the code or secondary education are put on a separate file, and before the code is revised or a new minute issued, all suggestions are numbered, classified, and considered. Given an Advisory Council, all suggestions, instead of being as hitherto addressed directly to the Secretary, would naturally be addressed to the Council, discussed by it, some being possibly rejected, and all certainly delayed. The Central Board of Wales has been largely a failure, and a meeting was held some time ago at which it was proposed to hand over its functions to the Universities. Mr. Haldane, M.P., in his speech at Dunbar, in which he endeavoured to represent Scotland as taking a back seat in comparison with Wales, prudently avoided all reference to the Welsh Board.

(4) Anomalous Position of Secondary Education.

The poor man with a primary school usually within easy reach is amply provided for, but the middle class, who contribute very largely to education rates, but who cannot afford to send their children to very expensive schools, and yet wish for more than can usually be had in a Board School, are left to shift for themselves in the best way they can. There is no good reason why this class should not be able to get, at a reasonable rate, an education suited to their social position. It is doubtful whether free secondary education is either hopeful or desirable. It is better to reduce than abolish secondary school fees. To do so, and

also provide bursaries, or free places for the promising poor, so that the best brain of the country from whatever class may be utilised, is the legitimate function of the fund secured by the Act of 1892. It is to be hoped that the recent £35,000 placed in the hands of the Department may be so dealt with as to place secondary schools of the classical type in approximately the same position as the schools of science to which a capitation grant has been offered.

(5) Burgh Schools and their relation to School Boards.

Till lately higher class schools without endowment had to depend entirely on fees. The Act of 1892 proposed in its preamble to provide efficient education for the whole people of Scotland, but its contribution to this desirable end amounted at first only to placing the Burgh Schools under the management of School Boards. The Act of 1878 allowed them to make demands on the School Fund, *i.e.*, on rates for buildings and other expenses for the promotion of efficient education. Of this permission School Boards have made scarcely any use except for buildings. The attitude of the Department towards such demands has been all that could be wished. Sir Henry Craik, in his report for last year, refers in terms of regret—I had almost said of reproach—to the timidity of School Boards in this matter, as a timidity that can be altered only by improved public opinion. The feeling that higher education is a matter of national interest has not been strong enough to overcome fear of the ratepayer. School Boards generally, and especially rural ones, are, from deficient culture and imperfect sympathy, ill suited for the oversight of higher education. Their interest is principally focused on large grants and low rates. The case is different in large towns, where the area of choice is wider, but even there the School Board can scarcely help feeling that the primary school is the chief object of its care, as being that for which it was specifically called into existence. An additional element, university or municipal, or both, would give steadiness to its action, and protection against the possible jumble that may occur every three years. In rural districts the steadying and protecting element might be furnished by forming a higher education committee for the county, consisting of the chairmen of the various boards in the county, with the addition of some members of the county council and secondary education committees, either co-opted by the chairmen of the boards or nominated by the Department. Two advantages would thus be gained: one, the required wider area; the other, the close and immediate interest of the boards in each parish. The admirable management of the Merchant Company and George Heriot Schools in Edinburgh, the High School of Dundee, and others, furnishes a strong contrast to that of School Boards. Till some such addition as that suggested has been made, the Burgh Schools will not get justice done them. To secure this legislation seems imperative.

(6) Transference of Primary School Pupils to Higher Class Schools.

The difficulty of bringing primary school pupils into line with those of the same age in higher class schools will continue as long as the curriculum of the higher class school remains as it is. Might not this, with advantage, be somewhat altered? There is a difference in the elementary training of the two schools, but it need not be so great as it is, or as some maintain that it should be. The foundation in both is, or ought to be, satisfactory proficiency in elementary subjects, with some knowledge of geography and history. The primary pupil is, in this respect, generally superior to the high school pupil, but the latter knows more Latin. Is the advantage entirely on the side of the high school? Both abroad and in Great Britain the idea is gaining ground that Latin is commenced unprofitably early, that consolidation of attainments in elementary subjects, the widening of intelligence by lessons in English, geography and history, and breaking ground in French as being an easier language, are more on the level of the mental development of a boy of ten than the memory work of Latin declensions and conjugations, and that by the postponement of Latin till, say eleven, the advancement at fifteen would be as great as if it had commenced at ten. By such an alteration the primary pupil would almost at once get into line with the high class pupil.

(7) Burgh Schools poached upon by Primary Schools.

This has been complained of, in some cases justly, in many unreasonably. Nothing could be more unreasonable than the suggestion that even the elements of secondary education should be forbidden in a primary school. A certain amount of overlapping on to the fringe of secondary education is necessary, not in every school, but if possible, in at least one school in every parish. We cannot cut off the modern representatives of the old parish schools from what, with all their faults, we cannot deny to be a grand tradition. Some consideration is surely due to pupils who wish something more than the "beggarly elements," but who cannot afford to go to a higher class school. In such cases there is no poaching. Poaching begins, and injury is done in the secondary school when, in the advanced department of a primary school, higher subjects are carried so far as to keep pupils from going to the secondary school who can afford to go there and would otherwise do so. Any injury has been more than compensated by the number in whom the beginnings of advanced work in a primary school has awakened a taste for more, and who, in pursuit of this more, have afterwards gone to the secondary school. This is one of the links that connect the primary with the secondary school, and make Professor Huxley's ladder from the gutter to the university a possibility and a reality. There are thousands all over Scotland who, by this means, have reached positions of eminence, and have reason to bless the existence of a certain amount of secondary education in primary schools.

(8) Leaving Certificates.

The scheme of leaving certificates has given a most healthy impulse to higher education in both secondary and primary schools. While it is thought desirable that a complete certificate should be issued only to those who pass in a specified group of subjects, there are certain considerations that must be taken into account. As a rule, only fully equipped secondary schools could meet the demand of grouped certificates. Advanced departments of primary schools could in most cases not attempt more than one or two. The candidates from secondary schools last year numbered upwards of 5,000, while those from primary schools were upwards of 11,000. These facts must be faced by a department which provides for all and not for the few. If groups were made imperative all round, the majority of these 11,000 candidates would cease to compete, and advanced departments in primary schools would in many cases be discontinued. This is a step which the department cannot be expected to take. It is no small matter that 11,000 pupils, who every year work steadily with a definite aim, and more or less success at higher subjects (inferior as I admit such training is to that of a fully-equipped secondary school) should be cut off, as they would be by examinations for single subjects being discontinued. I should welcome a proposal that such single passes should simply be recorded as contributory to a leaving certificate to be issued when the number reaches that of an approved group; that this should apply only to pupil

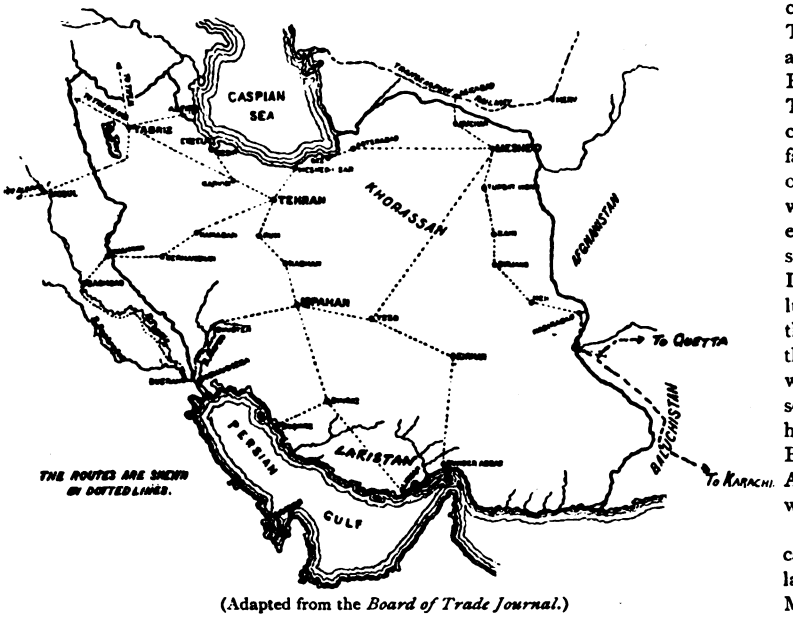
teachers and candidates from primary schools; and that candidates from secondary schools should be admitted to examination only for groups of subjects. The department has a numerous offspring to provide for, and not an only child. All the members of the family have equal claims on its parental care. Exclusive attention to any individual member would cause the department to forfeit its claim to be what, I am convinced, it is most anxious to be, the head of a well-regulated family. The future is full of promise. With a department in full sympathy with all that is best in a sound and liberal education, to whose hands it is both desirable and probable that the administration of the funds referred to will be entrusted; with a steadily growing sentiment that secondary, quite as much as primary, education is a national concern, and as a consequence of this, encouragement to School Boards to draw with reasonable freedom upon the rates for the promotion of secondary education, we have good reason to hope that it will have a successful future under the favourable conditions of united action and complete organisation.

CURRENT GEOGRAPHICAL TOPICS.

By A. J. Herbertson, F.R.G.S.

I.—Persian Trade and Trade Routes.

Persia and Afghanistan, in the west of Asia, are among the small States in that continent which still retain their independence through the jealousies of European Powers. Persia and Afghanistan occupy the Iranian mountain and plateau area between the Pamir and the Armenian Highlands, two mountain "nodes," as they have been called, where the Asiatic highlands are narrowed and the northern and southern lowlands approach each other. Russia and Britain are the two Powers contending for the mastery in this region.



(Adapted from the *Board of Trade Journal.*)

Russia has climbed up the valley of the Amu Daria and its tributaries, Britain up the Indus and its tributaries, until their frontiers practically meet in the Pamirs. In the south-east of the Iranian plateau Britain has its outposts beyond the Bolan Pass at Quetta, and its sovereignty extends over the south of the plateau almost to 61°E. In the north-west Russia has a footing on the Iranian plateau on the upper course of the Aras river. Each country watches with jealous eyes the attempts of the other to control and govern the trade of Persia or Afghanistan.

In recent years Russia has made great progress in its trade relationships with Persia, mainly through the ports on the Caspian Sea. Through the small port of Astara a route passes to Tabriz, the great commercial centre of North-west Persia, which is also connected with Tiflis by caravan route. Tabriz receives sugar from Russia by these routes, but most European products come through Trebizond on the Black Sea, and consist mainly of Manchester cottons and Austrian woollen goods, in return for which Persian carpets are exported. It is reported that Russia has had preliminary surveys made as far as the Persian Gulf for a railway along the western frontier of Persia.

The ports of Enzeli and Resht are far more important, and along with Meshed-i-Sar, also on the south of the Caspian, are connected with Tehran, the capital, by passes through the Elburz Mountains. Sugar is the chief article imported through Resht and the Caspian ports from Russia, and rice, fruits, raw cotton and tea are the chief exports to Russia.

The trade of Khorassan, or North-east Persia, is half in Russian hands, and is carried on through the port of Gez on the Caspian by Asterabad, or through the station of Askabad on the Transcaspian Railway, from which the route climbs up the mountains to Meshed, the most important city in this region. Russia proposes to extend its railway into this region.

Until recently, the trade between British India and Khorassan, about half that of this region, was carried on almost exclusively by the Persian Gulf from Bandarabbas, on the Strait of Ormuz, from which it is less than 1,000 miles distant, a camel journey of from two to three months. The British Government has recently opened a new route from Quetta by the north of Baluchistan and through Seistan to Khorassan. This route is nearly 1,100 miles long, but it can be traversed in two months owing to the facility with which camel transport can be obtained, and the avoidance of the delays with the custom officers and forwarding agents encountered on the other route. It has been suggested that an even better route from India would be from Karachi, through Baluchistan south of the Kharan desert and by the river Mashkel to Seistan. This way passes through a comparatively fertile and well-watered district, which could be rendered more so by improved irrigation. The natural route, however, would be by Kandahar, and were British control to extend into southern Afghanistan, no doubt much Indian trade would follow this historic trade route.

A large part of the trade of Persia is still carried on through the Persian Gulf, and is largely in British hands. Besides the routes to Meshed from Bandarabbas already mentioned, this port is also connected with the capital, but by far the most trade passes through Bushire, from which steep limestone terraces are climbed to Shiraz, whence the road proceeds northwards through Ispahan. Most of the Indian trade with Persia is carried on through Bandarabbas and from Lingah, from which a caravan passes to Shiras. Lingah, the port of Laristan, also does a large trade with Arabia.

The Karun river, which joins the Shat-el-Arab at Mohammera, is navigable to near Shushter, from which the plateau is climbed to Ispahan. Some goods are imported by this route,

and small quantities also through Basra and the Tigris to Bagdad, from which caravans pass to Tehran.

In 1897 £1,700,000 out of £2,200,000 of imports through the Persian Gulf came from India and the United Kingdom in almost equal proportions from each. Only half of the £1,200,000 of Persian exports through the Gulf ports were sent to India and the United Kingdom in return, and four times the £120,000 shipped to the United Kingdom went to India.

Tea and piece goods are the commonest imports into Persia through the Persian Gulf, petroleum is naturally brought across the Caspian, and sugar enters Persia by Caspian ports. The general exports are opium, carpets, precious stones, pearls, dried fruits, mainly dates, and raw cotton.

II.—The Canadian Rockies. Between Kicking Horse and Athabasca Passes.[1]

For half a century Mount Brown and Mount Hooker have figured on maps of Canada as the highest peaks in the Rocky Mountains, being reckoned between 15,000 and 16,000 feet high. These mountains were visited by Mr. Douglas, the botanist, after whom the Douglas pine of British Columbia is named, in 1827, and they are easily identified by means of a little tarn known as the Committee's Punch Bowl which lies between them. Professor Coleman visited this region in 1893, and saw that the mountains could not be more than about 9,000 feet, while many peaks, 2,000 and 3,000 feet higher, existed round about. The lowering of these reputed giants attracted much attention, and naturally led to the exploration of the comparatively little known country between them and the Canadian Pacific Railway.

In the past three years several parties have visited the mountains north of the Kicking Horse Pass, where the Canadian Pacific Railway crosses the Rockies, and have given us a general idea of the nature of the region, one of lofty mountains and great glaciers. Several peaks between 10,000 and 12,000 feet have been climbed, and other peaks between 12,000 and 14,000 feet have been seen and located from those scaled. Of these the most important are, Mount Forbes, Mount Bryce, Mount Columbia, and Mount Alberta, all probably about 14,000 feet high. They lie between the Saskatchewan and the Columbia rivers and between Kicking Horse Pass and the Wood River, which joins the Columbia where it turns sharply to the south.

Great glaciers gather in the upper valleys round these mountains and feed the tributaries of the Columbia on the west, those of the Saskatchewan on the east, and in the north send waters to the Athabasca. The Columbian icefields, round Mount Columbia, are the sources of rivers whose waters flow through the Saskatchewan to the Atlantic, through the Athabasca to the Arctic, and through the Columbia to the Pacific Oceans.

The north fork of the North Saskatchewan flows south in a longitudinal valley from the Saskatchewan glacier, which forms a tongue from the great Columbia icefields, and meets the south fork flowing in the same longitudinal valley from the south. They join and flow eastwards between the glaciated Mount Murchiston in the south, and Mount Wilson in the north, the former probably 11,500 feet high, the latter 1,000 feet lower. In this region many large valleys converge, and it will probably be one of the centres for mountaineers when the lofty mountains, with their great glaciers and thick pinewoods, are opened to travellers. The scenery here rivals that of the Alps, and is sure to attract many climbers.

Mr. Wilcox gives a good account of this region in the *Journal of School Geography* for December, 1897, from which the following description is quoted :—

"The Canadian Rockies are characterised by narrow and deep valleys hemmed in by sheer cliffs and precipices rising in solid walls of rock thousands of feet in one mighty leap. Add to this the depth and extent of perpetual snow, the pure white ice of the glaciers hundreds of feet thick clinging to narrow shelves on the mountain sides, and the contrasted beauty of the richly forested valleys, adorned by sparkling streams, beautiful waterfalls and lakes of exquisite colouring, and only then shall we have any clear idea concerning one of the most attractive regions of the world. The scenic charms of this region are rapidly becoming better appreciated among travellers, and in a few years the Canadian Rockies will in all probability be one of the favourite resorts of the world for mountain climbers and those who delight in the grandeur and beauty of nature."

[1] See *Geographical Journal* for April, and *Blackwood's Magazine* for February.

ITEMS OF INTEREST.

GENERAL.

THE Committee of Council on Education have requested the London School Board to prepare a statement showing what part of its expenditure on higher-grade schools falls within the limits of "elementary education," and what part has been incurred by the teaching of more advanced subjects.

IN his Report for 1898, on Elementary Education in the North-Central Division of England, the Rev. C. H. Parez speaks of the effects of the omission of examination and the substitution of simple inspection in the primary school, which change, he thinks, can now be pretty well gauged. The new method is very generally approved, and the number of schools excluded from it quite unimportant. Children hitherto have been told too much, and too little encouraged to discover. Mr. Parez thinks, and we agree with him, that the teacher's aim should be, if possible, to avoid telling the children and instead to lead them, by barring unpromising channels of thought, or by other devices, into a position where they shall be stimulated to find out for themselves.

THE Board of Education Bill was read a second time in the House of Lords on April 24th. Referring to the Bill, and in reply to criticisms, the Duke of Devonshire explained that the Government considers it desirable to completely reorganise the Education Department before the new local authorities for secondary education are called into existence. His Grace remarked that there is no insurmountable reason why a measure dealing with these local authorities should not be introduced and passed next session. As regards the consultative committee, the Government does not propose that it shall have any statutory character. The committee is to be the creation of the Minister, who is to be responsible for its action; and its duties are to be such as the Minister, on his responsibility, entrusts to it.

THE Council of the Association of Technical Institutions has unanimously adopted the following resolutions referring to the Board of Education Bill: (1) In reference to section 2 of clause 3, "That, inasmuch as in some counties and in most county boroughs the funds available are already fully appropriated for the purposes of technical education, it is not, in the opinion of this Council, desirable that these funds should be applied to the payment of the expenses of inspecting schools under this section." (2) "That, in the opinion of this Council, having regard to the fact that the funds assigned under the provisions of the Technical Instruction Acts are not more than adequate for the maintenance and development of technical education, it is essential that for the further purposes of secondary education additional funds be provided." The Council has also decided

to take steps to endeavour to secure that the interests of technical education shall be adequately represented on the consultative committee named in clause 4 of the Bill.

The last report of the Council of the Childhood Society shows that the association is continuing its very useful work. Since its foundation in 1896, with a membership of ten, the Society has steadily grown and augmented its number to eighty-four. The objects of the Society are: (1) To promote the study of educational methods and of the environment of children during school life best suited to ensure the mental and physical development of normal children, as well as of those whose conditions are abnormal, or who are feebly gifted mentally. (2) To supply information and diffuse knowledge on points connected with the mental and physical status of children, by means of publications, lectures, &c. (3) To promote the training of teachers specially qualified to deal with such children; and assist by legislation, philanthropic efforts, or otherwise, the provision necessary for them. The annual subscription of a member is half-a-guinea, and the offices of the Society are at Parkes Museum, Margaret Street, London, W.

The first number of *The Paidologist*, the organ of the British Child-Study Association, was published in April at Cheltenham. It is to be issued three times yearly, at an annual subscription of 1s. 6d. The editorial explains the somewhat formidable title in the following words:—"The title of the magazine may seem to call for apology. It is intended to be unattractive to children, and to those who, from lack of special interest in the topics treated of, would be 'bored' by that which the title represents. We hope it may commend itself, when endeared by familiarity, to the world-wide circle of lovers of children to whom ('Seid umschlungen Millionen') we would open our hearts and our minds in cosmopolitan brotherhood." Among other interesting articles, that by Dr. T. S. Clouston, the President of the Child-Study Association, on "What the Brain has to do in Youth besides 'getting educated,'" and that by Mr. H. Holman, H.M.I., on "Imitativeness in School Children," deserve special mention.

The second number of *Child Life*, a quarterly periodical, published at a shilling by Messrs. Geo. Philip & Son, contains a very interesting paper by Prof. Earl Barnes on children's "property-sense." Three hundred and fifty girls in London Board Schools answered the following test: "Tommy Parker was going fishing for sticklebacks with two other boys, when he found a shilling in a ditch on the way. If you had been in Tommy's place, what would you have done with it?" The idea was that the study would throw some light on the children's attitude towards found property, and on the way they tend to deal with complicated obligations. The replies were quaint and various. A girl of nine is typical who says: "Shared it between them. Why?—Because that was not greedy." We must refer our readers to the paper itself for an entertaining half-hour.

Prof. Barnes would like some papers written by children in answer to this test: A child used to pick up sticks to light the fire with. Its father paid it a penny for every basketful it brought in. Do you think the child ought to have been paid for its work or not? Why?—To those who will send papers to Prof. Barnes, at 36, Gower Street, London, W.C., he will be very grateful. We think the exercise would supply the subject for an essay in lower forms; the children should put their ages on their papers.

One of the many good services which the Teachers' Guild does for the schoolmasters and schoolmistresses in this country is to publish an annual edition of the little book, "Holiday Resorts and Recommended Addresses." The 1899 issue is corrected to February last. The volume is prepared by a sub-committee appointed by the Council of the Guild, and is revised every year, a circular letter (in English, French, or German, according to circumstances) being sent to all private addresses, pensions, and most hotels, with the object of verifying particulars for the new issue. Most of the addresses are recommended by members of the Guild, but some also are admitted when recommended by two non-members in independent letters, and a few on public repute. No money is received from anyone for inserting any address. Copies of the book can be obtained, price 1s. net, from the offices of the Guild, 74, Gower Street, London, W.C.

Alexandra College, Dublin, is being enlarged in order to give additional class-rooms and to otherwise improve the accommodation. The appeal made to the public to contribute to the building fund has been responded to by some handsome donations. About half of the £7,000 needed has now been subscribed.

The Irish Intermediate Examinations for secondary schools will be held, as usual, about the middle of June in centres in different parts of Ireland. There is a diminution of 1,000 this year in the number of students entering. This is accounted for by the new rule which now comes into operation for the first time, making fourteen the lower limit of age for candidates in the Preparatory Grade examination. Last year nearly 10,000 pupils entered for the examinations in the four grades.

The Irish Intermediate Education Commission, which was appointed last year to enquire into the working of the whole system, is expected to report next month. About £70,000 or £80,000 a year is spent, as an endowment to Irish secondary schools, entirely in the form of exhibitions, prizes and grants on the results of the annual public examinations. The system has naturally given rise to many evils, such as cramming and excessive competition, and much dissatisfaction with the type of education that has been developed has existed in Ireland for some time. The Commission has examined an immense mass of evidence, written and oral, very conflicting in character. The results of the Commission are of the highest importance, as the Intermediate system moulds almost the entire teaching in Irish secondary schools.

The accepted scheme for the administration of Dean Colet's fund, from which St. Paul's School now receives £14,000 a year, makes provision for a new school of four hundred girls, with one competitive scholarship out of every ten girls, and an annual expenditure of £500 on exhibitions to the women's colleges. There will be a governing body of thirteen, seven to be nominated by the Governors of St. Paul's, two by the County Council, two by the School Board, and two (apparently) co-opted. Three of the thirteen are to be women. It is expected that the building of the school on Brook Green, London, W., will be put in hand this year.

The third annual conference of the Parents' National Educational Union was held at the Portman Rooms, Baker Street, W., from May 9th to 12th, 1899. The programme of the week's meetings included several very interesting items. On May 9th Mrs. Boole lectured on "The Unconscious Preparation of the Mind for Science." On the 10th, Mrs. Fisher (Miss Arabella Buckley) lectured on "The Training of Children in the Observation of Nature;" and Dr. H. Laing Gordon spoke on "Parental Peculiarities and Parental Possibilities." Mr. M. E. Sadler also lectured. On the 11th, Miss Carta Sturge opened a discussion on "The Inculcation of the Spirit of Reverence." On the 12th,

Miss Helen Webb spoke on "The Formation of Habit," and Miss L. H. Montagu on "The Training of Citizens."

IN the account of an interview recently published by the *Daily Chronicle* with Miss Hughes, who, as most of our readers well know, is retiring, through ill health, from the Principalship of the Cambridge Training College for Women Teachers, she is reported to have said, there are two reasons why the number of women teachers is not likely to be much increased in the future. Firstly, the standard of requirements is rapidly rising, and secondly, there are so many new spheres of work opening for well-educated women that teaching will no longer be the refuge for the destitute which it has been in the past.

ACCORDING to elementary text-books, the earth is an oblate spheroid, that is, a sphere slightly flattened at the poles. But this designation only very roughly expresses the earth's shape. It is now universally admitted that the earth is flattened laterally at the equator as well as at the poles; moreover, the northern hemisphere is certainly more flattened than the southern, thus giving our globe a more or less peg-top form, though to teach children that the earth is like a peg-top would be worse than using the old-fashioned simile of an orange. Sir John Herschel once aptly expressed the facts in the statement that "the earth is earth-shaped," and the word *geoid*, which conveys this view, has now supplanted the old oblate spheroid in most geographical works other than text-books.

IN a recent paper read before the Royal Geographical Society, Dr. J. W. Gregory discussed a number of theories as to the shape of the earth, and he showed, by evidence derived from consideration of the positions of the main watersheds and mountain chains, and the distribution of land and water masses, that the earth is approximately a tetrahedron, that is, it has four faces, six edges, and four solid corners. This view seems ridiculous at first sight, but there is a large amount of scientific evidence in favour of it; for numerous experiments have shown that every hard-shelled body which is diminishing in size, owing to internal contraction, is constantly tending to become tetrahedral in form. According to this, the earth must become more and more a tetrahedron in shape as time goes on.

FOREIGN.

IN all the schools of Denmark great importance is attached to the study of at least two living languages, and in all the courses German and English are obligatory subjects. French is generally optional, and in some schools Russian and Spanish (for trade with South America) are taught as well. Clerks and shop-assistants having a fair knowledge of two languages beside their own are much more numerous in Copenhagen than in London.

IN a recent address on secondary education, Professor Hanus, of Harvard University, strongly urged that the secondary school should more definitely train for citizenship. He pointed out that this meant that teachers must identify themselves with public concerns; *e.g.*, if there is to be a new town hall or a new public library, if houses are to be torn down and playgrounds for the children of the poor are to be provided, the teachers of secondary schools must be concerned in these public matters, for in this way the meaning of citizenship is best made apparent to the children. Those in charge of public offices, the park commissioner, the city engineer, or the director of some factory, might with advantage be invited into the school to impart, by means of lectures or informal talks, some comprehension of civic and industrial industries. The latter idea is novel, but how would the public officials regard the suggestion?

PROFESSOR JAMES RUSSELL, of the Teachers' College, Columbia University, in a paper[1] read before the Department of Superintendence of the National Educational Association of the United States, deals with the subject of "The Training of Teachers for Secondary Schools." After considering the unsatisfactory aspects of secondary education in America, Professor Russell comes to the conclusion that the only hope for an improved condition of things lies in the introduction of professionally-trained teachers specially fitted for secondary work. Four qualities are to be desired in such teachers. First, general knowledge, such as is possessed by a student after four years' university training. Secondly, professional knowledge, including at least an appreciation of the physical conditions essential to success in school work, and a thorough understanding of (*a*) psychology and its applications in teaching, (*b*) the history of education from the cultural standpoint, (*c*) the philosophic principles that determine all education. Thirdly, special knowledge of some subject taught in secondary schools. Fourthly, technical ability to teach. Under the last heading it is pointed out that ability to maintain order in the classroom, to get work out of his pupils, to satisfy examiners, to keep fine records and to mystify parents—this too frequently passes for ability to teach. Professor Russell says, "A survey of the field of secondary education discloses that these four essential qualifications of the secondary teacher are everywhere recognised in practice. The difficulty is that few teachers unite them in due proportion."

LEGISLATION is not the only remedy, Professor Russell believes, for existing evils in American secondary education; he thinks that the discovery of the cure is to come from the Universities through their departments of education and their teachers' colleges. The best legislation would be, we are told, that requiring secondary teachers to earn certificates, the lowest requirements for which should be:—(1) The candidate must be a college graduate, or have the equivalent education, at least when he receives the certificate. (2) He must satisfactorily complete courses (*a*) in the history of education, (*b*) the philosophy of education, (*c*) psychology and its applications in teaching, and (*d*) school economy, especially school hygiene. (3) As evidence of special knowledge in each subject in which a diploma is sought, the candidate should be able to show the equivalent of at least three years' collegiate study in that subject—three to five hours a week. (4) The candidate must be given opportunity to observe good teaching, study its methods under guidance, and finally give instruction under normal conditions long enough to demonstrate his ability to teach.

IN the report for 1898 on the finances, administration, and condition of Egypt and the Sudan, Lord Cromer specially notices the remarkable progress which has been made in the matter of primary and secondary education. As regards the latter, Mr. Douglas Dunlop reports to Lord Cromer:—"The three secondary schools directly under the management of the Public Instruction Department—the Khedivieh School, with an attendance of 273, the Tewfikieh School, with an attendance of 170, in Cairo; and the Ras-el-Tin School, attended by 72 boys, in Alexandria—have all attained a high degree of proficiency, and can lose nothing by comparison with any European schools of similar rank."

AT the time of the British occupation of Egypt, now more than sixteen years ago, French, if not the only, was certainly the principal European language taught in the Government schools. English was either altogether neglected or, when any attempts

[1] The paper is printed in the April number of the *New York Educational Review*.

were made to give instruction in that language, the teaching was very defective. But an extraordinary change has since occurred. Every parent has been requested to state in writing whether he wished his son to learn French or English. He has been left entirely free to decide this question for himself. As time went on and the demand for teaching in English grew, the facilities for instruction in that language were naturally increased. The following table shows the number of pupils learning English and French respectively in the Government schools for each year during the last decade :—

	English.	French.
1889	1,063 ...	2,994
1890	1,747 ...	3,199
1891	2,032 ...	2,852
1892	2,237 ...	2,864
1893	2,434 ...	2,585
1894	2,669 ...	3,748
1895	2,655 ...	3,417
1896	2,800 ...	3,363
1897	3,058 ...	3,150
1898	3,859 ...	1,881

Lord Cromer summarises the present conditions of education in Egypt and the Sudan under the following heads :—(1) There has been a large aggregate increase in the attendance at the primary schools, and that it is more especially at these schools that the proportion of those learning English has undergone a great change ; (2) There has been some diminution in the aggregate number of pupils in the secondary schools, and although the percentage of those learning English has risen from 26 to 41, the majority of the pupils in these schools still prefer to be taught in French ; (3) In the technical schools, where the aggregate numbers remain about the same, the proportion of those learning English has slightly increased ; and (4) In the professional schools, where the aggregate attendance has remained nearly constant, the proportion of those learning English has risen from 22 per cent. to 49 per cent.

CURRENT HISTORY.

The apparently religious movement now proceeding in Austria-Hungary presents a peculiar problem, and should help British folk to understand the sixteenth century Reformation. The internal struggles of the Dual Monarchy are due to racial antagonisms. Germans are there face to face with the Czechs of Bohemia, the Maygars of Hungary, and the Slavic peoples of other provinces. Ever since Hungary made "insurrection" for Maria Theresia in the middle of the eighteenth century, the Hapsburgs have tended more and more to a non-German policy, and now that the various other parties have become powerful against the Germans, these are increasing in their desire to be incorporated with the German Empire, of which they were a part till 1866. As this is impossible in the political way, their aspirations have taken a religious turn, and as Germany is practically under the rule of Protestant Prussia, while the Slavs and other Austro-Hungarian nations are Roman Catholics, the phenomenon presented to us is a "revolt from Rome."

Oliver Cromwell was born on the 25th April, 1599, and he has not escaped the fate usual in these commemorative days of being tercentenaried. Much talk has been expended at the various meetings held in London, Huntingdon, and elsewhere, and naturally much of it is strained and unhistorical. It has indeed been interesting to watch the attempts at making the Puritan hero of the seventeenth century an object of admiration to the average Noncomformist of to-day. Cromwell saved the National Church from disestablishment and disendowment, he restored the ancient constitution in all but name, he was the first British Imperialist, the first Unionist—his Parliaments contained representatives from England, Scotland, and Ireland —his foreign policy was on the whole Protestant, though he balanced long between alliance with France and with Spain. Such a man is ill-adapted to be a popular hero.

Australian Federation is advancing, slowly, it is true, but in all probability it will shortly be realised. Perhaps it is the only instance of such a movement being brought about except under the violent pressure of circumstances. Canadian Federation—the nearest parallel, though in a reverse sense—was necessitated by the rivalry of French Roman Catholics and British Protestants ; the United States of America made their union for many urgent reasons, more or less temporary ; the German Empire united for obvious military reasons of defence against France ; but in the case of Australia there is only a desirability, not an urgent necessity, and therefore there are hesitations and reluctances to be overcome. The Australians have much leisure and many precedents. Constitution making is always an opportunity for the discussion of theories, a discussion which in most cases is closed by the necessity of speedy action, but in Australia this cutting of the Gordian knot is not available. We have had, therefore, many struggles on the part of the smaller colonies for the preservation of "state rights," and much opposition on the part of free-trading New South Wales to enter into what promises to be a more or less "protectionist" federation. *Che sara sara.*

The Dreyfus case still evolves with ghastly fascination. The great majority of us are simply bewildered with the endless contradictions which have arisen. But the moral of the whole story is plain to most British men. It is an object lesson which has taught us the radical difference between British and French ways of treating an accusation. Since the Petition of Right and the Habeas Corpus Act, we have gone on the principle that a man is innocent till he is proved to be guilty, that the *onus probandi* lies on the accusing parties, that it is better that the State should take some harm, or at least run the risk of doing so, than that any innocent man should suffer. In this we are unique among European Powers. On the Continent, the presumption is that a person accused by authority is guilty, he is examined by a *juge d'instruction*, and there is a *droit administratif*—we have no English equivalent for the phrases—which protects officials from the results of actions which, if done by a private individual, subject him to the penalties of the civil and criminal law. If an English War Office official had been condemned as Dreyfus was, he could instantly, by a writ of Habeas Corpus, have removed the case into the civil courts, and there the matter would have been settled at once ; there would have been no need for a three-years' agitation.

Remuneration of Schoolmasters.—The Report of the Commission on Secondary Education tells us that in ten of the best schools the average salary of an assistant master is £242 and a fraction per annum, in one hundred and ninety others it is only £105, giving an average in the two groups of £135. The lists of masters wanting appointments published by the educational agents tell an even sadder story ; from them we learn that men who have had adequate experience of teaching, and who are in no sense failures, who have begun work with the qualification of high University honours, and who have since taught themselves to be good teachers, cannot hope to command even the moderate salary of the ten best schools mentioned in the Report of the Comissioners.—John C. Tarver, "Debatable Claims." (Constable.)

THE SCHOOL PULPIT.

NOTABLE PASSAGES FROM SERMONS PREACHED IN PUBLIC SCHOOLS.

Lovers of Self.[1]

NOT many weeks ago I was standing at the outskirts of a town[2] of ancient and historic fame, whose position is almost unique among all the towns of the world. For on three sides of it it looks down upon a precipice so deep, so sheer, so abysmal, that one shrinks back instinctively from the edge of it. Surely an impregnable fortress, one would say: a city in which men may dwell secure, and fear no enemy and no assault. And yet the records of it tell us that it has been taken no less than four-score times in the memory of man. And why? Simply because, though its three sides are so sheer and so unapproachable, its fourth side is comparatively easy of access, and has been guarded with too little vigilance by generations of citizens who thought themselves safe. And so it is with the fortress of the heart. It is quite possible for us to be, and to know and feel that we are, safe almost in every point against the temptations which Satan can bring to bear against us; but if there is one weak side to our hearts, if there is one point upon which we find it hard to resist, be sure that the citadel of our hearts is in danger, and needs earnest and vigilant guardianship. There are few more dangerous things for the soul of man than to think itself safe, to know that it is proof against ninety-nine of the sins which prove fatal to others, while it offers no resistance to the hundredth. It is thus again and again that Satan has found his way into the heart, and come in the end to make himself lord there. Beware how you cherish a single sin, be the sin what it may! in the long run it must open your heart to others. It is not enough to resist pride or dishonesty or evil temper if you let yourself be untruthful: not enough that you guard yourself against lying or conceit or irreverence if you let Satan enter by the gate of impurity; not enough to be proof against arrogance or greediness or cruelty if anger flings open the portals of your heart to every evil thought. It is very often not the great sins which we know we can resist that are dangerous to us, so much as the smaller sins for which we make allowances, and in which we indulge ourselves. God help us so to watch and guard our hearts that we never let any sin be so engrained in our nature that the love of self must mean the love of our one besetting sin. "My little children, keep yourselves from idols."

Hitherto I have only spoken of those kinds of selfishness where self-love was bad because self was bad, or contained a bad element. But it is perhaps a commoner form of it yet when, though our nature may not be utterly depraved or undermined by any one paramount sin, we still think only of ourselves, our own interests and pleasures and wants. In the one case self-love was bad because self was bad; in this it is bad because the love is excessive.

This complete concentration of the thoughts upon self is the commonest thing in the world. It comes out in a score of ways. It comes out in self-conceit, when we seem to ourselves to be a sort of centre of the universe, or at any rate of that part of it in which we immediately move. It is not only that we give ourselves a much higher position in it than we are entitled to, but that we see everything that goes on only from the point of view of how it affects ourselves. The thought of self, in fact, colours everything that we see, enters into all our thoughts: we can't get rid of it. Or again, it comes out in contempt of others: in one way or another we come to regard the rest of the world as somehow beneath us and unworthy to consort with us. Or yet again, it reveals itself in our carelessness about the interests and feelings and pleasures of others. We say just what comes into our heads, no matter whose feelings we are hurting: we do exactly what we like, no matter who suffers. No appeal to our generosity moves us to a real act of self-denial. We are not perhaps actually mean or grasping or hard, but our standard is a low one, because we have never taught ourselves to think of others in our daily and hourly doings.

Now that, I take it, is not an unfair description of a very large number of people in the world; and I want you to bring it home to yourselves to-night how very true it is of a great deal of our school life here. There are some points in which the standard of unselfishness in a school is a good deal higher than it is in the world generally: for instance, I have no doubt at all that a very large number of you indeed would any day accept a tolerably severe punishment rather than get a schoolfellow into trouble. But ask yourselves whether you are entirely consistent. Two boys are, let us say, in the same study together: one strong and robust, entering with a healthy vigour into every game, into every trial of strength, into every side, in short, of the life of school, whether it be work or play. The other is different: perhaps he doesn't care for games; perhaps he is dreamy and absent, wanting in tact, an unconscious offender against the ways of school life; or perhaps he is new, and hasn't learnt to fall in with them. What is the result? Of course, you will say, there won't be much sympathy between them: they won't get on together. True, but is that all? Do you, the strong, healthy schoolboy, to whom few things in life come wrong, you who would, as I said just now, fifty times rather take a thrashing than be a sneak—do you try and make allowances for your weaker companion? Do you try and help him? Do you try and keep down your contempt for his odd ways and his social slips? Do you try to speak a kind word when a harsh one rises naturally to the lips? Not always, I fear; and that is why school life is not as happy as it might be, or as it should be, not only to the few eccentric ones who are too odd ever to expect much sympathy, but to many whose only eccentricity is that they have a higher sense of honour and duty and industry than obtains among their fellows. It is to thoughtful minds perhaps the most discouraging side of school life that it tends to grind down everything and everybody to one dead level of conventionality: and if finer and more sensitive spirits escape this fate, it must be often at the cost of much resistance and some suffering. Let me plead with you on this first Sunday of term to aim at being more consistently kind. It is not enough that you would scorn to be bullies. Something more is asked of you. Think less of yourselves. Put yourselves in the place of others: be sympathetic when you might be hard. Remember that a very little kindness often goes a long way, and may cure a great deal of unhappiness. It is not by big sacrifices, but by little acts of thoughtful self-denial done cheerfully and quietly hour by hour, that we may best live the Christian life, and best help our brothers in the world.

[1] From a sermon preached in the chapel of Rossall School, by the late Headmaster, the Rev. H. A. James, D.D., Headmaster of Rugby School.
[2] Constantine, the ancient Cirta.

The Influence of the Teacher.—Whatever sense of order, discipline, duty, children acquire, is acquired mainly from the teacher. All idea of knowledge, of thinking, and of mind, is traceable wholly to the teacher. In short, character in its full sense, intellectual, moral, spiritual, is moulded to a startling extent by the teacher, who is himself a living object lesson to the taught, and unconsciously is made their model. From character flows almost everything else.—Harold Hodge, *Fortnightly Review*, May, 1899.

LONDON MATRICULATION, JUNE, 1899.

Guide and Monthly Test Papers.—No. V.

I.—Latin.

Grammar and Composition.

(1) Give the accusative singular and genitive plural, if in use, of—Abies, seges, pulvis, hiemps, anceps, manceps, palus, cinis, pecus, ligo. In the case of the nouns give the gender also.

(2) Give the 1st person singular perfect indicative supine in—*um*, and infinitive present of—Caedo, cado, ēdo. ēdo, prodo, prodeo, proficio, proficiscor, nascor, nanciscor.

(3) What constructions are found with—Oportet, sequitur, permitto, contingit, prohibeo? Give examples of each. How does the meaning of the following vary with the case or construction employed—Consulo, impero, moneo, caveo, praesto?

(4) Put into Latin—by my advice; worthy of ruling; all of you; he is persuaded; he is being persuaded; a ditch six feet deep; the more the merrier. And correct—Hic rumor multum eum nocuit: non dubito te vera dicere: videtur eum errasse.

(5) In what ways can you express purpose and value in Latin? Illustrate your answer by examples.

(6) Turn into the Latin *oratio obliqua* after a verb in the past tense—Have courage. Why do you remain here instead of breaking up the camp and attacking the enemy? Though they are many in number, yet by courage and energy you can utterly destroy them.

(7) Translate into Latin *five* of the following sentences:

(*a*) Your letter arrived too late for me to answer yesterday.

(*b*) Cæsar replied that the messengers would have been spared had they spoken the truth.

(*c*) The next time you see the brave consul I wish you would ask him how much he gave for his house at Baiæ.

(*d*) We must take care to leave Rome before Sulla arrives.

(*e*) He gave no answer when I asked what he meant to do.

(*f*) I then beg of you to oblige him in all things, so far as you can do so without trouble to yourself.

Cicero. Pro Marcello.

Revision of Whole Book.

(1) Translate:

Ch. 2 § 6 Quae quidem . . . . . omne ducit suum.
Ch. 8 § 23 Omnia sunt . . . . . mederi nemo potest.
Ch. 11 § 34 Quod autem . . . . . cumulus accesserit.

(2) Translate, and explain the construction of the italicised words:

(*a*) Diuturni *silentii*, patres conscripti, *quo* eram his *temporibus* usus non *timore aliquo* sed partim dolore, partim verecundia, finem hodiernus dies attulit *idemque* initium, quae *vellem* quaeque sentirem, meo *pristino more* dicendi.

(*b*) Soleo saepe ante oculos ponere idque libenter crebris usurpare sermonibus omnis nostrorum imperatorum res gestas cum tuis non posse conferri, nec vero disiunctissimas terras citius passibus cuiusquam potuisse peragrari, quam tuis non dicam cursibus, sed victoriis *lustratae sunt*.

(*c*) Equidem de te *dies* noctesque, ut debeo, cogitans casus dumtaxat humanos extimesco doleoque, cum respublica immortalis esse *debeat*, eam in unius mortalis anima consistere.

(3) Retranslate:

(*a*) The praises of your military exploits will be sung not only in our own tongue but in that of every nation in the world; but such exploits seem somehow, even when one reads of them, to be drowned by the cries of battle and the blare of trumpets.

(*b*) But unless this Commonwealth be wisely re-established in institutions by you bestowed upon us, your name will travel over the world, but will have no stable habitation: and those who come after us will dispute about you as we have disputed.

(4) Give as full an account as you can of Cæsar's work after the Civil War came to an end.

(5) How far are the sentiments to which Cicero gives utterance in this speech consistent with his previous and subsequent attitude towards Cæsar. What is your estimate of Cicero's character?

Cicero. In Catilinam I.

Revision of Whole Book.

(1) Translate:

Ch. II. § 4 At vero nos . . . . . condemno.
Ch. VI. § 15 Ac iam illa . . . . . corpore defigere.
Ch. XII. § 30 Qamquam nonnulli . . . . malorum omnium.

(2) Give the meaning of and explain—Patres conscripti; ante diem XII. Kalendas Novembres; in Etruriae faucibus; inter falcarios: consul designatus: ubinam gentium: quaestiones.

(3) Sketch the life of Cicero up to the delivery of the Catilinarian Orations.

(5) How are the following expressed by Cicero—

(*a*) do you remember my saying?

(*b*) at the last meeting for the election of consuls.

(*c*) known by your own exertions only.

(*d*) without any public summons to arms.

(*e*) but it is worth while.

(6) Translate, with grammatical notes when necessary—

(*a*) Superiora illa quamquam ferenda non fuerunt, tamen, ut potui, tuli: nunc vero me totam esse in metu propter unum te, quidquid increpuerit Catilinam timeri, nullum videri contra me consilium iniri posse, quod a tuo scelere abhorreat, non est ferendum.

(*b*) Si te iam Catilina, comprehendi, si interfici iussero, credo, erit verendum mihi, ne non potius hoc omnes boni serius a me quam quisquam crudelius factum esse dicat.

(*c*) . . . . . si mihi inimico, ut praedicas, tuo conflare vis invidiam, recta perge in exilium: vix feram sermones hominum, si id feceris . . . .

(7) Discuss the different views that are held as to the nature of the so-called "conspiracy" of Catiline.

II.—English.

Language and Literature.

Revision Paper.

(*Not more than ten questions to be answered: Nos.* 14 *and* 15 *must be two of them.*)

(1) What do you understand by "Latin periods" in English? What were the chief effects of each of these "periods"? Distinguish between "popular" and "learned" French words borrowed by English.

(2) What are the Teutonic elements in the grammar of English? Give a few names of common objects that are of French origin.

(3) Classify the consonantal sounds in English. What changes have taken place since the earliest times in the pronunciation of the *long* vowels *a, o, u*?

(4) What rules guide you in the formation of the plurals of (i.) compnund nouns; (ii.) foreign words? Account for the number of—*riches, scissors, banns, thanks, hopes, wages.*

(5) Give the history of the possessive case in English. Explain the forms—Wednesday, Lady-day. Give the possessive case of—*James, justice* (abstract noun), *Ulysses, Mr. Lewis.*

(6) Discuss the origin and grammatical use of—(i.) the gerundial infinitive; (ii.) the gerund.

(7) Explain the verbal forms in italics:

(*a*) He *dare* not eat the food; (*b*) How *do* you *do*? (*c*) He *need* not come to-morrow; (*d*) We *ought* to read this poem; (*e*) To *wit*; (*f*) I *am to be interviewed*: (*g*) You can take a holiday if you *like.*

(8) Parse the words in italics in the following:

(*a*) *When* did you come? (*b*) I know *when* you came; (*c*) You came *after* I left; (*d*) *As* the tree falls, *so* will it lie; (*e*) They are not such geniuses *as* you imagine; (*f*) We ran *like* the wind.

(9) What rules govern the position of the adverb?

(10) Distinguish between the uses of *who* and *what* as conjunctive pronouns. When may the conjunctive pronoun be omitted?

(11) Illustrate the rules that obtain with regard to the sequence of tenses in English. Discuss the following—"I hoped to have called."

(12) What is the difference in meaning between *anxious* and *desirous*, *latest* and *last*, *people* and *persons*, *vocation* and *avocation*, *unlikely* and *improbable*. Give examples of words that have undergone changes of meaning during the last three centuries.

(13) Explain the forms of the following words—Reticule, bridegroom, bonfire, widower, sirloin, umpire, posthumous, handicap, gingerly (in "to walk gingerly"), fuchsia, trickle, gadfly, dirge, walrus.

(14) Analyse:

Before the world had past her time of youth,
While polity and discipline were weak,
The precept, "eye for eye and tooth for tooth,"
Came forth—a light, though but as of daybreak,
Strong as could then be borne.

(15) Write an essay upon one of the following subjects:
(*a*) Vivisection; (*b*) Socialism; (*c*) Capital Punishment.

HISTORY OF ENGLAND, WITH GEOGRAPHY RELATING THERETO.

(53 *B.C.*—1700 *A.D.*)

Ten questions to be answered.

(1) Describe the Roman province of Britain. What effect has the Roman dominion had on the subsequent history of this country?

(2) Trace the growth of kingship and of manorial powers till the end of the Norman period; note specially royal titles.

(3) Group the events which illustrate the relation of Church and State before the Reformation, with special reference to the questions of investiture and jurisdiction.

(4) Describe the Shire Moot as it existed before the Norman Conquest, in the Norman period, and in the Angevin period.

(5) Give the chief points in the development of juries. In what sense may the House of Commons be called the "Grand Jury of the Nation"?

(6) In what senses may Wiclif be correctly called the "Morning Star of the Reformation"?

(7) What various principles governed the conduct of English statesmen in their dealings with Ireland, 1560-1700? Illustrate by specific reference to events.

(8) Were the Tudor sovereigns "despots"? What was the difference in principle between the rule of Elizabeth and James I?

(9) What were Cromwell's principles in (*a*) foreign policy; (*b*) constitutional methods; (*c*) relations of Church and State? Illustrate each section.

(10) Describe the "Cabal." How far was the modern Cabinet developed before 1700?

(11) What are "Dissenters"? What part did they play in English history, 1660-1700?

(12) Give briefly the history of English towns: what part did they play in the national history at various times?

(13) Define villeinage: why did it disappear in England?

(14) Which are the chief landmarks in the history of "the freedom of the subject"?

(15) Discuss the question whether the crown of England has been at any time hereditary or elective.

III.—Mathematics.

ARITHMETIC AND ALGEBRA.

This paper includes, in Arithmetic, Stocks and Shares, and, in Algebra, Arithmetical and Geometrical Progressions. Read:

Arithmetic:—Pendlebury, chap. xxxii.; Loney, chap. xxii.; Lock, chap. xvi.; Hamblin Smith, chap. xxvi.

Algebra:—Hall and Knight, chaps. xxxiii., xxxiv.; Hamblin Smith, chaps. xxxi. xxxii.; C. Smith, chaps. xxii., xxiii.; Todhunter and Loney, chaps. xxxv. and xxxvi.

(1) Show that a fraction is not altered in value if its numerator and denominator be both multiplied by the same number.

Find what fraction of the volume of a rectangular-shaped tank 4 ft. long, 2 ft. 6 in. wide, and 1 ft. 2 in. high, will be occupied by a quarter of a ton of water, supposing 1 cubic foot of water to weigh 1,000 ozs.

(2) The difference between the banker's discount and the true discount on a bill due four months hence at a rate of 4 per cent., simple interest, is 6s. 8d.; find the bill.

(3) A man invests half his capital in foreign $3\frac{1}{2}$ per cent. securities at 84, one-fifth in 4 per cent. debentures at 120, and the remainder in 3 per cent. stock; what must be the price of the stock if his income be the same as he would realise were he to invest his whole capital in 4 per cent. stock at par?

(4) Simplify

$$a - \frac{a^2}{1 + \frac{a}{3-a}} - \frac{a}{1 - \frac{a}{a+\frac{3}{a}}}$$

Prove that

$$(a-b)^2(a-c)^2 + (b-c)^2(b-a)^2 + (c-a)^2(c-b)^2 = (a^2+b^2+c^2-bc-ca-ab)^2$$

(5) Solve the equations:—

(i.) $\frac{1}{x-5} + \frac{1}{x-6} = \frac{2}{x-4}$;

(ii.) $\sqrt{x-7} = \sqrt{x+2} - 1$.

(6) A man bought two pictures for £2 10s.; if he paid $16\frac{2}{3}$ per cent. more for the one and 10 per cent. less for the other, he would have paid 6 per cent. more on the whole bargain; what was the price of each picture?

(7) Sum the series:—

(i.) $2\frac{1}{2} + 3\frac{7}{8} + 5\frac{1}{2} + 7\frac{1}{8} + \cdots$ to 15 terms;
(ii.) $25 + 5 + 1 + \frac{1}{5} + \cdots$ to infinity.

The fourth term of a geometrical progression is 192, and the seventh term is 12288; find the tenth term.

(8) How long will it take a man to repay a debt of £1,450 in yearly instalments, the first instalment being £100 and each instalment increasing by £10?

Answers.

1. $\frac{96}{125}$. 2. £1,900. 3. 72. 4. $-a^2$. 5. (i.) $5\frac{1}{3}$; (ii.) 23. 6. £1 10s. and £1. 7. (i.) $204\frac{3}{8}$; (ii.) $31\frac{1}{4}$; 786432. (8) 10 years.

GEOMETRY.

Euclid, Books I.-IV.

(1) A point is taken within a parallelogram, and straight lines are drawn parallel to the sides; show that if either pair of opposite parallelograms so formed be equal, the point is on one or other of the diagonals.

(2) The bisectors of the angles of a triangle meet in a point.

AD, BE, CF, the medians of the triangle ABC, meet in O; show that the quadrilateral DOFB equals in area one-third of the whole triangle.

(3) If a straight line be divided into any two parts the sum of the squares on the whole line and one of the parts is equal to twice the rectangle contained by the whole line and that part together with the square on the other part.

(4) Describe a triangle which shall be equal in area to a given parallelogram and have its vertical angle equal to a given angle.

(5) The angle at the centre of a circle is double the angle at the circumference when the angles stand on the same arc.

(6) AB is a chord drawn at right angles to the diameter CD of a circle; if P be any point on the circumference of the circle and AP, BP (produced, if necessary) meet the diameter, or diameter produced, in Q and R, show that the circles circumscribing the triangles BQP, APR pass through the centre of the given circle.

(7) Inscribe a circle in a given triangle.

Show that the straight lines joining the centres of the escribed circles of a triangle pass through the angular points of the triangle.

(8) Inscribe a regular quindecagon in a given circle.

In a similar way, show how to inscribe in a circle a regular figure of thirty equal sides.

IV.—General Elementary Science.

Study Chaps. xii., xiii., xxii., and xxiii. of "Elementary General Science," by A. T. Simmons and L. M. Jones.

Chap. XII.—You are very likely to have a question on this chapter. Be sure you know the parts (and the method of fitting up) each of the kinds of cells described. Do not spend very long over p. 190 if you find it difficult.

Chap. XIII.—This chapter will be mastered without much trouble; pp. 203-4 are very important. Be able to write the equations given here.

Chap. XXII.—The reactions dealt with in this section are worth a lot of attention. All experiments described must be performed if you wish to really understand the relations between acids, bases and salts. The quantitative nature of the reactions considered on pp. 302-4 must have special care given to it. Practise writing the meanings of equations in words.

Chap. XXIII.—The only trouble you will have is with the names of the natural forms of calcium carbonate and silica. Obtain and examine specimens of as many of them as you can.

(1) Describe how a Daniell cell is constructed, and explain fully the use of each of its parts.

(2) What happens in the following circumstances?—

(*a*) A piece of ordinary sheet zinc is dipped into dilute sulphuric acid.

(*b*) Chemically pure zinc is treated as in (*a*).

(*c*) Pieces of copper and amalgamated zinc are placed parallel to one another in dilute acid and connected by a copper wire outside the liquid.

(3) What experiments would you perform to demonstrate the magnetic properties of the wire in question 2 (*c*)?

(4) Explain fully and carefully what happens when the wires from an electric battery are dipped into (*a*) mercury, (*b*) turpentine, (*c*) acidulated water, (*d*) copper sulphate solution.

(5) State the composition of the following substances:—Iceland spar, flint, arragonite, chalk and sand. Describe the appearance of each.

(6) Write the names and describe the appearances of the substances produced when diluted sulphuric and hydrochloric acids respectively are mixed with soda and lime respectively, and the water evaporated away.

(7) How would you prepare dry ammonia gas? Explain how you could determine the composition of this gas by volume.

(8) Describe briefly the part taken by calcium carbonate and silica in the composition of the earth's crust. Indicate which of the forms of these compounds you name is due to organic agency.

V.—French.

I. Translate into English:

(*a*) Bonaparte songea enfin à se rendre à Milan. A l'approche de l'armée française les partisans de l'Autriche et tous ceux qu' épouvantait la renommée de nos soldats, qu'on disait aussi barbares que courageux, avaient fui, et couvrait les routes du Brescia et du Tyrol. L'archiduc était parti, et on l'avait vu verser des larmes en quittant sa belle capitale. La plus grande parti des Milanais se livraient à l'espérance et attendaient notre armée dans ies plus favorables dispositions. Quand ils eurent reçu la première division commandée par Masséna, et qu'ils virent ces soldats, dont la renommée était si effrayante, respecter les propriétés, ménager les personnes, et manifester la bienveillance naturelle à leur caractère, ils furent pleins d'enthousiasme, et les comblèrent des meilleurs traitements. Les patriotes, accourus de toutes les partis de l'Italie, attendaient ce jeune vainqueur dont les exploits étaient si rapides, et dont le nom italien leur était si doux à prononcer.

(*b*) Me voilà bien embarrassé; car je crois aussi avoir trouvé le fruit tant cherché: l'arbuste qui le porte croit partout à deux ou trois lieues de l'embouchure du Jourdain; il est épineux, et ses feuilles sont grêles et menues; il ressemble beaucoup à l'arbuste décrit par Amman; son fruit est tout à fait semblable en couleur et en forme au petit limon d'Égypte.

Lorsque ce fruit n'est pas encore mûr, il est enflé d'une sève corrosive et salée; quand il est desséché, il donne une semence noirâtre, qu'on peut comparer à des cendres, et dont le gout ressemble à un poivre amer. J'ai cueilli une demi-douzaine de ces fruits; j'en possède encore quatre desséchés, bien conservés, et qui peuvent mériter l'attention des naturalistes.

II:

(1) Give the plurals of—Bal, abat-jour, tête-à-tête, and the feminines of—sec, pêcheur, loup, serviteur.

(2) Explain the difference between—

(*a*) Mon propre habit *and* mon habit propre.

(*b*) Une clef fausse *and* une fausse clef.

(*c*) Une robe nouvelle, une nouvelle robe, *and* une robe neuve.

(*d*) L'année dernière *and* la dernière année,

(*e*) Un homme galant *and* un galant homme.

(3) Explain, by means of examples, the difference between *après* and *derrière*, *entre* and *parmi*, *voici* and *voilà*, *puisque* and *depuis que*.

(4) Give the primitive tenses and the second singular future of the following verbs:—Envoyer, acquérir, bouillir, mourir, pouvoir, moudre *and* plaire.

(5) Give the rules for the agreement of the past participle in French, and translate the following sentences to illustrate:

(*a*) This town is not free, the enemy has captured it.

(*b*) The pens that he has bought are bad.

(*c*) They have hurt their hands.

(*d*) The boots that I ordered are not ready.

III. Translate into French:

It is now almost five weeks since I left Dijon, one of the gayest and most agreeable little cities of France, for Lyons, its reverse in all these particulars. It is the second in the kingdom in bigness and rank; the streets uncommonly narrow and nasty; the houses immensely high and large (that, for instance, where we are lodged has twenty-five rooms on a floor, and that for five stories); it swarms with inhabitants like Paris itself, but chiefly a mercantile people, too much given up to commerce to think of their own, much less of a stranger's diversions. We have no acquaintance in the town but such English as happen to be passing through here on their way to Italy.

RECENT SCHOOL BOOKS.

Modern Languages.

Dumas, L'Exploit du Chevalier d'Artagnan. Edited by H. E. Berthon, B.A. xi.+180+40 pp. (Hachette.) 1*s.* 6*d.*—The publishers are to be congratulated on the speed with which the book has been produced. It is only a little while ago since this text was set for the Cambridge Junior Local. Mr. Berthon supplies a brief introduction and satisfactory notes, in which much attention is given to grammar. The vocabulary seems to be adequate; a number of words, similar in French and English, have been omitted, probably to economise space. Thus we miss *affirmer*, *combattre*, *composer*, *conférer*, *conseiller*, and many more. For *appel*, the only meaning given is "roll-call," which is not suitable on p. 138, l. 16.—Messrs. Hachette also publish "Exercises in Re-translation" (by J. Lazare and F. Minoggio), 8*d.*, based on the above text, which teachers may find useful.

Les Gaulois et les Francs. By F. B. Kirkman and J. M. A. Pécontal. xii.+96 pp. (A. & C. Black.) 1*s.* 3*d.* net.—This is the first volume of a series of tales from French history in elementary forms. These books are issued under the able editorship of Mr. Kirkman, who supplies an interesting preface to the present volume, with the general principles of which we are in full agreement. Teachers will welcome this little reader, which contains carefully prepared texts dealing with early French history, oral exercises and a French-English vocabulary. The book contains pictures of varying value. Something more artistic might surely have been found to take the place of the old-fashioned and poor wood-cut on page 23.

The Principles of French Grammar.—By C. S. Le Harivel. viii.+368 pp. (Oliver & Boyd.) 2*s.* 6d.—There is nothing sufficiently original in this book to justify our giving it particular commendation. It is very much on the old lines of the grammatical method. We have failed to find a single connected passage of French. On the other hand, there are numerous quotations of the following kind:—"*Hein! vous dites?* (Sandeau)." "*C'est ici la fameuse chambre d'où Grotius s'est évadé.* (Dumas, père)."

Dent's Second French Book. By S. Alge and Walter Rippmann. vii.+167 pp. (Dent.) 1*s.* 6*d.* net.—The devotees of that method of teaching French so much in vogue on the Continent, and so ably expounded in England by Professor Rippmann, will be glad to see a volume supplementary to the "First French Book" already noticed. The book has many useful exercises on the tenses in the form of reading lessons. It is essentially a reader, and half the volume is taken up with a short story, "La tâche du petit Pierre".—a very suitable exercise for initiating beginners into continuous prose. The weak part of the book is in the vocabulary—or rather, in the explanation of words; for there no English words are used. For instance, "Singe, animal qui a quatre mains" furnishes a riddle rather than a meaning.

French Daily Life. Adapted by Walter Rippmann from Dr. R. Kron's "Le Petit Parisien." vii.+165 pp. (Dent.) 2*s.* 6*d.*—This is a novel form of conversation guide. It consists of short chapters in French on subjects of every-day importance, and gives a correct idea of those phases of French life with which it deals. The book appeals most to those who have a fair knowledge of French and are visiting France. To the man who wants to "do" France with the aid of a phrase-book it is useless, for there is no English in it, but those who know some French and have made their first visit will testify to the value of chapters on colloquialisms, Parisian slang, and etiquette. It is quite a refreshing change after the old "you-have-the-pen-of-my-sister" style.

The Easiest German Reading. By George Hempl, Ph.D. xvii.+82 pp. (Ginn, Boston.) 40 *cents.*—This book is charmingly printed and extremely funny. It consists of a large number of English nursery rimes literally translated into German, to which are added many questions in the same language. The book deserves a trial in the nursery; perhaps it will be found that their very familiarity with these rimes may lead the children to associate the German word with the English word rather than with the object itself. The book is carefully printed in exceptionally good type.

Kleist, Prinz Friedrich von Homburg. Edited by J. S. Nollen, Ph.D. lxii.+172 pp. (Ginn, Boston.)—The editor of this play rightly maintains that its historical position and its intrinsic excellence render it peculiarly fit for use as a class text. His edition "is designed for advanced classes, capable of reading and understanding the play as literature." It is well calculated to fulfil this object. Mr. Nollen has provided a full and interesting introduction. We take exception only to some of his remarks on prosody. In dealing with blank verse such terms as "pentameter, tetrameter," are better avoided. On the same page we notice the ugly hybrid "syncopation." The notes are good and diversified with a large number of quotations, many of which are apposite.

Goethe, Iphigenie auf Tauris. Edited by H. B. Cotterill, M.A. lxvi.+183 pp. (Macmillan.) 3*s.*—There can be no doubt that the editor has taken great pains over his work, but it must inevitably suffer from a comparison with Dr. Breul's edition. The first section of the introduction might make an interesting article in a magazine, but appears somewhat superfluous in a school book. On the other hand, the account of the myth in Greek literature is valuable. The notes are full and satisfactory. The passages for translation into German (Appendix 3) are not directly based on the text, but are well chosen from various books, such as Scherer's "History of German Literature." The Fourth Appendix deals with words of foreign origin. It is interesting and carefully put together.

We have also received *Jäschke's English-Spanish Conversation Dictionary*, published by Mr. Nutt at 3*s.* 6*d.* (a handy and well-compiled little volume of 460 pages); in Heath's Modern Language series, two little volumes of *Selections for Advanced Sight Translation* (9*d.* each), one from "Modern French Authors," compiled by T. F. Colin, Ph.D., the other from "Modern German Authors," by Rose Chamberlin, both of which can be commended; in the same series *French Review Exercises*, by P. B. Marcou, Ph.D.; and *Keys to Appendices* and *Word and Phrase Books*, to the editions of "Vor dem Sturm," "Zwischen den Schlachten," "Petites Ames," and "Cinq-Mars," in Mr. Siepmann's Series. (Macmillan.)

Classics.

Homer, Odyssey VII. By C. W. Bain, M.A. xi.+123 pp. (Ginn.)—The best feature of this American edition is that the book is treated as literature, and parallel passages from Greek, Latin and English are freely quoted. There are several misprints, *e.g.*, *fuges*, p. 19; *vacus*, p. 56; ὀγδότᾶον, p. 64; and slip-shod notes like the following, both on p. 25, are too frequent: "προτιόσσεο: an Epic verb = Attic προσβλέπω;" "φιλέουσι = φιλοῦσι: Homer often fails to contract." The vocabulary has been carefully prepared, but the etymologies put forward are not always sound; thus γυνή has nothing to do with root γεν, and ἐκάς is not connected with ἐκ, but has lost initial σϝ-.

The First Oration of Cicero against Catiline. By C. H. Keene, M.A. xlvi.+98 pp. (Blackie.) 1*s.* 6*d.*—This volume of Blackie's Latin Series contains a lucid historical introduction, text, a few various readings, very full notes, exercises and vocabulary. Every assistance is given, and students reading without a teacher will find it just the edition they require.

Cæsar. Gallic War. Books IV. and V. By J. F. Davis, D.Lit., M.A. xix.+108 and xix.+167 pp. (Hachette.) 2*s.*; also separately, 1*s.* 6*d.* each.—These books contain very considerable help for the learner in his early stages, or for the private student, and have here reached a new edition.

Easy Latin Passages for Translation. By Frank Ritchie, M.A. 187 pp. (Longmans.) 2*s.*—Yet another selection of extracts—252 in number—which differs little from many predecessors, except perhaps in the number of excerpts from Justin and other late writers. When are we going to get rid of the letter *j* from Latin books? It flourishes here.

The Classics for the Million. By Henry Grey. 351 pp. (Swan Sonnenschein.) 3*s.* 6*d.*—This is a new edition of a work which has met with a considerable measure of approval. Its scope is denoted by the sub-title, "An epitome in English of the works of the principal Greek and Latin writers." It is a useful work of reference for the general reader, but its highest object will be attained if it attracts him to the study of the classical writers in the original tongues.

Grammar and Composition.

English Grammar and Analysis. By W. Davidson, B.A., and J. C. Alcock. 288 pp. (Allman & Son.) 2*s.*—This is a "new edition with considerable additions." Frankly, we do not like attempts to bring text-books up to date in this way.

Tense is something more than "a change in the form of a verb to express time." On p. 100 we have "disjunctive (!) conjunctions." Rule x. on p. 146 strikes us as being rather naïve—"The possessive case always precedes the noun by which it is governed: as, The king's castle, not The castle king's." The sections on analysis are fairly complete, though here also we take exception to many of the authors' statements. The last twenty pages of the book are devoted to examination papers taken from various sources.

The Principles of Composition. By Henry G. Pearson. xiv.+151 pp. (Isbister & Co.) 2*s.*—The Introduction, written by Professor Arlo Bates, is a very convincing exposition of the value of English composition as a factor in mental discipline; and English composition is a subject that receives nothing like adequate treatment in our secondary schools. The author is instructor in English at the Massachusetts Institute of Technology, and they, apparently, manage these things better in America. The book, very properly, tells us not what to write, but how to write it. The three principles governing English composition are Unity, Coherence, and Emphasis, and these are broad enough "to cover the construction, not merely of the whole theme, but also of the paragraphs that compose it, and still further of the sentences that make up the paragraphs." The work is well worth purchasing (1) by teachers of English generally, (2) by students preparing for the higher branches of the Civil Service and for scholarships at the universities, where the English essays, as a rule, seldom receive more than 50 per cent. of the total number of marks.

Edited Books.

The Eversley Edition of the Works of Shakespeare. Vol. III. By Prof. C. H. Herford, Litt.D. 500 pp. (Macmillan.) 5*s.*—This volume comprises "Much Ado About Nothing," "All's Well," "Measure for Measure," and "Troilus and Cressida;" and in respect of criticism it is even more impressive and suggestive than the foregoing volumes. Indeed, each successive issue of this work seems more stimulating than the last. When Professor Herford, for instance, notes that "Beatrice creates the intellectual atmosphere in which the play ('Much Ado') moves," and then shows her piling "thought upon thought, the spontaneous utterance of a brilliant mind steeped in the hues of highly individual character, and betraying in spite of her the impulses of a passionate woman's heart," it is difficult to recall any more searching or comprehensive criticism since Shakespeare was worthily criticised at all. So, too, of "Measure for Measure," the editor remarks acutely: "Put forth in the first years of the momentous seventeenth century, this great though dramatically unequal play is full of prophetic intimations; the scathing ridicule of tyrants may be put beside the courtly compliments, in the first scene, to a popular king. The temper of stern recognition of the heights and depths of good and evil pervades it, and through the web of ethical seriousness there runs a thread of that brooding intellectual curiosity apparent in the whole 'Hamlet' period, the zest for probing the secrets of human nature and finding 'what these seemers be.'" Criticism of this lofty kind only whets the appetite for more.

Dryden's Palamon and Arcite. Edited by W. H. Crawshaw. 147 pp. 1*s.* And *De Quincey's Opium Eater.* Edited by G. A. Wauchope. 235 pp. 1*s.* 6*d.* (Heath's English Classics.) (Isbister & Co.)—Are two more American editions of well known English works, one of which is very well done. Dryden's poem is treated somewhat cavalierly in the entire lack of introductory matter, but the critical suggestions at the end of the volume really amply compensate for this omission. The connection of Dryden with Chaucer and "Dryden's Views of Chaucer" are the subject of two very instructive sections. The best part of Mr. Wauchope's edition of De Quincey's "Opium Eater" is perhaps the editor's preface on literary education in general. For the rest, both the introduction and notes are dry and often "scrappy."

A Key to the Waverley Novels. By Henry Grey. 124 pp. (Sonnenschein.) 2*s.* 6*d.*—Everybody who has read Mr. Grey's "Classics for the Million" knows that he is a past master in the art of condensing information and also of "putting it" lucidly. The present "Key" is already fairly well known, and many people find it serviceable. It is by no means an ideal handbook to Scott—*that* is a work still to be desired by all educationalists—but it gives the entire essence of his stories in a compact and most readable form. It is an admirable compilation, although it (alas!) is nothing more. Mr. Grey has been fortunate enough to get his work into a second edition, and that is no small praise. Many people who will put this volume on their bookshelves for occasional reference will find it a help in every time of need.

We notice that Messrs. Macmillan have added *Tennyson's Poetical Works* to their well-known Globe Library. Now that a complete edition can be obtained for 3s. 6d., everyone can become familiar with the beauty of the late Poet Laureate's masterpieces.

History.

Nicias and the Sicilian Expedition. By Rev. A. J. Church, M.A. 150 pp. (Seeley.) 1*s.* 6*d.* *Hannibal and the Great War between Rome and Carthage.* By W. W. How, M.A. 176 pp. (Seeley.) 2*s.*—Two well-written short biographies of a Greek and a Carthaginian statesman respectively. Occupied almost entirely with military matters, they should be better supplied with maps, but the stories are readable and trustworthy.

The Story of London. 256 pp. (Edward Arnold.) 1*s.* 6*d.*—Pleasantly written, plentifully illustrated, historico-descriptive talk about London, it skims lightly over the surface, and is apparently based on the many good books on the subject that have appeared lately.

Geography.

Map-Building Sheets. Set 1. The British Isles. (G. Philip and Son.) 6*s.*—This set consists of four outline maps, viz. (1) British Isles, (2) England and Wales, (3) Scotland, (4) Ireland. They are printed in red on special blackboard paper, and suitable coloured crayons are to be obtained at 6d. per box. They will supply a distinct want of teachers of geography to beginners. Their cheapness and general excellence should ensure them a large sale. The maps are attached to a single roller and they can be conveniently hung up before the class. Other maps are in preparation and will be supplied singly at 1s. 6d. each.

British Possessions and Colonies. By W. B. Irvine, B.A. (Relfe Bros.) 1*s.*—This is a geography book and atlas combined. There are twelve full-page maps (size 9½ × 7 inches) and several insets. The text is accurate, but the maps were surely never intended to be used with it. On p. 15 we have Akra, but Accra on the map: we are told that the Sneeuwbergen mountains are in Cape Colony; they are not marked on the map; British Guiana is described in about fifteen lines, but only the name of the colony is inserted on the map (of the West Indies). On the whole, we cannot recommend the book.

Mathematics.

A School Arithmetic. By R. F. Macdonald. viii.+264 pp. (Macmillan.) 2*s* 6*d*.—The plan upon which this book is designed is somewhat novel. After a recapitulation of the elementary and compound rules by means of an unusually large number of miscellaneous examples, the pupil is taken through the more difficult parts of the subject, as far as percentages, interest, discount, stocks and roots. In addition to the exceptionally complete collection of problems illustrative of the various subjects dealt with, twenty-six general examination papers are added at the end of the volume. The book should be very useful in schools of science and higher grade schools, and will also provide a greater variety of exercises for use in secondary schools that can be obtained from most books.

Practical Lessons in Book-keeping. By T. C. Jackson, B.A., LL.B. 372 pp. (University Correspondence College Press.) 3*s*. 6*d*.—It is regrettable, for many reasons, that more of our secondary schools and colleges do not include book-keeping in their curriculum. We have always found that our own pupils take kindly to what is by no means the "dry" subject it is usually considered. In the book before us we have a very useful guide to the subject. The exercises are of suitable length (itself a great boon); they are interesting (*e.g.*, make out the Cash Account of Mr. Montague, of Verona); they are well graded, and finally, there are answers to all of them. We have no hesitation in recommending the work, not only for use in connection with the College of Preceptors' and similar examinations, but for students preparing for the Civil Service and Accountants' examinations. One feature of the book calls for attention, we mean the offer of prizes to those examinees who use it; devices like this are an unwelcome innovation in education.

Science and Technology.

An Introduction to the Carbon Compounds. By R. H. Adie, M.A., B.Sc. viii.+90 pp. (Clive.) 2*s*. 6*d*.—This nicely printed little volume is provided with full instructions for the performance of 55 typical experiments. The actual compounds described are those included in the syllabuses for the first M.B. examination at the Cambridge University and the Intermediate Science and Preliminary Scientific Examinations of the London University. Mr. Adie has succeeded in making organic chemistry quite attractive.

General Physics. By C. S. Hastings, Ph.D., and F. E. Beach, Ph.D. viii.+768 pp. (Boston, U.S.A.: Ginn & Co.)—There are so many good books dealing with the different branches of physics in an introductory manner published in this country that we are afraid this volume will not be very largely used in British schools. Mechanics, heat, electricity, sound and light, are dealt with in much the same order and way, though not quite so fully, as in the treatises of Deschanel or Ganot, which have been known for many years. But Drs. Hastings and Beach are more up-to-date than the authors we have referred to; their chapters on magnetic and electric fields show that they are quite familiar with modern views. Their book can be recommended with confidence.

Elementary Physics and Chemistry. By R. A. Gregory and A. T. Simmons, B.Sc. viii.+150 pp. (Macmillan.) 1*s*. 6d.—Messrs. Gregory and Simmons say rightly in their preface, "Every teacher now understands the importance of practical exercises in all scientific instruction, however elementary," and the little work reviewed is at once a book of practical instruction and a reading book explanatory of the principles taught. The book will probably be most serviceable to the teacher, giving him directions as to the carrying out of class demonstrations, but it will also be of value as a text-book. The course of science of this volume has much the same order and method of treatment as the First Stage of Mechanics initiated by the Liverpool School Board in 1877, with such additions as the syllabus of the 1st stage of "elementary physics and chemistry" of the 1898 and 1899 Codes require. The arrangement and methods of the book are precise, accurate, scientific; a teacher, ignorant of science, would have no serious difficulty in working through it with his pupils. The language is, very properly, simple; the book has many illustrations, most of them new, and all of real value to the novice.

A Laboratory Manual in Astronomy. By Mary E. Byrd. ix.+273 pp. (Boston, U.S.A.: Ginn & Co.)—Interest in astronomy, as well as facility in making calculations referring to the positions of celestial bodies, will be gained by the study of this volume. Students who intend to present themselves in astronomy at the Cambridge Higher Local Examination, or are preparing themselves in mixed mathematics for London University, should make themselves familiar with this text-book; for, though the book does not follow any syllabus, it contains a well-considered course of practical and theoretical work.

Miscellaneous.

Sermons to Boys and Girls. By the Rev. J. Eames, B.A. viii.+247 pp. (Allenson.)—Mr. Eames has the faculty of making himself understood by children. His style is simple and persuasive, and his addresses are very suitable for reading to the younger boys and girls in boarding schools.

Schoolboys' Special Immorality. By Maurice C. Hime, M.A., LL.D. x.+48 pp. (Churchill.) 6*d*. net.—Dr. Hime appeals, in language of studied moderation and out of the fulness of a long experience of boys, to parents and schoolmasters to do what we regard as their simple duty. It is childish to assume the non-existence of this insidious evil. Yet such is the ostrich-like policy of many headmasters of boarding schools! The cowardice of this prevalent eye-shutting is ruthlessly exposed and the futility of resorting to wholesale expulsion when the matter can no longer be ignored is mercilessly demonstrated. Dr. Hime's indictment of the cubicle system is alone enough to warrant us in earnestly calling the attention of fathers and schoolmasters to this modest little volume.

JUNIOR OXFORD LOCAL EXAMINATION, JULY, 1899.

Guide and Monthly Test Papers, No. 4.

English Grammar.

Word-Formation.

(1) Explain the prefixes in—*I*llumine, *com*panion, *in*nocence, *twi*light, *with*stand, *thorough*fare; and the suffixes in—law*yer*, hil*lock*, bal*loon*, crum*ble*, glob*ule*, birt*h*.

(2) Give examples of Hybrids, Doublets, Stems, Compound Prepositions, Pronominal Adverbs.

(3) How are Abstract Nouns formed?

(4) Give the meaning, and account for the form, of each of the following words—Vixen, drake, bridegroom, aloft, songstress, twelve, alms, monogram, drawing-room, cyclostyle.

(5) Add to each of the following words the prefix which reverses its meaning—Proper, credible, interested, polite, normal, religious, trustful.

(6) State and illustrate the chief ways in which Adverbs are formed.

(7) Mention some of the particulars in which the English alphabet is imperfect.

(8) Paraphrase:

I would not enter on my list of friends
(Though graced with polished manners and fine sense,
Yet wanting sensibility) the man
Who needlessly sets foot upon a worm.
An inadvertent step may crush the snail
That crawls at evening in the public path;
But he that has humanity, forewarned,
Will tread aside, and let the reptile live.

History of England.

(1558—1580.)

(1) Describe the Acts of Uniformity and Supremacy of 1559. When and by whom were the 39 Articles authorised?

(2) What persons were proposed as husbands for Queen Elizabeth? What objections had she to any of them, or to all? Why would she never marry?

(3) Tell the story of Mary Queen of Scots till 1580. What claims did she make to the English throne? Who were her principal friends in England and abroad?

(4) What countries did Philip II. receive from his father? Which of these did he lose, and how? What others did he win?

(5) Who were the "Puritans"? Who were the "Separatists" or "Brownists"? How did Elizabeth and her ministers treat them?

(6) Give some account of English voyages and conquests before 1580.

Geography.

(*India.*)

(Illustrate by sketch maps whenever possible.)

(1) Draw a map of India, and insert the following names and no others—(Mountains) Himalaya, Vindhya, Ghauts; (rivers) Ganges, Indus, Nerbudda; (towns) Peshawur, Bombay, Calicut, Trichinopoly, Delhi, Pondicherry, Goa, Simla, Chitral.

(2) Give an account of the rainfall in various parts of India. Name a few *sanatoria* in India.

(3) In what districts are the following found—Tea, poppies, gold, salt, teak, quinine, indigo, wheat?

(4) Describe the course of the Ganges. The harbours of India are, as a rule, very poor. Explain this fact.

(5) Name the states (and their capitals) of India which are independent. Mention the chief railways, and show how they have "revolutionised the trade and social life of the country."

(6) Explain the following terms—Doab, Monsoon, Bore, Ghats, Sundarbans, Adam's Bridge, Indore Agency.

(7) What passes lead from India across the Himalaya Mountains? What is the height of the snow line (i.) on the northern, (ii.) on the southern side of these mountains? Explain the difference.

(8) Give the position and mention anything noteworthy of each of the following—Allahabad, Benares, Gap of Coimbatore, Mitzapur, Agra, Mysore, Madura, Rawal Pindi, Madras, Colombo.

Latin.

VIRGIL.—ÆNEID VI.

Ll. 625—END.

(1) Translate:

(*a*) Ll. 656-664. Conspicit . . . . . fecere merendo.
(*b*) Ll. 743-751. Quisque suos . . . . . reverti.
(*c*) Ll. 845-853. Tu Maximus . . . . . debellare superbos.

(2) Translate, with notes:

(*a*) non illi se quisquam impune tulisset
obvius armato, seu cum pedes iret in hostem,
seu spumantis equi foderet calcaribus armos.

(*b*) qui strepitus circa comitum! quantum instar in ipso!

(*c*) utcunque ferent ea facta minores,
vincet amor patriae laudumque inmensa cupido.

(*d*) causasque requirit
inscius Aeneas, quae sint ea flumina porro.

(*e*) nec non Threicius longa cum veste sacerdos
obloquitur numeris septem discrimina vocum.

(3) Write notes on the following: Silvius; Berecyntia mater; caelifer Atlas; Torquatus; gener adversis instructus Eois; duo fulmina belli; Titania astra.

(4) Give the meaning, gender, and nominative singular of: caminis; virecta; pectine eburno: paeana; tramite; genis; virgulta sonantia; latices; incana menta; tumultu.

(5) Parse, giving the principal parts: sequatur; pascuntur; tetendit; rebar; surget.

CÆSAR DE BELLO GALLICO.—BOOK IV.

Ch. XXVII.—END.

(1) Translate:

(*a*) Ch. XXVII. Hunc illi e navi . . . . . sese daturos dixerunt.
(*b*) Ch. XXXII. Cæsar id quod . . . . . essedis circumdederant.
(*c*) Ch. XXXVI. Eodem die . . . . . delatae sunt.

(2) Translate, with notes upon the construction of words in italics:

(*a*) cum *frumentum Romanis* deesse intellegerent et paucitatem militum ex castrorum exiguitate cognoscerent, quae *hoc* erant etiam angustiora, quod sine impedimentis Cæsar legiones transportaverat, *optimum factu* esse duxerunt *rebellione* facta *frumento* nostros prohibere.

(*b*) Dum haec *geruntur*, nostris omnibus occupatis qui erant in agris reliqui discesserunt. Secutae sunt continuos complures *dies* tempestates, quae nostros in castris *continerent*. Interim barbari nuntios in omnes partes dimiserunt et, quanta *praedae faciendae* atque in perpetuum sui liberandi facultas *daretur*, si Romanos castris *expulissent*, demonstraverunt.

(3) Parse the following verbs, and give their principal parts: subiciendam; nanctus; delituerant; afflictae; sustulerunt.

French.

A.

(1) Translate into French:

(*a*) I suppose that the books ordered yesterday have arrived.
(*b*) I shall see him on my way home.
(*c*) He thanked me for lending him the money.
(*d*) What have you in your pocket? Something good to eat.
(*e*) I would rather write letters than go out in this weather.

(2) Translate into French:

Carriages were first brought into England by the Earl of Arundel in the year fifteen hundred and eighty, and were then used with two horses. It was the Duke of Buckingham who first began to have them drawn by six horses, which people thought was a sign of great pride. In France it was Catherine of Medici who first used a carriage; but it had leather doors (*portière*) and curtains. In the reign of Henry the Fourth carriages were so rare in France that the king himself had only one carriage, and when the queen drove out in it he was obliged to walk or ride on horseback.

B.

(1) Translate into English:

Il y avait à Glasgow un théâtre où l'on jouait les pièces de Shakespeare. Dire comment on les jouait, est difficile, mais on peut assurer que c'eût été un spectacle curieux pour un dandy de Londres, si l'on songe que les trois quarts au moins de la population de Glasgow parlaient encore l'écossais et que la moitié des acteurs étaient de montagnards. C'était l'enfance de l'art, dans le temps même où Garrick le portait au plus haut degré en Angleterre. Cependant dans la troupe il se trouvait un acteur qu'eût envié Londres même, si Londres eût pu lui apprendre à se défaire de son accent écossais: un beau jeune homme de vingt-cinq ans, grand, bien fait, d'une figure noble et gracieuse en même temps, dont tous les mouvements, toutes les poses, avaient cette souplesse majestueuse et fière particulière aux montagnards. Il se nommait MacGrégor, et on racontait des traits de sa jeunesse qui prouvaient son courage et son intrépidité.

(2) Give the plural of—Livre, bras, feu, chou, mal; and the feminines of—Sage, complet, blanc, long, ambigu, glorieux, trompeur, loup.

(3) Give general rules as to forming the plural of compound nouns. Give the plurals of—Arc-en-ciel, chou-fleur, aide-de-camp, coupe-gorge, rouge-gorge.

(4) The meanings of the following words depend upon their gender; give their meanings—Garde, manche, mousse, vase, aide, pendule.

(5) Give the second plural present indicative and preterite indicative of—*Faire* and *voir*; and the present subjunctive in full of— *Valoir* and *craindre*.

(6) Correct the following sentences where necessary :

(*a*) J'ai des bons oranges.
(*b*) Je lui l'ai donné.
(*c*) Elle s'a habillé.
(*d*) Avez-vous bien de livres?

C.

For those who offer "L'abbé Constantin" (pp. 164—218).

(1) Translate the following passages: (*a*) p. 184, ll. 7-18; (*b*) p. 194, ll. 1-8; (*c*) p. 210, l. 12—p. 211, l. 2.

(2) Write short notes on—Il avait failli retourner sur ses pas, s'emporter, colonel en retraite, si fait.

D.

For those who offer "La Mare au Diable" (pp. 47-59).

(1) Translate the following passages: (*a*) p. 48, ll. 1-7; (*b*) p. 54, ll. 5-10; (*c*) p. 58, ll. 11-21.

(2) Write short notes on—Vert-épinard, bouder contre votre verre, métayers.

PRIZE COMPETITION.

Result of No. 4.—Voyage round the World.

THE well-educated gentleman who had decided to travel round the world was offered a choice of no fewer than 60 places to stay at. Following the plan described in setting the competition, we find that the twelve places considered the most interesting, as judged by the number of votes received, and placed in the order of the times they were mentioned on the replies sent in, were as follows :—

New York.
= Paris. / Rome.
Cairo.
Calcutta.
= Sydney. / San Francisco.
Jerusalem.
= Athens. / Pekin. / Venice.
Bombay.

The first prize is awarded to

A. H. Crowther,
East Lodge,
Wokingham,

who mentions 10 of the places occurring on the final list. This reply reads as follows, the two cities printed in italics taking the places of Sydney and Bombay :—

Paris.	Jerusalem.
Venice.	*Damascus.*
Florence.	Calcutta.
Rome.	Pekin.
Athens.	San Francisco.
Cairo.	New York.

Two competitors name 9 of the places voted the most interesting, and the second prize is consequently divided between them. Their names are :—

Agnes G. Bowman, Rosslyn, Liscard, Cheshire. and M. Schlich, Cooper's Hill, Englefield Green, Surrey.

Their lists are printed below, the italicised words representing places not in the voted list :—

Paris.	Paris.
Florence.	Rome.
Rome.	*Constantinople.*
Athens.	Cairo.
Jerusalem.	Jerusalem.
Cairo.	Bombay.
Calcutta.	Calcutta.
Pekin.	Pekin.
Sydney.	*Tokio.*
Dunedin.	San Francisco.
New York.	*Chicago.*
Montreal.	New York.

The list sent in by John Buckley (Wigan) contained nine successful places, but was received too late to be considered.

It is worth remarking that six places scored the same number of votes, and took together the thirteenth place, viz. :—Chicago, Constantinople, Florence, Montreal, Naples, Yokohama. M. Baxendale, D. M. J. James (Miss), E. M. Parsons, and David Rees, each named eight places correctly.

Competition No. 5.

A successful writer of boys' books has decided to write the biographies of the **ten noblest men in British History** which he thinks will most appeal to English-speaking boys. What ten men (not living) would you advise him to choose?

We offer **two prizes** of books, each of the published value of one guinea, to be chosen from the catalogue of Messrs. Macmillan & Co., Ltd., for the two best lists. This competition will be decided as in previous months. The lists of heroes must be accompanied by the coupon printed on page iv., and must reach the editors of THE SCHOOL WORLD, St. Martin's Street, London, W.C., on or before Wednesday, May 31st, 1899.

OUR CHESS COLUMN.

No. 5.

A YEAR or two ago the headmaster of one of our large public schools sent the subjoined letter to the *Times* :—

"We send out many of our boys into the world at a comparatively early age. We have taught them (theoretically) to love learning for its own sake, but we have not taught them how to amuse themselves except in athletic exercises. The boys of whom I speak take clerkships or similar positions in our great towns. During the hours of daylight they are kept fully employed and out of mischief. When they get away from their work what do they do? Do they spend their evenings in quiet reading or intellectual society? No: they naturally seek amusement, and they turn to the music-hall, the billiard-room, and the like. Now, a boy who has acquired a taste for chess can at the present time easily enough join a chess club. There he will escape many of the temptations which beset a young man, including the gambling which is ruining so many of our 'sports,' obtain the necessary relaxation for a few hours each week, and not be obliged to spend his money when he feels the need of amusement. *I am certain that the moral gain is really great, and therefore would strongly advise heads of schools to give more encouragement to the chess club, which ought to exist in every school.*"

I thoroughly endorse these remarks, and urge all teachers to encourage the spread of the game in schools. Apart from its intellectual advantages, chess has a humanising effect that one cannot help but notice.

I have received an interesting letter from A. B. Craig, who lives at Laen—a town nearly 120 miles N.W. of Melbourne, Victoria. He had seen a copy of our January game in the *Australasian*. "I am," he writes, "16 years old, and have been learning chess two or three months; so I am only a novice at the game; nevertheless, nothing venture, nothing win. I have enclosed two solutions." His solutions are correct in every respect, and I have written to congratulate him on his manifest enthusiasm for the game. Would there were more boys like him!

The solution to the end-game in the last number is as follows:

(*a*)

White.	Black.
1. R—Kt4 (ch.)	1. K x R
2. Q—B3 (ch.)	2. K—R5
3. Kt—B5 mate.	

(*b*)

1. B x P (ch.)	1. K—R4
2. Q—R4 (ch.)	2. K—Kt3
3. B—B6 (dis. ch.)	3. K—B4
4. Q—Kt4 mate.	

The prizes are awarded to

N. P. Wood,
Noncomformist Grammar School,
Bishops Stortford.

and

N. B. Dick,
Merchant Taylors' School,
Charterhouse Square,
London.

Correct solutions were also received from:—F. G. M. Beck; L. Buck; M. E. Dungey; F. E. Kendall; A. V. Poyser; A. D. Punchard.

At the time of going to press the leaders in the monthly competitions are:—N. P. Wood, 4; F. G. M. Beck, 3; several competitors, 2.

The games in the Inter-School Tourney, necessarily interrupted by the holidays, have now been resumed, and are going on merrily. There are six clubs engaged; this number I hope to see largely increased in our next tourney.

For this month's competition I am giving a somewhat easy problem:—Place the white king, black king, and black queen each on its own square. Then show the least number of moves in which white can be mated. Black has the first move. Send in solutions before the 29th inst. The number of prizes—Messrs. De La Rue's pocket chess-board and men—will depend upon the number of competitors.

Rules.

I.—Write on postcards only.
II.—Give name, date, and school address.
III.—Address all communications to

The Chess Editor,
The School World,
St. Martin's Street,
London, W.C.

CALENDAR.

[*Items for the June Calendar should be sent in by May 31st.*]

May, 1899.

Tuesday, 16th.—Abbott Scholarship Examination (Science) at Oxford University.
Wednesday, 17th.—Return forms for Pupils' Certificate Examination of College of Preceptors.
Liverpool University College, Examination for Entrance Scholarships begins.
Friday, 19th.—Send forms for 2nd Matriculation Examination of University of Wales.
Return forms for Lower Certificates, Oxford and Cambridge Schools Examinations.
Wednesday, 24th.—Return forms for Trinity College, London, Examination.
Thursday, 25th.—Scholarship Examinations begin at Yorkshire College.
Monday, 29th.—Annual Meeting of the Froebel Society at the College of Preceptors, 8 p.m.
Tuesday, 30th.—Scholarship Examinations begin at Rugby and Durham Schools.
Wednesday, 31st.—St. Andrews University, LL.A. Examination begins.
Examination for Classical Scholarships at Exeter and Jesus Colleges, Oxford.

June.

Thursday, 1st.—Send in forms for July Exams., Guildhall School of Music.
Return forms for Senior Commercial Certificates Examination, London Chamber of Commerce.
Last day for returning forms Inter. Arts and Science Examinations, London University.
Saturday, 3rd.—Return forms for Entrance Scholarship Examinations, Bristol Univ. College.
Return forms for July Examination, National Froebel Union.
Tuesday, 6th.—Return forms for Diploma Examination, College of Preceptors.
Examination for History Scholarship at Christ Church, Oxford.
Edinburgh University Local Examinations begin.
Preliminary Examination, Institute of Chartered Accountants, begins.
Scholarship Examinations begin at Clifton, Cheltenham, Hereford, Brecon and Weymouth.
Monday, 12th.—London University Matriculation Exam. begins.
Irish Intermediate Board Exam. begins.
Tuesday, 13th.—Scholarship Examinations begin at Tonbridge School.
Thursday, 15th.—June number of The School World published.
Last day for entrance Bedford College, London, Scholarship Exam.

[Scholarship examinations are held early in June at several public schools, including Marlborough, Eastbourne, South Eastern College, Ramsgate, in addition to those named in the Calendar.]

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The Editors will be glad to consider suitable articles, which, if not accepted, will be returned when the postage is prepaid.

All contributions must be accompanied by the name and address of the author, though not necessarily for publication.

The School World

A Monthly Magazine of Educational Work and Progress.

No. 6. JUNE, 1899. SIXPENCE.

CHAPTERS IN SCHOOL HYGIENE.

By C. E. SHELLY, M.A., M.D., &c.
Consulting Medical Officer, Haileybury College.
Joint Hon. Sec. of Medical Officers of Schools Association.

I.—Diet.

NATURE provides the human individual, at the outset, with no more than a Hobson's choice of diet; and on this he thrives. Subsequently, too, as the young animal's range of selection widens, and the means of gratifying the extending appetite increase, the result is satisfactory—provided only that nutriment be obtainable in sufficient amount; for it may be said that there is no practice which mankind has followed for longer, more persistently, and on the whole, more successfully than that of—eating. Complications ensue, however, in proportion as there are introduced into the problem those unnatural conditions which go to make up so large a part of what is known as civilisation; and it soon becomes apparent that a judicious provision and supervision are both necessary in order to secure the proper feeding of young and adolescent humanity in face of the artificial environment of modern life.

AMOUNT OF FOOD NECESSARY.

Now, thanks to physiological investigations, we can express the energy expended by the human body in its growth, at rest, or at work, with approximate accuracy in foot-tons. We know what tissues are consumed, and with what expenditure of what chemical elements, to produce this result. We can calculate thence the daily physiological income required to balance the expenditure of life, *plus* growth, *plus* work; we can express this in chemical nomenclature, and translate it into its equivalent of the common food stuffs available. Thus, in order to maintain a boy or girl weighing from 90 to 100 lbs. in health, and to provide at the same time for growth and work, there is needed in each twenty-four hours food of such kind and amount as will furnish some 2,700 foot-tons of energy. This would be represented by 3 ozs. of water-free albuminates (*i.e.*, the actually solid, nitrogenous, or flesh-forming foods such as exist in meat, eggs, milk, peas, bread, &c.); 2½ ozs. of fats; 10 to 11 ozs. of carbo-hydrates (starch or sugar); and nearly 1 oz. of mineral matter, including common salt; in addition, of course, to the always necessary water.

AN IDEAL DIET.

In only one variety of one single kind of natural food—in human milk, that is—do all these essentials exist combined in suitable proportions; and the dietary of post-infantile life is practically an artificial and cunningly devised mosaic of animal and vegetable substances, which, when administered in suitable proportions and under the proper conditions, yields to an efficient digestion the net result equivalent to that obtainable from mother's milk. Into the details of many different sorts of food, as the term is ordinarily understood, which may be variously combined in order to furnish this result to the greatest advantage of the consumer, and without unreasonable gastric or financial strain, it is not proposed to enter now. School dietaries adapted to various ages have been sketched by numerous authorities; and some excellent outlines—capable of ready variation—may be found in Dr. Clement Dukes' book on "School Diet." But attention may be usefully directed to some aspects of the subject which seldom receive the full attention they deserve.

DIET SHOULD VARY WITH AGE.

For the first twelve months of life, at all events, nature provides an ideal dietary which, under normal conditions, no artificial substitute can quite adequately replace. The succeeding seven or eight years of the child's life are usually spent at home; and during this period a "more substantial dietary," as it is called, gradually replaces milk. This period does not fall directly within the purview of the schoolmaster; yet in it is not only laid the foundation of the physical structure of his pupils, but, according to the system followed in the nursery, is largely determined the pattern which the child's body, during its subsequent school life, will follow in appropriating and utilising the nourishment then presented to it. At least, it appears to be true that—as with plants—if the young animal be inadequately or inappropriately fed, the result is a habit, as it were, of producing imperfectly elaborated tissue;

which habit, originally begotten of necessity, becomes eventually so established that—even when placed under really favourable conditions of feeding and environment—it cannot be altogether altered; so that the organism continues to starve in the midst of plenty, because it has lost the power of doing itself justice. Having been forced to make bricks without straw for so long, it can never afterwards be taught to make them otherwise. In this relation, except, perhaps, amongst the very poor, more harm is done by improper, rather than by merely inadequate feeding. We have already noted the ideal qualities of milk as a food. The diet of childhood deviates from the ideal much in proportion as it varies in composition from that of milk; or, in other words, in proportion as stimulating elements are added to and replace the simpler nutrients.

PROPER USE OF FLESH FOOD.

This applies especially to the use of flesh food—and particularly to over-cooked meat and its derivatives, such as brown gravies, soups, meat jellies, domestic beef-tea, in all of which the nourishing qualities of muscular fibre have been replaced by the merely stimulating properties of the peptones and similar bodies formed at the higher temperatures. Fish and eggs are somewhat less open to this objection (as is raw or underdone butcher's meat); but a large proportion of the nitrogen required can be better obtained from other sources, such as the various grains, leguminous seeds, and milk itself. Evidence on this head is abundantly to hand, and only one or two illustrations need be quoted. Into the Orphans' Home and Asylum, in New York, children are admitted at from 3 to 8 years of age, and are kept there until the age of 12. For those under eight the dietary comprises milk and cereals with vegetables and fruit in suitably varied combinations, to the rigid exclusion of both fish and meat. Children over eight have meat three or four times a week at dinner, and at those meals milk is omitted. Under these conditions a remarkably low death-rate and an unusual freedom from disease of all kinds—with a noticeably small number of cases of gastro-intestinal derangements—have been maintained from year to year; with only one exception. In that year only were the children under eight allowed a meat diet; and it is significant that in that year, the total number of inmates being 139, there occurred 98 cases of gastric disorder (as against 25 only in the previous year, with 124 inmates), and a total of 5 deaths, this being exactly *one-fourth* of the total deaths recorded during the whole of the 25 years over which these observations extended.

EFFECT OF DIET ON THE TEETH.

Again, in an institution containing some 400 deaf and dumb children, it was found that after a twelve months' dietary consisting mainly of milk and cereals, comprising maize, oats and wheat, from which the layer just beneath the silicious coating had not been removed in milling, an entire change is noticed in the character of the teeth. Several cases of the spontaneous arrest of caries and of new formation of dentine have been observed; the teeth become more firmly implanted in their sockets, so that extraction is difficult; and they become so hard that the dentists' instruments have to be specially tempered in order to cut the dentine in preparing cavities for filling. The value of the condition of a child's teeth, as an index of both its general nutritional vitality and of the suitability of its diet to growth and development, is generally recognised; and both the examples quoted above are the more striking because they refer to children who embark on life for the most part but ill-furnished with vital endowments, "already impregnated with the seeds of disease, sown by vice and violation of all sanitary laws."

IMPROPER USES OF MEAT IN A CHILD'S DIET.

But there are other less obvious but not less serious results dependent on the too early inclusion of meat into the dietary of childhood. Man is a cooking animal—by art: the taste for cooked meat is purely an artificial one, and the (almost inevitably associated) liking for the browner, overcooked parts of roasted flesh means the acquisition of a taste for substances which are almost purely stimulants—excitants—of bodily functions, but which possess scarcely any nutritive value. As stimulants they may serve a useful purpose, under certain conditions of imperfect health for example, by urging weakened digestive functions to do temporarily more effective work, but they are not necessary to the healthy body; and—by acting as (needless) stimulants to the appetite—they tend to induce the consumption of a larger amount of food than a natural appetite would call for as the expression of the needs of a healthy body. Without any undue leanings towards vegetarianism, or to any other extreme, few will deny that most people eat more meat than is good for them. And a careful examination of the matter leaves little doubt but that this is due to a precocious, artificial, and physiologically improper stimulation of the taste for cooked flesh, which—initiated by beef-tea and gravy in the nursery—is strengthened and extended by the kind of diet ordinarily provided both at home and at school during the later years of growth and adolescence.

SUITABLE SUBSTITUTES FOR MEAT.

The remedy for these mistakes is obvious. Supply the child with its necessary quota of albuminous nourishment (proteids), as this is contained in milk, the various cereal foods, peas, beans, lentils, with fish and eggs in moderation. Do not add meat in any form to his dietary before the age of eight or nine at earliest, and then only gradually, and in its least stimulating guise. Do not, in this respect, approximate his diet-table to

that of the adult before the age of thirteen or fourteen years. If such rules were followed there would be more healthy—though probably fewer precocious—children. Many of the most serious problems, moral and mental as well as physical, which confront the schoolmaster would assume much simpler proportions, and a signal check would be given to the manufacture of those neurotic failures which are so conspicuous amongst the products of modern civilisation.

FAT IS A VALUABLE FOOD.

One essential food, of which children never get too much, is fat. Valuable as a fuel, its presence also favours the growth and repair of tissue, and it is abundantly required in the building up of a sound nervous system. The best and most assimilable form of fat is good butter—an expensive but not really extravagant food—and its "other self," the cream of good milk. Any one form of fat, except butter, is apt to become distasteful sooner or later, and this especially when one is fatigued. But in addition to encouraging the eating of such fat as naturally accompanies meat, when meat is allowed, dripping, lard, and suet (as in the useful suet pudding) afford numerous combinations, all of which, when properly varied, are palatable as well as valuable. Maize also contains a large proportion of fat.

As regards the necessary carbo-hydrates, starch is largely present in potatoes, &c., wheat and other grain and seeds, and forms almost the whole bulk of sago, tapioca, and arrowroot. These latter, therefore, need the addition of milk (proteids and fat) in order to produce a sustaining form of food.

THE PLACE OF SUGAR IN THE DIET.

Sugar is, amongst other things, a valuable muscle-food, and in its various forms, as cane sugar, treacle, honey, and golden syrup, should be regarded as a necessary item in the provender of early life especially. It is a mistake to stint the child of sugar at its meals (sweetmeats between meals fall into a different category), and in practice it will be found that the child who can obtain with its food all the sugar that it likes does not take more than it needs, and is less likely to become a precocious or excessive eater of flesh.

THE VALUE OF VEGETABLES.

In addition to common salt (an essential constituent of the blood) the other mineral substances which go to the sustenance of bone, nerve and muscle are ordinarily obtainable from vegetables and fruit, as well as from flesh-food. The vegetable acids and the sulphur compounds present in fresh vegetables also make them most valuable additions to the dietary, and they should always be provided in abundance and in such successive variety as the season permits. Some ingenuity is required in this respect during the later autumn and winter months, when the choice of green-stuff is more restricted. The school which has its own kitchen-garden and its orchard and fruit garden, as well as its own dairy, is an example of wisdom as well as of good fortune. Sound, ripe fruit should enter largely into the daily dietary, and, provided it be not given later than the mid-day meal, there is no fear of any harm resulting from an unlimited supply.

TIMES FOR MEALS.

The digestion of children is rapid, and their meals should not be timed too far apart. For example, if breakfast be at 8, and dinner at 1 or 1.30, some food, in the shape of biscuits or bread-and-butter and milk, should be given about 11 a.m. And food should be similarly provided about 4, to avoid the otherwise unbridged gap between dinner and the evening meal.

SUITABLE BEVERAGES.

As regards beverages, water is the best and simplest—and it should be easily obtainable pure, fresh, and cool by every pupil throughout the day. Milk—itself a food requiring digestion—must not be regarded as a beverage, or supplied as such with any meal at which meat or fish is provided. Tea, not necessarily "weak," but infused for not more than three minutes and then poured off into another vessel for distribution, so as not to stand upon the leaves, should be given with plenty of milk. Cocoa, made with milk, or coffee, with at least three times its volume of hot milk added, is good at breakfast, cocoa especially in winter. Home-made lemonade is good at any time, and makes a pleasant supper beverage during the warmer months. Alcohol should be rigidly excluded from the dietary of every junior school, and never given save by specific medical directions. It may be at least questionable whether an equally rigid restriction is entirely wise in the case of senior schools. To give the older schoolboy no training in learning to refuse what he will ere long be tempted to take as a matter of course, is doubtful policy; it would turn him out into the world possessed, it may be, of an innocence—now all at once stripped of the artificial safeguard hitherto extended to it—but destitute of virtue strong in practised self-control.

How One Stands Erect.—A child has to practise long before it can sit upright, and still longer before it can stand and walk. But having once thoroughly learned the feat, it is no longer necessary to give conscious attention to the maintenance of the erect position. Yet, to accomplish this apparently simple act, nearly all the muscles of the trunk and legs must act together in perfect harmony. To bring about this complete co-operation an impulse must be transmitted to the muscles from the brain, and before the brain can perform its work of regulation it must be in its turn acted upon by suitable external sensations. Important among these sensations are touch, hearing and sight.

ON THE TEACHING OF ENGLISH COMPOSITION.

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PERHAPS there is no branch of school work about which it is more difficult to map out a workable method than the teaching of English composition; and yet there is none in which some teachers would be more glad to receive guidance, if any useful suggestions can be given them for that purpose. How is the teaching of composition to be adapted to the different stages of a student's training? What is the order of treatment that brings forth the most satisfactory results? What are the errors of expression to which the genius of our language lends itself most readily? How are such errors to be corrected? Another difficulty that is often experienced by teachers is how to correct errors in composition, and especially in essay-writing, in such a way that the pupils may get the full benefit of such corrections. These are some of the problems to be faced. Without pretending to dictate to anyone, or to lay down any precise rules for the teaching of such an elastic and indefinable subject, I will offer a few general suggestions for the consideration of those who have not already found a satisfactory method of their own.

I.—Correction of Common Errors of Expression.

Grammatical accuracy, as I need hardly say, is the first rung of the ladder by which the student may hope to ascend from the easier to the more difficult kinds of composition. The fewness of inflections in our language is a constant snare, exposing one to the continual risk of neglecting and sometimes misplacing those few that have survived. The student, therefore, after he has mastered the main principles of accidence and syntax, should be well practised in correcting inaccurate sentences; and he will perceive the value of such practice when he is brought to realise the fact that mistakes of this kind are not uncommon in books or newspapers where we should least expect to find them. By way of illustration, I give a couple of very simple examples, the one containing a false concord, and the other putting an objective case for a nominative:—

Its contents, so far as the disaster is concerned, *is* confirmed by a dispatch received at the Berlin Foreign Office.—*Berlin Telegram, Daily Telegraph*, p. 9, April 13th, 1899.

A cabman, who applied to Mr. Plowden for a summons against a fare, *whom* he alleged had not paid the proper amount, seemed to have the vaguest ideas on the subject.—*Daily Telegraph*, p. 9, April 27th, 1899.

There are other kinds of inaccuracy which, though not amounting to errors of accidence, may well be regarded as errors of composition, such as awkward constructions, the misuse of pronouns, of auxiliary verbs, and of prepositions. To show the kinds of errors that I refer to, I give three examples from current journalism, all of very recent date:—

In England the external restriction has been removed (from the Jews), as it has been from every sect who conceives it to be their duty to spread heir faith.—*Fortnightly Review*, p. 674, April, 1899.

Here, for *who conceives* we should write *whose members conceive;* and the word *other* should be inserted before *sect*.

I feel that it is my duty to indicate what I have said elsewhere, namely, how the Jewish Theistic Church shall speak of the great Jew of Tarsus.—*Fortnightly Review*, p. 672, April, 1899.

Here *shall* has evidently been used for *will* to denote future time in the third person. The next example is one of awkwardness rather than inaccuracy:—

There are men who are impossible to work with with any degree of satisfaction.—*Church Gazette*, p. 690, April 8th, 1899.

The reader will see at once how much this sentence might be improved by substituting "with whom it is impossible to work" for "who are impossible to work with"; and this change would have the additional advantage of separating *with* from *with*, which in the original are placed side by side.

Mistakes are not unfrequently made in the use of prepositions; but, so far as I am aware, the current text-books on composition give the student scarcely any help in the use of these important little words. In the following example, "to draw" has been written for "in drawing":—

But our scanty sources of knowledge (about this Arabian sect) do not warrant us to draw any conclusions as to their creed and religious attitude. — *Church Gazette*, p. 31, April 29th, 1899.

These few examples will suffice to show the kinds of inaccuracy to which journalists are liable in the hurry of composition. There is probably no way in which a beginner can be put on his guard against careless writing of this kind more effective than that of giving him as much practice as may be possible in the correction or improvement of faulty sentences. Genuine, authenticated sentences are much to be preferred to manufactured ones. It is easy to manufacture bad English, but it is not so easy to say what are the errors of expression into which a student is most likely to fall, and against which he has most need to be guarded. This can be best ascertained from mistakes that appear occasionally in print through the inadvertence of writers.

II.—The Conversion of Sentences from one Form to another.

The next kind of exercise in which a beginner should be practised is one that seems to have been much neglected hitherto, viz., the conversion of sentences from one form to another without

altering their meanings. Everyone is familiar with the process of changing a direct into an indirect narration, as, "He said, I will come," "He said that he would come." But this is only one out of many other examples of the way in which the form or quality of a sentence can be changed without alteration of the substance. To show more clearly what I mean, I will now give a few examples:—

He was poor, indeed, but he was always honest.

This sentence might be re-written in at least three other forms:—

He was always honest, although he was poor.
Poor as he was, he was always honest.
However poor he might be, he was always honest.

Sentences can be changed from negative to affirmative, and *vice versa*:—

His services cannot be forgotten. *Negative.*
His services have been too great to be forgotten. *Affirmative.*

One part of speech can be substituted for another without changing the base of the word affected by the process:—

I am glad that my intention to become a soldier has received your *assent.* *(Noun.)*
I am glad that you *have assented* to my becoming a soldier. *(Verb.)*

He was *absolutely* ruined by that unlucky business. *(Adverb.)*
The ruin that he incurred by that unlucky business was *absolute.* *(Adjective.)*

Simple sentences can be converted to compound, and *vice versa*:—

He must confess his fault to escape being fined. *Simple.*
He must confess his fault, or he will be fined. *Compound.*

Simple sentences can be converted to complex, and *vice versa*:—

On reaching the age of manhood you will have to work for your living. *Simple.*
As soon as you have reached the age of manhood, you will have to work for your living. *Complex.*

Complex sentences can be converted to compound, and *vice versa*:—

I have found the sheep that I had lost. *Complex.*
I had lost a sheep, but I have found it again. *Compound.*

Besides the modes of conversion exemplified in the few specimens given, there are many more by which a student could be practised in the art of turning a sentence about from one form to another; and it can hardly be doubted that the effect of such practice would be to give him greater facility and readiness of expression.

III.—Synthesis, or the Composition of Sentences.

We come now to what I consider to be the third stage in the teaching of composition, viz., Synthesis, or the building of sentences—the art of arranging the words, phrases, and clauses of which a sentence consists in their most effective setting. In the composition of sentences there are three effects to be especially aimed at, viz. perspicuity, so that the drift of the writer may be understood at a glance; emphasis, so that more prominence may be given to one point than to another, according to the intentions of the writer or the drift of the argument; euphony, so that the sentence may be well balanced, and, if read aloud, sound well to the ear. Now, all these qualities of style depend to a large extent, though not exclusively, on the collocation of words, phrases, and clauses. I recommend, therefore, that at this stage of his course the student be thoroughly grounded in the principles of order, so that when he has written a sentence he may be in a position to know whether the sentence needs improvement in this respect or not, and if it does, to know how to take it in hand and carry out the improvement desired.

To show what I mean by the importance of order, I give a few examples selected from recent journalism, in which the rules of arrangement or position have not been sufficiently attended to:—

Perspicuity.—They tell him that there shall be no reforms in the slovenly methods common enough fifty years ago, some of which have survived to the present day, of which he does not approve.—*Church Gazette*, p. 710, April 15th, 1899.

Emphasis.—The power of the pulpit (in the United States) upon all moral questions has gained as much as it has lost upon all theological issues. It is not less powerful to-day in this domain in the republic than in Scotland, and far more so than in any other English-speaking country.—*North American Review* for March, 1899 (quoted in *Review of Reviews*, p. 342, April, 1899).

Euphony.—Mr. Yeats has an overdose of symbol. His "cloths of heaven" are too much embroidered with, to mundane eyes, inscrutable insignia.—*Literature*, *Church Gazette*, p. 439, April 29th, 1899.

The perspicuity of the first sentence suffers from the wrong place given to the clause "of which he does not approve;" this should have been put immediately after the word "reforms." The force of the second sentence (not to speak of its sound) suffers from the wrong place given to the phrase "in this domain," which, for the sake ot the emphasis that it requires, should have been made the first words of the second sentence. The euphony of the third sentence suffers not only from the juxtaposition of the prepositions *with* and *to*, but from a phrase being wedged in between *with* and its object. This awkwardness of sound and syntax could be removed by changing the order of the words, and saying "embroidered with insignia inscrutable to mundane eyes."

These examples are sufficient to show how very important it is to place emphatic words or phrases in positions of emphasis, and related ones in positions of proximity, and how necessary it is (so far as perspicuity and emphasis permit) to avoid placing words in a position that offends the ear. There are of course many devices besides those of collocation or order which conduce to the perspicuity, emphasis, or euphony of a sentence, and there are other qualities of style besides these three to which a student's attention must be directed before his training is completed. But I

have no space to enter upon such details here; they will no doubt be found in most of the current text-books on English Composition. I should be inclined, however, to place "order" in the foreground, and to advise that its rules and principles be mastered, at any price, before any attempt is made at original composition even of the easiest kind.

It appears to me that there are at least three kinds of practice by which the principles of arrangement or position in sentence-structure can be exemplified and enforced. I give them in the order of difficulty, putting the easiest first: (*a*) To re-compose, *i.e.*, put back into readable form, sentences which have been decomposed or put out of their proper shape by analysis; (*b*) to correct or improve sentences in which some of the parts are misplaced; (*c*) to combine a string of little sentences into one sentence, that may be simple, compound, or complex according to the directions given for combining them.

(*a*) In the first kind of practice (with which Mr. Goyen has made us familiar in his excellent "Principles of English Composition") the analysed sentences which the student will be required to reconstruct have no flaw in them, and thus the student has nothing to do but to restore the beauty of form which has been temporarily destroyed by analysis. To do this he must bring into use the rule of proxmity and the rule of priority, which it is assumed he will have acquired already from some standard text-book.

Principal clause:—

Subject.
- *Nominative*—Governor
- *Enlargement*—(1) the
  (2) of the town
  (3) being much astonished

Predicate.
- *Finite verb*—ordered
- *Object of verb*—Androcles
- *Complement of verb*—to explain
- *Extension of verb*—on seeing this

Subordinate clause (*object of "explain"*):—

Subject.
- *Nominative*—beast
- *Enlargement*—(1) a
  (2) savage
  (3) like that lion standing meekly before him

Predicate.
- *Finite verb*—had forgotten
- *Object of verb*—its innate disposition
- *Extension of verb*—(1) why
  (2) all of a sudden
  (3) so as to fawn upon him with the affection of a dog.

On seeing this the governor of the town, being much astonished, ordered Androcles to explain why a savage beast like that lion standing meekly before him had so forgotten its innate disposition all of a sudden as to fawn upon him with the affection of a dog.

(*b*) In the second kind of exercise the sentences placed before the student should have some faultiness of order which he would be asked to correct. Here, as before, we advocate the use of genuine examples in preference to manufactured ones, and for the same reason. The following is an example of a sentence the words of which need some re-arrangement of position:—

Only a few weeks ago we called the attention of the clergy and others who have to do with savings' banks, or are trustees for parochial funds invested in Consols, to this matter. —*Church Gazette*, p. 45, April 29th, 1899.

The reader will at once see, from the position of the phrase "to this matter," that this sentence contains a violation of the rule of proximity. It could be put right by a very slight alteration:—

Only a few weeks ago we brought this matter to the attention of the clergy and others, who have to do with savings' banks or are trustees for parochial funds invested in Consols.

(*c*) The third kind of exercise (to which, so far as I know, no attention has hitherto been paid in current text-books) consists in combining a string of short simple sentences into one longer sentence. In working out such exercises the student will have a chance of acquiring practice in the use of conjunctions and other connective words as well as in the observance of the rules of order. I give two examples:—

(1) He was armed with a coat of mail. The blows of his assailants fell thickly upon him. They had no effect.

Armed as he was with a coat of mail, the blows of his assailants, however thickly they fell upon him, had no effect.

(2) Northumberland's triumph seemed to be complete. The heir to the throne was a Protestant, and his own son's wife. Then King Edward died (1553).—"Short History of England," by Mark Hunter, M.A.

Northumberland's triumph seemed to have been made complete, firstly by the investiture of the right of succession in a lady, who was at once a Protestant and the wife of his own son, and then by King Edward's death, which followed soon afterwards (1553).

"The end of a sentence" (as I have stated elsewhere, "Eng. Gram. and Comp.," p. 137) "is more emphatic than the beginning, because one's mind is held in suspense till we know the closing circumstance, and our interest is aroused to know what that circumstance is." Hence qualifying clauses should, as far as possible, precede the clause or word to which they are subordinate. This principle, it will be seen, is observed in example (1), where the first short sentence is converted into a subordinate clause, which qualifies the predicate of the principal clause by giving the reason why "the blows of the assailants had no effect." On the other hand, the middle of a sentence is less emphatic than the beginning. Hence, in the same example, the second short sentence, describing the thickness of the blows, is put into a subordinate clause, which is wedged into the middle of the principal clause.

It follows from what has been said that, if we do not wish a word, phrase, or clause to be emphatic, we should avoid placing it in an emphatic position. Observe the almost ludicrous tameness of the words at the close of the following sentence:—

A collision between a bicycle and a cab opposite the Talbot Road on Monday, throwing the cyclist and breaking the wheel of his machine, led to nothing more serious.—*Ealing Guardian*, p. 5, May 6th, 1899.

The grammar of the sentence is perfect, but the bathos or anti-climax of the words placed at the

close of it certainly needs correction; and this can easily be effected by a slight change of order:—

A collision on Monday between a bicycle and a cab, opposite the Talbot Road, led to nothing more serious than throwing the cyclist and breaking the wheel of his machine.

Here *throwing* and *breaking* have not only been placed at the close of the sentence, on which the attention of the reader is naturally fixed, but they have been converted for this purpose from participles to verbal nouns, the forms of which are identical in our language.

(To be continued.)

THE TEACHING OF GEOMETRY.

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(Concluded.)

MEANING OF ANGLES.

ANGLES may now come, and with them, of course, the circular protractor. Euclid's definition, "an angle is the *inclination* of two right lines to one another," has, in the ordinary way, to satisfy the pupil until he gets near the end of Book VI.—if, indeed, he succeeds in extracting more light there. In reality, it gives him no definite notion at all. In vain does the teacher impress on the pupil the truth that "an angle is not the *space* between the lines, but their *inclination*." This reminds me of the Eleatic definition of *Being*: "This being is the pure characterless, changeless, general ground, not being that is contained *in* becoming, but being with exclusion of all becoming, being that is pure being and only to be comprehended in thought." (Schwegler, "History of Philosophy," p. 15.)

Measurement, by the protractor, of angles between pairs of right lines drawn at random should be extensively practised by the pupil; and after a little of such exercise he should be asked to guess the magnitude of the angle between two assigned lines, and then to measure it. He should also draw lines inclined to each other at an assigned angle. The fact that if a right line meets another right line, the sum of the two adjacent angles is two right angles (Euclid's Prop. xiii.) is better seen with a protractor than without it. In fact, I doubt whether or not Euclid's "proof" of this simple result is any proof at all. For since his definition gives no numerical way in which the magnitude of an angle can be measured, I cannot think it evident that if three right lines, OA, OB, OC, are drawn through a point O, the inclination of the first to the third is the sum of the inclinations of the first to the second and of the second to the third. How am I to know, from Euclid's definition, that "inclinations" can be added?

And here let me characterise a piece of the tedious, or the frivolous, which forms part of the proof of this proposition in the school Euclids. The proposition is, in all gravity, divided into two heads. "Case I., if the two right lines are at right angles to each other." This case is, of course, very properly dismissed in few words; for, if two things are equal, their sum is naturally twice one of them. Such tedious discussion of "Cases" is characteristic of the Euclids, and is, I suppose, thought to be a valuable exercise for the pupil. I know that it is a severe trial for the examiner.

After plenty of numerical work with the protractor comes very simply the cardinal fact that if a right line, OA, represented, say, by an arrow with the feather at O and the point at A, revolves about O continuously in the same *sense*, and finishes exactly in its first position, it has revolved through four right angles; and this will still be true if, without always turning, like the hand of a clock, about O, it jumps from its first position to any second position, and then to a third, and so on, finally reaching *exactly* its first position. The understanding of this is enormously important, and extremely easy for the merest beginner. It is Euclid's thirty-second proposition with all its consequences for polygons. But it is, in reality, more. It is the fundamental fact in rotation, whereas the fact that the sum of the internal angles of a triangle is two right angles is only a subsidiary one: the fundamental result is that the sum of the *external* angles is four right angles—not that the sum of the internal is two.

Numerical examples of the construction of triangles whose *three* angles are given, or two only of which are given, may now exercise the pupil for several lessons—especially as we may combine numerically assigned sides with numerically assigned angles in many ways in these exercises. The pupil will very soon learn that if he is given the three angles of a proposed triangle, their sum must make up 180°, and he will be on the alert, as he was when he was asked to construct a triangle with three numerically assigned sides. Right-angled triangles should figure in these examples, and the relation between their two acute angles learned.

We have now got so far in the subject—and this with no formal statement of logical reasoning, except that involved in the proof of Prop. i.—that I had almost forgotten to say something about Euclid's Prop. ii. This problem, we should have thought, was already disposed of in Euclid's third postulate: "Let it be granted that a circle can be described with any centre and with any radius"; and so far as any utility is contained in the problem or proposition, there is really nothing more to be said about it. But does not every teacher know what a very difficult problem this is for the young beginner? And is it at all desirable to vex his mind with such a trifling exercise? I have vivid recollections of this bugbear; I remember the very puzzling effect of placing the point through which the required line was to be drawn in other positions than that figured in the book; but, of course, I had no suspicion of the entire paltriness of the problem; and I now see that it would have been much better if I had been allowed to make

progress in geometry by going on with what is easy, interesting, and important in the subject, instead of vexing myself and wasting time with an intricate mass of construction for an essentially useless proposition.

Order of Propositions.

Easy exercises in precise statements of deductive reasoning may now follow, and of course, our first example will be Euclid's Prop. iv. The beginner should be told at once, in plain English, that the whole proof is nothing more than this: one of the triangles can be made to fit exactly over the other. Plain English, and appeals to common sense are, unfortunately, too much divorced from the ordinary teaching of Euclid. The language of Euclid is (as I have elsewhere said) a special kind of jargon—stiff, stilted, and pedantic. It is said to be conducive to clearness of statement and logical reasoning. My experience of the writings of English men of science is not favourable to this view. Clearness of exposition, correctness of literary style, and strict adherence to logical order are pre-eminently characteristic of French writing, but not conspicuous (to say the least) in our own books.

In the teaching of Prop. iv., triangles having the given relation should be cut out of paper by the pupil, and their superposition effected.

It should then be shown that Prop. v.—the famous *Pons Asinorum*—is really the fourth over again, *without any construction whatever*. This is, indeed, recognised in some of the Euclids, and given a secondary place as *an alternative proof*. For the beginner it should be *the* proof, and the time-honoured proof, with its well-known construction, need not be mentioned until long afterwards, when the pupil, with a fair grasp of the subject, comes to revise his work. The fact that, if the equal sides are produced, the angles below the base are equal, will be at once recognised from what has been already learned from the protractor. From the fourth proposition follow easily for the beginner Propositions v., vi., viii., ix., x., xi. and xii. Observe the omission of Prop, vii. In Euclid the eighth is deduced from the seventh; but in some editions an alternative proof of the eighth is given, based directly on Prop. iv. This is the best and simplest way.

Prop. vii. should not, in my opinion, be assigned its present dignity; it is merely a minor result, or corollary from a fact which ought, perhaps, to rank as a proposition, viz., that if any point is equidistant from two given points, A and B, that point must lie on the perpendicular to AB at its middle point. This is a very easy and interesting deduction from Prop. iv., and it is readily understood by the young pupil. Of course, Prop. vii. follows at once from this fundamental result, because if the two triangles involved are ACB and ADB, having the common base AB, and vertices C and D, we cannot have A equidistant from C and D at the same time that B is so. This is a simple way of looking at the matter, whereas Euclid's proof (repeating Prop. v.) is somewhat obscure and involved for the young pupil.

This seventh proposition is usually presented under three heads, or "cases," one of which is absolutely frivolous.

Having deduced from Prop. iv. the various propositions before mentioned, as well as the proposition that *the angle in a semicircle is a right angle*, we may proceed to the consideration of parallel lines and parallelograms. In my little book, "Geometry for Beginners," p. 61, I have given what I found to be the most readily intelligible way of defining two parallel lines. We imagine a line to have two sides, an upper and a lower, or a right and a left; and we imagine these sides to be coloured red and blue. The pupil should colour them with red and blue pencils. Two lines will then be parallel if any other line makes with them *equal angles measured in the same way*, as explained in the above-mentioned little book.

The series of propositions relating to parallelograms may follow Euclid's order. There is nothing at all difficult in this part of the subject.

But when speaking of the equality of parallelograms to each other or to triangles, we should be very careful to avoid Euclid's inaccurate language, and to emphasise the fact that the equality is one of *area*. Of course, we must show previously how the area of a rectangle is measured, and copiously illustrate by numerical examples. Such examples will occupy the pupil for several lessons in the calculation of the areas of parallelograms, triangles, and trapeziums. This is very easy arithmetic, and it causes the little pupil no difficulty whatever. When applied to the measurement of a carpet or a field it excites interest.

Immediately after the exercises on areas I should proceed to the Proposition of Pythagoras (Prop. xlvii.); but the proof should not be that given in Euclid, which the beginner would find too difficult. Euclid's very difficult propositions xliv. and xlv. should be omitted until the pupil has learned all that is really important in the range of the First Book—and these propositions cannot be considered as really important. The Proposition of Pythagoras will lend itself to many arithmetical exercises without requiring the pupil to be able to extract the square root of a number in general; for we can always supply him with integer numbers for the sides.

Reforms Needed in Examinations.

This brings me to the end of what I have to say at present on the subject of imparting rapidly an intelligent knowledge of the essentials of geometry to very young pupils. The present system of slavishly following Euclid's language and order is, I maintain, a shocking waste of time. There are now so many branches of knowledge (especially scientific) making demands on our time that a strong effort should be made to remove such a serious hindrance to progress as the current teaching of Euclid. But where is reform to be sought? It ought to be in the preparatory schools. But so

long as the public schools require Euclid in their scholarship examinations, the preparatory schools will continue to teach Euclid slowly and painfully, instead of an efficient knowledge of the elements of geometry. If these scholarship examinations required merely such an intelligent knowledge of the subject as could be obtained by most boys on the lines which I have indicated, a great benefit would be conferred on English scientific education.

ENGLISH HISTORY, 1399-1603.

TWO HUNDRED NOTEWORTHY TOPICS ARRANGED ALPHABETICALLY.

EACH of the underwritten words has some definite and important association with the period of English History prescribed for the Oxford Local Examination this summer (1399-1603). The words in the first column have associations simple enough to be within the scope of the Junior or Preliminary candidate; those italicised have already aroused the curiosity of Locals examiners at Oxford or Cambridge; those distinguished by an asterisk have been "set" more than once in recent years. The second column includes the more difficult terms and proper names suitable for Senior candidates.

It is suggested that the teacher may use these lists either privately, as a kind of synoptic view of the topics about which it is desirable that the members of his or her class should know something, or publicly for revision work in class. The word-lists may be used either as *memory* tests or as *intelligence* tests.

(1) *As Memory Tests.*—Read out the words as they come to the class, at the rate of one per minute. Let the members of the class write down the word in any case and, if possible, add brief notes of the historical facts which the word may suggest to them (where it is, what it is, who it is, what it did, &c.). The class will thus have practice in moving quickly from fact to fact, and so get out of the accustomed grooves; the teacher will easily discover the weak points in the knowledge of the class. Each teacher is the best judge for himself as to whether the weak points are worth strengthening, how many words should be taken at each lesson, &c.

(2) *As Intelligence Tests.*—Take any two or three words, find out in the usual way that the class knows something about each, and then get the members of the class to write down any connection they can trace between the things denoted by the words. For instance, though the two following columns have been drawn up independently, there is a suggestive connection between the pairs of entries numbered 8, 10, 15, 21.

The exercises thus briefly outlined require to be used discreetly, and will probably prove confusing rather than suggestive to any class which is not tolerably familiar with the events of the period taken chronologically. They are designed not so much to increase the sum of knowledge but rather to make it more flexible.

JUNIOR TOPICS.	SENIOR TOPICS.
1. Agincourt.	Allegiance.
2. Anjou.	Annates.
3. *Armada.	Armagnac.
4. Aragon.	Articles of Religion.
5. *Arras.*	Attainder.
6. Aske.	Baronage.
7. Babington.	Berwick.
8. *Bacon.*	Bible.
9. **Barnet.*	Bill.
10. *Beaufort.*	Bolingbroke.
11. *Benevolence.*	Bothwell.
12. Blackheath.	Brownist.
13. Boleyn.	Burgundy.
14. Bonner.	Calicut.
15. Book of Common Prayer.	Calvin.
16. **Bosworth.*	Cambray.
17. Brittany.	Campion.
18. *Burleigh.*	Canon Law.
19. Cabot.	Cartwright.
20. Cade.	Cateau Cambrésis.
21. **Cadiz.*	Cecil.
22. **Calais.*	Chivalry.
23. Cape of Good Hope.	Cobham.
24. Castillon.	Congé d'élire.
25. Caxton.	Congregation.
26. Circumnavigation.	Convocation.
27. Clarence.	Council of the North.
28. Cleves.	Darien.
29. **Cranmer.*	Divine Right.
30. **Cromwell.*	Douay.
31. **Darc* (or d'Arc).	Dudley.
32. **Drake.*	Dunkirk.
33. *East India Company.*	Edinburgh.
34. *Estaples.*	Emperor.
35. **Field of the Cloth of Gold.*	Erasmus.
36. First-Fruits.	Estates (the Three).
37. *Flodden.*	Excommunication.
38. *Fotheringhay.*	Fidei Defensor.
39. Frobisher.	Fisher.
40. **Gardiner.*	Florida.
41. Glendower.	Flushing.
42. **Grey.*	Fortescue.
43. Hawkins.	Fox.
44. *Hexham.*	Gascony.
45. *High Commission.*	Grenville.
46. *Hooker.*	Guise.
47. *Hooper.*	Holbein.
48. Huguenot.	Holy League.
49. Ket.	Howard.
50. **King-Maker.*	Impeachment.
51. Latimer.	Langside.
52. **Lollard.*	Liveries.
53. Monopolies.	Machiavelli.
54. *More.*	Maintenance.
55. Morton's Fork.	Mortimer.
56. Netherlands.	Nantes.
57. *Neville.*	North-West Passage.
58. Newfoundland.	Orange.
59. Normandy.	Pale (the).
60. Oldcastle.	Paston.
61. *Parker.*	Pavia.
62. Peter Pence.	Pecquigny.

63.* *Pilgrimage of Grace.*	Percy.
64. *Pinkie.*	Poor Law.
65. Pole.	Protector.
66. *Poynings.*	Provisors.
67. Praemunire.	Ravenspur.
68. Puritan.	Reformation.
69.* *Ralegh.*	Renascence.
70. Ridley.	Richmond.
71. *St. Albans.*	Rouen.
72. Shrewsbury.	Sawtre.
73. *Simnel.*	Separatist.
74.* *Star Chamber.*	Slave Trade.
75. Stuart.	Smerwick.
76. Swynford.	Stanley.
77. *Tewkesbury.*	Supremacy (Royal).
78. *Towton.*	Treason.
79. *Troyes.*	Ulster.
80. Virginia.	Uniformity.
81.* *Wakefield.*	Vasco da Gama.
82. *Warbeck.*	Vervins.
83.* *Wolsey.*	Wales.
84.* *Wyatt.*	Walsingham.
85.* *Zutphen.*	Wentworth.

JUNIOR. *Notable Persons having the following* 15 *Forenames :—*	SENIOR. *Notable Persons deriving Titles from the following* 15 *Counties :—*
86. Anne.	Buckingham.
87. Charles.	Cambridge.
88. Edward.	Essex.
89. Henry.	Gloucester.
90. James.	Kildare.
91. Joan.	Leicester.
92. John.	Norfolk.
93. Katharine.	Northumberland.
94. Louis.	Somerset.
95. Margaret.	Suffolk.
96. Mary.	Surrey.
97. Richard.	Tyrone.
98. Robert.	Warwick.
99. Thomas.	Westmoreland.
100. William.	York.

MENTAL FATIGUE.

By E. E. FOURNIER D'ALBE, B.Sc., &c.

THE literature on the subject of mental fatigue is already of very considerable dimensions. In the *Allgemeine Deutsche Lehrerzeitung* (No. x., 1899), Otto Hänssel enumerates no less than forty-eight papers on the subject, the majority of which are, needless to say, in the German language. Considering that the subject requires the aid of physiology, psychology, and mental and physical hygiene for its adequate discussion, it is not surprising that the task of summarising the results to date should be difficult. And yet the study of the phenomena of mental fatigue is of the most far-reaching importance. For it is the fatigue produced by mental work which limits the efficiency both of the teacher and his pupil. They both start on their task with a definite amount of nerve energy, and that nerve energy is exhausted more or less rapidly according to the mental exertion. Modern physiology has proved that every kind of mental activity is accompanied (though not necessarily caused) by some physical process in the brain or elsewhere. Mental work has a well-defined effect upon the heart's action, upon the rate of breathing, upon muscular power, and upon the activity of the organs of secretion. All these activities are stimulated at first—say in the first half-hour of work—but afterwards they gradually decline. Prolonged mental work has the effect of reducing the activity of all the bodily processes. Energy is, so to speak, withdrawn from the animal functions, and concentrated upon the brain. This has been brought out clearly by the French educationists, Henri and Binet, who collected statistics of the consumption of bread in French public schools. It was found that towards July, the month in which the sessional examinations are held in France, there was a notable general diminution in the amount of bread consumed. At the same time there was a reduction in the weight and in the rate of growth of the pupils. That this was not due to the heat of the summer was proved by simultaneous observations in prisons, where no such diminution was found to take place.

The remedy for this drain upon the vitality of the pupils would be to spread the examinations more evenly over the session, so as to make the mental work more uniform. This is largely done in German secondary schools, where there are weekly examinations in writing, and the pupil's progress is principally judged by notes of his answerings made from day to day.

A great variety of processes have been devised for "measuring" mental fatigue. The tasks chosen for that purpose include the addition or multiplication of numbers, the committing to memory of series of numbers or meaningless syllables, the counting of letters in a printed composition, writing by dictation, rapid reading, and filling up omitted words or letters. In most of these methods the acquisition of facility by practice disturbs the calculations very much. This applies most of all to the arithmetic work, and least to the method founded upon the reading of a series of miscellaneous words or syllables without context. The number of mistakes made in the reading of such a series is a fairly accurate measure of the mental fatigue of the reader.

Other methods are based upon physiology. Professor Griesbach has invented what he calls an esthesiometer, consisting of a pair of compasses provided with a scale for finding the distance between the points. The points are placed on the skin, say on the first finger, and the distance between them is diminished until they can be no longer felt as two separate points. Professor Griesbach has found that the minimum distance increases with fatigue. But the method is subject to many disturbing influences, and there is no strict proportion between the scale measurements and the actual degree of exhaustion.

The general result of the most trustworthy measurements appears to be that in a piece of continuous mental work, lasting, say three hours,

the efficiency begins at a fairly high value, and diminishes within the first twenty minutes. It then increases steadily, and attains its maximum about the end of the first hour. After that it diminishes during the next two hours, but increases again towards the end under the stimulus of its approaching termination.

It will be seen at once that several effects are superimposed. There is the alertness and interest of the first few minutes, which, however, wears itself out as rapidly as a straw fire. Meanwhile, the nervous energies are being properly organised and got into harness, and so the efficiency increases, until at the end of the first hour it is in full swing. Then the effects of fatigue begin to tell, and they result in a steady diminution of the working capacity. This is the general course of events, whatever may be the work in hand. But the rapidity with which the working capacity is reduced depends very much upon the subject. Different subjects vary considerably in the tax they put upon different people, and an idea of their comparative difficulty can only be obtained by experiments with a large number of pupils and of teachers also, since the difficulty depends largely upon the teacher's manner of presenting the subject. One classification, given in the *Deutsche Blätter*, by Marx Lobsien, of Kiel, is the following :—Arithmetic, History, Grammar, Catechism, Natural History, Experimental Science, Geography, Geometrical Drawing — the most difficult subject being put first in the series.

Strange to say, interest in a subject does not eliminate fatigue, but rather hastens it, since it leads to an increased expenditure of nervous energy.

The problem now is to arrange the subjects, the duration, and the arrangement of the lessons in such a manner as to obtain the highest efficiency without excessive fatigue. Fatigue in itself is not objectionable. On the contrary, it is as necessary as recreation. But when there is too much of it the effects extend over the following days, and the original freshness is not recovered except after a prolonged rest. A state of chronic fatigue is injurious, and must in the end prove disastrous.

Most of the authorities in this field of research agree that healthy children can work five hours a day without danger to their health, when the work is properly arranged. The object aimed at should be to dispose the subjects so that the tax upon the mental faculties should not exceed the reserve of nerve energy. It is therefore advisable to take the most difficult subject second in the programme, the efficiency being then at its highest. After that the subjects should become more and more easy. The proper timing of intervals is an important feature of a good time-table. A five minutes' interval will often be a good restorative where a quarter of an hour will injure by removing the impetus acquired during the lesson. A substantial meal has, on the whole, the effect of withdrawing a large portion of nerve energy for the service of the digestive process, and the proper efficiency is not recovered for three hours.

An important result of all the best measurements is to show that bodily exercise is not an antidote to mental fatigue. It must be regarded as so much work, however much it may show the nature of play. Gymnastics especially involve considerable exhaustion, which tells on the mental energies to the same extent as mental work. The only way of recovering mental energy is really perfect rest, a relaxation of the entire system, and sleep is the best restorer of all.

It may be objected that these researches only apply to the average schoolboy or schoolgirl, and that practical conditions vary individually within wide limits. That is true, of course; but as matters stand, the hours, subjects and intervals must be arranged to suit the majority in each class, and individual proclivities can only be considered in private tuition. It should also be borne in mind that the fatigue of the teacher is as much to be reckoned with as that of the pupil, if not more. For the overtaxed pupil has always the expedient of inattention, which acts as a kind of safety-valve. It may be safely said that the average schoolboy does not allow any one to overburden him. If the teacher attempts it he is repaid with inattention. But the teacher has not that resource. His alertness and energy must remain effective to the end, or the class will get beyond control. In an ordinary workaday school it is well-nigh impossible to attain any plan which would be thoroughly in accordance with all the requirements specified in this article; but the ideal should be borne in mind, and actual arrangements made to approach it as far as practicable.

THE SCHOOLS OF PUBLIC MEN.

V.—MEN OF LETTERS.

THE precise connotation of the term "Man of Letters" is a decidedly debatable point. Mr. Ruskin, however, has put us on the scent of a true definition; for in his "Sesame and Lilies" he remarks the fact that a man versed in literature "is called, by the consent of nations, a man of letters instead of a man of books, or of words." He further urges that a good book is one which, if read "letter by letter—that is to say, with real accuracy," makes the reader "for evermore in some measure an educated person." With these luminous hints to guide us, it might be possible to abridge our list of two hundred-and-twenty literary celebrities whose early education is the subject of the present article. We shall give to the expression "man of letters" a broad and generous sense; though, owing to the small output of some writers, we may run the risk of excluding men who, when tested by Ruskin's implicit definition, are perhaps equally deserving of the title.

The above heading also covers historians, philologists, and certain newspaper and magazine editors, leader writers, and special correspondents. Writers on scientific subjects have already come

more or less within our purview in a former article.

The school contributing the largest number of distinguished men of letters is **Eton**, viz., eleven. They are—

Mr. F. C. Burnand, editor of *Punch*; Mr. O. Crawfurd, Mr. R. N. Cust, Mr. F. Grainger (*nom de plume*—Headon Hill), novelist; Mr. Henry Labouchere, of *Truth*; Sir H. C. Maxwell Lyte, historian; Mr. W. E. Norris; Mr. W. Herries Pollock; Mr. G. W. Prothero, Professor of History, University of Edinburgh; Professor Goldwin Smith, who went to United States in 1868; and Mr. Leslie Stephen.

Harrow succeeds Eton with ten names, including—

The Marquis of Bute, Mr. W. J. Courthope, Professor of Poetry, University of Oxford; Mr. C. J. Longman, editor of *Longman's Magazine*; Mr. H. F. Pelham, Camden Professor of Ancient History, University of Oxford; Sir Douglas Straight, editor of *Pall Mall Gazette*; and the Rt. Hon. Sir George Otto Trevelyan.

After Eton and Harrow there is a distinct diminution in the number of eminent men of letters claimed by any one school. Four schools follow with six names each. They are **King's College School, Marlborough, Merchant Taylors'**, and **Winchester**. The following are from King's College School—

Mr. T. Anstey Guthrie; Mr. Frederic Harrison; Mr. Sidney J. Low; Mr. W. M. Rossetti; Mr. G. E. B. Saintsbury, Professor of Rhetoric and English Literature, University of Edinburgh; and the Rev. W. W. Skeat, Professor of Anglo-Saxon, University of Cambridge (Professor Skeat was also educated at Highgate School).

From Marlborough we have—

Mr. S. H. Butcher, Professor of Greek, University of Edinburgh; Mr. C. L. Graves, editor of the *Cornhill Magazine*; Mr. Anthony Hope (Hawkins); Mr. R. E. Prothero, editor of the *Quarterly Review*; Mr. P. S. Robinson; and Mr. Clement Scott.

From Merchant Taylors' we have—

Mr. W. Davenport J. Adams, the Rev. T. K. Cheyne, Oriel Professor of the Interpretation of Scripture, University of Oxford; Mr. W. C. Hazlitt; Mr. G. G. A. Murray, Professor of Greek, University of Glasgow; and Mr. H. D. Traill.

Winchester furnishes the following, the first name of which is also identified with Rugby—

Mr. T. Arnold; Mr. George Earle Buckle, editor of *The Times*; Mr. E. T. Cook, editor of the *Daily News*; the Rev. S. R. Driver, Regius Professor of Hebrew, University of Oxford; and Mr. S. R. Gardiner, historian. Honiton Grammar School had also a share in educating the editor of *The Times*.

Edinburgh Academy follows with five names—

Mr. W. Blackwood, editor of *Blackwood's Magazine*; the Rev. Marcus Dods, Professor of New Testament Theology, University of Edinburgh; Mr. Andrew Lang; Mr. J. Macaulay; and Mr. P. G. Tait, Secretary of Royal Society of Edinburgh.

Glasgow High School and **Rugby** furnish four distinguished men of letters each. From the former we have—

Rt. Hon. James Bryce; Mr. Robert Buchanan, who was also educated at Glasgow Academy; Mr. J. W. Hales, Professor of English Literature, King's College, London, who was partly educated at two other schools, viz., Durham Grammar School and Louth Grammar School; and Mr. Kennedy Jones, managing director London *Evening News*.

Rugby, besides furnishing Mr. T. Arnold (already mentioned under Winchester), gives us—

The Rev. Sir G. W. Cox, Bart.; Mr. R. Ellis, Corpus Professor of Latin Literature, University of Oxford; and Mr. Henry Sidgwick, Professor of Moral Philosophy, University of Cambridge.

Five schools supply us with three eminent literary men each. They are Aberdeen Grammar School, Bath College, Charterhouse, Cheltenham, and Westminster—

Mr. J. Donaldson, Vice-Chancellor and Principal of the University of St. Andrews; Mr. D. Masson, Historiographer Royal for Scotland; and the Rev. W. Robertson Nicoll are from Aberdeen Grammar School. We are not quite sure whether Mr. James Nicol Dunn, editor of the *Morning Post*, and Mr. George Macdonald, novelist, were also educated at the same school. Both were educated in Aberdeen. Bath College furnishes us with the familiar literary names of Mr. W. L. Courtney, Mr. T. H. S. Escott, and Mr. J. A. Spender, editor of the *Westminster Gazette*. From Charterhouse we have Professor R. C. Jebb, Mr. R. F. D. Palgrave, and Mr. J. Forbes-Robertson. Cheltenham supplies the Rt. Hon. W. E. H. Lecky and the Rt. Hon. John Morley. Two distinguished names connected with Westminster are Mr. G. A. Henty and Mr. Thos. Wakley, joint editor of the *Lancet*.

There are nine schools which furnish each two names of eminence in the literary world, viz., Clifton, Dumfries Academy, Ealing, Felsted, Hanwell, King Edward's School (Birmingham), Oscott, Shrewsbury and Stonyhurst.

From Clifton we have Mr. J. M. Le Sage, managing editor of *Daily Telegraph*, and Mr. A. T. Quiller-Couch; from Dumfries Academy Mr. J. M. Barrie and, we believe, Mr. J. Burgess, an authority on Indian archæology; from Ealing Mr. W. S. Gilbert and Rev. Canon George Rawlinson; from Felsted Mr. A. W. A'Beckett, senior member (next to editor) of literary staff of *Punch*; and Mr. Hugh Chisholm, editor of *St. James's Gazette*; from Hanwell Mr. F. J. Furnivall and Mr. George R. Sims; from King Edward's (Birmingham) Mr. Grant Allen and Mr. J. Thackray Bunce, editor of *Birmingham Daily Post*; from Oscott the Rt. Hon. John Lord Acton, Professor of Modern History, University of Cambridge; from Shrewsbury the Rev. J. E. B. Mayor, Professor of Latin, University of Cambridge; and Mr. E. Stanley Weyman; from Stonyhurst Mr. Percy H. Fitzgerald; and Stonyhurst shares with Oscott the distinction of having nurtured our present Poet Laureate, Mr. Alfred Austin.

Twenty-five eminent men of letters were educated privately, eighteen of them at home by their parents or by private tutors. The more noteworthy among them, taken at random, are—

Mr. P. W. Clayden, Mr. Sidney Colvin, Prof. E. Dowden, Mr. G. Manville Fenn, Mr. Edmund Gosse, Mr. S. Lane-Poole, Mr. W. H. Mallock, Mr. Wilfrid Meynell, Mr. D. Christie Murray, Mr. H. C. Pennell, Mr. A. W. Pinero, Mr. John Ruskin, Mr. Herbert Spencer, and Sir Edward R. Russell.

The majority of literary celebrities, as might be expected, added to their equipment by studying in foreign universities or by travelling abroad.

But we have the names of twelve distinguished men whose early education also was received in foreign countries—

Mr. Frank Harris, Mr. Henry James, Mr. George Meredith, Mr. A. C. Swinburne, Mr. Henry Hess, Mr. C. G. Leland; Mr. Henry Norman, late of *Daily Chronicle;* Mr. T. Heath Joyce, editor of *Daily Graphic;* Mr. F. Villiers, war-artist and correspondent; Mr. C. Waldstein, Slade Professor of Fine Art; and of course, M. Paul Blouet (Max O'Rell), and Prof. F. Max Müller.

Some ninety remain on our list who were educated at as many different schools. The following is a selection—

Sir Edwin Arnold (King's School, Rochester); Mr. R. D. Blackmore (Blundell's School, Tiverton); Mr. F. Marion Crawford (St. Paul's); Mr. John Davidson (Highlanders' Academy, Greenock); Mr. H. Austin Dobson (Beaumaris Grammar School); Rev. E. J. Hardy (Royal School, Portora); Mr. J. Hatton (Bowker's, Chesterfield); Mr. Henry Arthur Jones (Winslow, Bucks); Mr. Coulson Kernahan (St. Albans); Mr. Rudyard Kipling (United Services' College, Westward Ho! North Devon); Mr. Richard Le Gallienne (Liverpool College); Rev. Hugh Macmillan (Breadalbane Academy, Aberfeldy); Sir Theodore Martin (Edinburgh High School); Mr. Gerald Massey (British and National Schools, Tring); Sir Lewis Morris (Cowbridge and Sherborne Schools); Mr. Clark Russell (Dr. Behr's, Winchester); Mr. Samuel Smiles (Haddington Burgh Schools); Prof. J. Sully (Independent College, Taunton); Mr. A. C. Harmsworth, editor of *Daily Mail* (Stamford Grammar School, Liverpool); Mr. Henry W. Massingham, editor of *Daily Chronicle* (Norwich Grammar School, under Dr. Jessopp); Mr. Hammond Hall, joint-editor of *Daily Graphic* (Bedford Grammar School and Blackheath Proprietary School); Sir J. R. Robinson, manager of *Daily News* (Lewisham Congregational School); Mr. Clement K. Shorter, late editor of *Illustrated London News* and *The Sketch* (Downham Market); Mr. Oliver Armstrong Fry, editor of *Vanity Fair* (Magdalen College School, Oxford); Mr. C. A. Cooper, editor of *Scotsman* (Hull Grammar School); Mr. Archibald Forbes (Aberdeen Parish School); Mr. W. E. Henley (Crypt Grammar School, Gloucester); Mr. H. W. Lucy (Crescent School, Liverpool); Mr. Charles Williams, senior military correspondent of *Daily Chronicle* (Belfast Academy and Greenwich School); Mr. H. G. Wells (Bromley Grammar School); Mr. M. H. Spielmann, editor of *Magazine of Art* (University College School); Rev. A. H. Sayce, Professor of Assyriology, University of Oxford (Grosvenor College, Bath); Rev. W. Sanday, Professor of Divinity, University of Oxford (Repton); Mr. W. T. Stead, editor of *Review of Reviews* (Silcoates' School, Wakefield); Mr. Jerome K. Jerome (Philological School); Mr. T. P. O'Connor (College of the Immaculate Conception, Athlone).

Mr. Hall Caine was educated at schools in the Isle of Man and in Liverpool; Mr. H. Rider-Haggard privately at Ipswich; Mr. Thos. Hardy and Mr. J. Knowles (of *Nineteenth Century*) were both specially educated for the profession of architect; Mr. I. Zangwill and Mr. G. Bernard Shaw had a very meagre early training, and both are practically self-taught.

Of thirty-two ladies distinguished in various branches of literature, whose schools we have inquired into in addition to the foregoing, we find that about half were educated privately—most of them at home under governesses and tutors. Conspicuous among these are the names of—

Miss Jane Barlow, Miss D. Beale, Miss M. B. Betham-Edwards, Lady E. F. Dilke, Mrs. Craigie (John Oliver Hobbes), Florence Marryat (Mrs. Lean), Mrs. J. Maxwell (*née* Braddon), Mrs. I. F. Mayo, Mrs. A. Meynell (entirely by her father), Mrs. M. L. Molesworth, Mrs. L. B. Walford, Miss Charlotte M. Yonge, Miss Agnes Giberne, and Mrs. E. Crawford, Paris correspondent of *Daily News*.

Mrs. A. E. Barr was educated at Glasgow High School; Miss A. E. Bayly (Edna Lyall) at Brighton; Miss M. A. Belloc (Mrs. Lowndes) at Mayfield Convent, Sussex; Miss Sarah Doudney at Southsea, by Mrs. Kendall; Madame Sarah Grand at Royal Naval School, Twickenham; Miss Evelyn Everett-Green at Gower Street Preparatory School; Mrs. H. Reeves (Helen Mathers) at Chantry School, Frome; Mrs. Thackeray-Ritchie at Paris and Kensington; Mrs. A. Stannard (John Strange Winter) at Bootham House, York; Mrs. Burnett Smith (Annie S. Swan) at Edinburgh Ladies' College; and Miss Hulda Friederichs, editor *Westminster Budget*, at Ronsdorf and Cologne.

It will be noticed that several distinguished men of letters are not included in the above lists. This is only because it has been found impossible to ascertain their schools from books of reference.

SCHOOL PREPARATION FOR THE HIGHER CIVIL SERVICE.

By A HIGHER-DIVISION CLERK.

MANY a man on leaving the University would feel glad to know that a career free from the sordid cares of bread-and-butter hunting was open to him. Too often men with brilliant academical distinctions have no idea how to turn their knowledge to account. Much anxiety at a critical period of life would be avoided if somehow a definite programme could, with the boy's own consent, be plotted out for him. From this point of view the last few terms at school are a most important period in a man's life history. It is then those boyish individual tastes assert themselves which will develop into the hobby of the man. Probably one of the most important and interesting of the many duties of a schoolmaster consists in perceiving and moulding these tastes—in rejecting what will taint, and fostering what will improve. In fact, a great responsibility rests with the teacher in thus being able to direct a boy's inclinations to his future advantage.

There is a substantial security about a higher Civil Service appointment which makes it worth while to spend the best of one's youthful days in striving after it. Renown, it is true, is only for the few, but to all a reasonable and increasing income for life is assured.

In the open competitive examination for these higher appointments the range of subjects is so wide that there is sufficient opportunity for making use of almost any subject in which special interest and ability has been shewn. To a boy who intends competing the importance of his fifth- and sixth-form days cannot be over-rated. A clever boy's main object at that period is generally to win a scholarship, or, at all events, to specialise

in some subject that he may be sure of taking a good degree in it at the University. It is well for the would-be civil servant that such is his object, for his chances would be deplorably small in the absence of a University training. An examination of the list of successful candidates in last year's competition shews that of the 102 who obtained appointments only six were not University men. Oxford furnished 44 men, Cambridge 32, London 7, Dublin 7, Indian Universities 7, Royal University, Ireland 5, Scotch Universities 4, and Colonial Universities 2. No less than 10 of these claimed two, and one gloried in three universities!

Dismissing a candidate's special subject for the present as a *sine qua non*, it will be well to consider the course a boy's general reading should take to best fit him for this competition. His college tutor will take care of his classics, history, mathematics or science, as the case may be; the present business is to consider the schoolmaster's share in the work of preparation. On looking at the papers it seems to an examinee that the Civil Service Commissioners, in arranging the syllabus of the examination, gave the examiners in most of the subjects *carte blanche* to ask any questions whatever. Fortunately, some of the papers are not of so searching a character, and in the preparation for these much can be done at school. Among such subjects the English, French and German languages and literature, elementary physics and chemistry, general modern history and the essay, may be included.

The average sixth-form boy would probably be staggered if asked to write at least two foolscap pages on either "The Morality of Conquest" or "Criticism and Creation." Yet such were two of the subjects for an essay in the last examination. The subject-matter would prove an obstacle and it is not exactly the province of the schoolmaster to deal with this difficulty, but it is his duty to teach his pupil to write clearly. Clear writing can be best assured by taking care that all translations are rendered into good English; that essays are a weekly institution, and that instruction is given in the proper method of writing them. It is useless to throw a subject at a boy and leave him to do his best with it. Generally he is at a loss for facts, at least for relevant facts. Give him a skeleton essay, or his practice in composition will be very small. For the bigger boys the School Magazine is an excellent field of preparation for this transference of thought to paper. Masters should neither hesitate to furnish both subjects and facts, nor to act in an editorial capacity, but the weaving together might with advantage be left to the boy. His own experience of the world in the years directly following school will furnish him with material for his essay in a Civil Service competition, but the power to put them together clearly will be largely due to his drilling at school.

Of the other subjects—languages, science and history—not more than one can be conveniently studied at school. It would be a novel and interesting experience for a boy to have standard English literature put into his hands instead of ordinary school-work; nevertheless, from our standpoint it would be a good investment, receiving its due return in marks in the English papers. The same may be said of French and German literature. Time would be economised if the teacher selected the most important books and supplied the *raison d'être* of the book, its relation to contemporary works, its place in literature generally, and its place in the history of the novel, the sonnet, or the particular form of literature to which it belongs. It is in points like these that most lads are deficient.

Many a boy prefers dabbling in a laboratory to reading the most entrancing literature, or playing the most exciting game. Let him dabble! He may be able to gain 600 marks out of it. The boy who reads English literature can only aspire to 500. But take care that his dabbling is not without system, or he will get few marks at the expense of many test-tubes.

The subject of General Modern History is one which should engage most serious attention. It is a significant fact that nearly 66 per cent. of the successful candidates took this subject, and yet not a half of this number took their degree in history. The marks obtained, too, were above the average of those obtained in other subjects. Unfortunately, boys do not as a rule take very kindly to history—a youngster of fifteen or sixteen cannot be expected to evince any great liking for the subject when presented to him in text-book form. Biography, however, has charms for all, and it will well repay a boy to tackle history through the interesting agency of biography. Of the four periods which may be offered, the last, viz., 1714-1848, A.D., is the favourite. Suppose (for instance), a boy has thoroughly studied good and complete lives of Frederick the Great and Napoleon Buonaparte, he will have broken the back of the period (1714-1848), and his interest will have been sufficiently aroused to insure his completing the study of it during his university career. As a matter of fact, a thorough knowledge of the two lives mentioned would have been sufficient to obtain full marks in General Modern History in the last examination.

As far as the choice of a special subject is concerned, the man who has the best chance is (to use 'Varsity slang) the "classical" man. It is an open secret that the regulations for the examination were prepared with a view to catering for men who have passed through the Literæ Humaniores School at Oxford. Reducing chances to marks it is found that, considering the ordinary University curricula alone, classical men have a maximum of 4,100 marks at their disposal, history men, 3,300, mathematical and science men, 2,300 each. These figures include in each case 500 for the essay, for which classical and history men have very much more practice than the devotees of mathematics and natural science. Altogether the latter stand a very poor chance unless they have made themselves familiar at school with one or more of the subjects dealt with above. A boy, then, who shows no decided

preference for any particular subject should specialise in classics or history. Still it should be borne in mind, even by students of history and the classics, that a very few marks may just turn the scale, and they must not despise those minor subjects of which something at least can be learnt at school. A few diligent hours spent on certain subjects in youth may solve a problem which, to many a man leaving the University, is most important—What work can I do in order that I may eat?

LEISURE-HOUR PURSUITS: PHOTOGRAPHY.

By H. E. HADLEY, B.Sc. (Lond.), A.R.C.Sc. (Lond.)
Headmaster of Kidderminster School of Science.

III.—SELECTION OF PLATES.

THE beginner is strongly recommended not to attempt to work with *films (i.e.*, plates in which the sensitised emulsion is supported on celluloid instead of on glass) until he has had a fairly long experience with plates. In fact, the only advantage of films is that of weight. This only becomes important when a large number of negatives have to be carried; and they possess several disadvantages, particularly in manipulation during development.

Plates of various rapidity are made; *rapid* plates are more difficult to manipulate than *slow* plates, and the beginner should carefully restrict himself to the latter. Ilford "Ordinary," Paget XXX, Warwick, or Cadett "Ordinary" may be recommended; these brands may be purchased in boxes, each containing twelve ¼-plates, at 1s. each.

Great care should be observed in storing plates. Damp air is extremely injurious, and plates should always be kept in a thoroughly dry, dark cupboard. Plates also deteriorate with age, particularly the more rapid brands, so that it is advisable not to purchase more plates than can be used within a reasonable time. A slow plate will keep perfectly well in a dry cupboard for two or three months.

IV.—SELECTION OF DEVELOPER.

The number of formulæ for developing negatives is legion. Each manufacturer of plates issues his own formula as being the best to use with his plates, and new developers are constantly being advertised and recommended, to the bewilderment of the beginner. If a *plébiscite* were taken amongst all photographers one developer would claim as many votes as all the others combined—the *Pyro-Soda* developer. The "Ilford" and the "Warwick" plates have an excellent pyro-soda formula printed on each box of plates, and they do not recommend any other. The "Cadett" plates are also issued with an alternative pyro-soda formula. The beginner cannot do better than adopt this developer, and to use no other until he is an experienced photographer.

Further suggestions on development will be given in a later section.

V.—THE DARK ROOM.

The essential features of a satisfactory dark room are good ventilation, plentiful supply of clean water, and a carefully adjusted light. The ventilation is often neglected, and nothing can be more injurious than to remain for a considerable time in the little square "boxes" which are occasionally made to serve as dark rooms. Good ventilation does not necessarily require a window and a fireplace, but a room which has not these should have a large air shaft passing up from the ceiling; some air shafts do not "ventilate," but serve as inlets, and they may sometimes do either according to the direction of the wind; such faults should be rectified. A room which depends upon an air-shaft for ventilation is more adapted to buildings heated by hot-water pipes, since a room without any arrangement for heating is liable to be somewhat damp.

If the room has window and fire-grate, care should be taken in shutting out all daylight when the room is to be used for developing. A simple method is to have a spring roller-blind of closely-woven canvas, with its edges running in *deep* wooden grooves, fixed to the sides of the window frame, and with a wooden hood fixed over the roller. In order to prevent any light entering between the lower edge of the blind and the wall it is advisable to have the blind considerably longer than the window, and to fix a thick deal board to the wall just below the window frame, so as to completely fill the gap between the blind and the wall. The canvas blind will probably allow a little light to percolate through, and it is an advantage to paint the blind and the woodwork with a good dead black. The following formula makes a serviceable black:—

Methylated spirit	...	...	850 c.c.
Shellac	...	...	170 gms.

Mixed, and allowed to stand until all the shellac is dissolved, then add

Vegetable black	...	...	55 gms.
Venice turpentine	...	...	50 gms.

In some dark rooms the window is protected by an additional sliding window of ruby glass, and the daylight entering through the window is used for development. This method cannot be recommended owing to the extreme and sudden fluctuations in the amount of light. On a dull day it might be quite safe, but a sudden gleam of bright light might readily spoil a negative.

Water Supply.—This should be plentiful, and supplied to the room through a fixed tap with a large rectangular sink underneath. The hardness or general quality of the water is not of any importance, but it must be absolutely free from dirt and suspended matter. Good rain-water is as serviceable as spring or river water. If it is found to contain suspended matter it can easily be rectified by tying two layers of flannel over the mouth of the tap, so as to filter the water. The flannel should be frequently changed.

Dark Room Lamps.—Electricity, gas, paraffin oil,

or a candle may be used as a means of illuminating the dark room. The chief aim should be to obtain as strong a light as possible, but screened with sufficient ruby glass or canary fabric to prevent the light from affecting the plates during development. It should be borne in mind that a light which is quite safe for a "slow" plate may hopelessly ruin a "rapid" plate. It is, therefore, advantageous to have some means of varying the degree to which the lamp is screened.

If the building is fitted with electric light a small 8-candle power incandescent lamp with ruby glass is an admirable source of light. The lamp should hang from the ceiling or from a bracket by means of a flexible wire "lead," and it may be screened by tying round it a loose bag made of orange-yellow silk or sateen[1] (the bag having a tape or string let into a seam round the edge of the bag). If further screening is required a second bag may be placed over the lamp. Two bags would render the light safe even for rapid plates.

Gas is the next best illuminant to electric light. An excellent gas lamp is "The Phœnix" (price 15s., made by Reynolds & Branson, Commercial Street, Leeds). It is constructed so as to be joined up to a gas pipe by means of rubber tubing, thus enabling the lamp to be placed in any convenient position. An additional gas jet is fixed on the outside of the lamp, and serves as an ordinary illuminant for the room. Both jets are completely regulated from one tap, and neither is completely extinguished, whatever the position of the tap. Pieces of canary fabric may readily be added to the ruby glass if further screening is required.

A suitable form of paraffin lamp is Fallowfield's "New Duplex" (cost 4s. 6d.), which has an inner orange and an outer ruby chimney.

A candle should only be used as a last expedient. Cheap folding lamps may be purchased (*e.g.* the "Princess, price 1s.), which are useful for touring purposes. The candles should be short and flat (like night lights), and contained in a tin; a suitable form is the "Champion," which are sold in boxes containing twelve candles, price 6½d.

VI.—Additional Notes on the Purchase of Apparatus.

Members of School Camera Clubs who are not prepared to purchase so expensive a camera as suggested on p. 181 of the School World are recommended the "Harris" Field Camera (cost, with three dark slides, £2 3s.), made by Messrs. Philip Harris & Co. (Edmund Street, Birmingham), or the "Field Camera No. 5" (cost, with three dark slides, £2 13s.), made by Messrs. J. J. Griffin & Sons (Sardinia Street, London, W.C.).

Special Trade Terms.—The writer is permitted to state that a discount of five per cent. for cash is allowed on all apparatus by the Thornton-Pickard Manufacturing Company and by Messrs. Taylor, Taylor & Hobson, and that the same terms are allowed to *bona-fide* members of School Camera Clubs by Messrs. Reynolds & Branson, Messrs. Philip Harris & Co., and Messrs. J. J. Griffin & Sons.

[1] Orange silk, cherry fabric, and canary fabric can be purchased at small cost from most photographic dealers.

WEATHER AND CLIMATE OBSERVATIONS IN SCHOOLS.

By H. N. Dickson, F.R.S.E., F.R.G.S.
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In these days, when so many schools can boast well-equipped laboratories for the practical study of physics and chemistry, and workshops for all manner of work in wood and iron, it seems a pity that the unique advantages offered by close observation of the weather for illustrating and applying the facts of elementary physics and physical geography are still entirely neglected. The smallest child is familiar with the main features of weather-changes; his affairs are more dependent on them than those of most of his seniors. All through his school-days a boy keeps an anxious watch on the face of the sky, balancing as best he can the chances of a cricket-match being stopped by rain, or a foot-ball match by frost, or the prospects of skating holidays: he approves the snow that will make snowballs rather than the snow that will not; and he looks for the coming of spring, with its wild flowers and birds' nests, comparing one year with another. Thus from day to day he collects for himself a body of fact, and is able to take note of conditions which seem to him exceptional, of great heat and cold, of excessive wetness and dryness, of violent winds, and of early and late seasons. From this it is but a short step to teach him how to analyse his observations according to certain elements of wind, rain, cloud, temperature, dryness and dampness, and to understand that they are affected with errors, and must be rendered more precise by the help of *scientific instruments*. A school climatological station can be equipped so as to give records of real value at a quite moderate cost, and even where inferior instruments are used the observations encourage habits of regular attention to a small piece of routine work, afford opportunities of illustrating many elementary principles taught in the classes of arithmetic, physics, and geography, and open a way to what is really original research. In addition to this, an excellent foundation is laid for the systematic instruction in the principles of meteorology which may one day take its proper place in school science courses.

When and What to Observe.

However simple the arrangements at such a station, or however few the elements observed, the first essential is regularity in making the observations. If one observation a day is all that can be accomplished, let that be made at 9 a.m., the hour at which observers all over the country are making their morning records. These observations will be comparable with those made at other stations, and something can be learned about the differences between the climate at the school station and in other parts of the country. The idea of daily variation is also introduced, and if possible, observations

at other hours, say 2 p.m. and 9 p.m., may be started, and the records used to calculate true means and daily ranges: or a similar result may be obtained by self-registering instruments (*e.g.* maximum and minimum thermometers). For purposes of comparison the data published by Stanford for the Royal Meteorological Society in the "Meteorological Record" are the best and most accessible.

The elements to be recorded at a climatological station are five in number—temperature, humidity, rainfall, wind-direction and force, and species and amount of cloud. We propose here to deal only with the first three of these, which involve the use of instruments: the last two are usually "eye-observations," which may be of real educational and scientific value, but require no expenditure of money.

TEMPERATURE.

Observations of temperature of course require a thermometer. For meteorological purposes it is necessary to employ a high-class instrument if the results are to be of permanent value, but much can be learned from the use of cheap thermometers if the nature of their defects is always kept in view. A thoroughly trustworthy thermometer, with the degrees engraved on its stem, can be purchased for ten or twelve shillings, and a Kew certificate showing the errors of the instrument at intervals of 10° costs about 1s. 6d. extra. When the degrees are not engraved on the stem, but on the frame of the thermometer, there is always the fear of changeable and uncertain errors creeping in through the thermometer tube shifting on its frame, either on account of a shock, or of the fastenings becoming corroded. Probably a "chemical" thermometer, with a paper scale inside an outer glass tube, most completely meets this objection, and its cost need not exceed 1s. 6d.; but this instrument, and still more the ordinary thermometer with a wood or zinc scale (price 1s. to 2s. 6d.), must be constantly watched, and its errors determined from time to time by comparing it with a standard: this work of comparison and also the determination of freezing-points make admirable exercises in practical physics for older boys.

The proper "exposure" of the thermometer demands attention. A really perfect method of exposure, which will protect the thermometer from all radiation and allow it to register the true air temperature, has yet to be invented. One of the most accurate methods of making an observation of air temperature is to attach a string about two feet long to the top of the thermometer and to swing the instrument in a vertical circle, catching it at intervals and reading off promptly until, on repeated trials, the temperature continues steady. This operation requires some neatness and "knack," and is good practice in manipulation. The standard method of exposure is less accurate but more convenient, and is to be recommended because, although its errors are unknown, they are common to all observing stations, and the observations are therefore comparable. The thermometer is exposed in a "Stevenson Screen," a box about 10 inches long, 9 inches broad, and 10 inches deep; open altogether below, with a solid top, and sides formed of a double set of slats or louvre-boards, presenting the general appearance of a small meat-safe. The screen must be painted white, and mounted on four upright posts on a grass plot, the bulb of the thermometer being as nearly as possible four feet above the ground. A Stevenson Screen can be got for about thirty shillings, but the construction of one should present no great difficulties to school carpentry. If a screen of regulation size, or the conditions for exposing it, cannot be obtained, a small case about six inches square and just high enough to hold the thermometer should be made, with single slats or louvres on three sides: this can be placed against a north wall or outside a north window, but the observations will not be nearly so satisfactory.

When the observations are made by senior pupils, maximum and minimum thermometers should be added; the maximum should be a mercurial, and the minimum a spirit thermometer. Good instruments of this kind cost from fifteen shillings to £1 each, and the use of cheap forms is not to be recommended, except for merely illustrative purposes. The self-registering thermometers are to be hung horizontally in the Stevenson screen, and read and "set" once daily. If the latter operation is performed at 9 a.m., the maximum reading must be entered against the previous day. The calculation of the "mean temperature" and the "daily range" from the readings of maximum and minimum, and the comparison with the readings of the ordinary thermometer at various hours, open up many questions of interest and of no great difficulty to an intelligent pupil.

DRYNESS AND DAMPNESS.

Observations of the amount of moisture in the air are rather troublesome to make, and their results are not easily made intelligible to junior pupils. It is probably best to begin with the principle of the *direct* hygrometer, explaining the *dew-point*, and using the familiar illustrations of condensation on the cold window-panes of moist rooms, or on the outsides of vessels containing cold liquids. A form of direct hygrometer, devised by Professor Chrystal, which can be easily and cheaply made, affords excellent practice in observing, and gives valuable results after a little experience in its use. A box about three inches square and three-quarters of an inch deep, made of thin sheet copper, has two small short copper tubes projecting at opposite corners, and an aperture on one of the narrow sides for inserting the bulb of a small thermometer, which is secured by a cork. One of the square sides of this box is plated with silver, and the box is mounted on a suitable board or stand. To the upper of the short copper tubes a length of rubber tubing is attached to act as overflow, and the lower is joined to a T-piece, the

other arms of which communicate (also by rubber tubes) with vessels containing luke-warm water, and water cooled by a few pieces of ice. Taps or pinch-cocks regulate the flow of warm and cold water (mixed in the T-piece) through the copper box. In making an observation, the proportion of cold water is slowly increased by opening the cold-water tap, and the temperature of the mixture in the box lowered till a cloudiness appears on the silvered surface; the reading of the thermometer then gives the dew-point directly. The varying differences between the dew-points and the air-temperatures in the screen may be studied first, and as soon as the idea of vapour-pressure is mastered the observations can be used for calculating absolute and relative humidity.

With a little trouble, Chrystal's hygrometer can be used for routine work, but pupils should be made familiar with the dry and wet-bulb hygrometer. The idea of "temperature of evaporation" involved in this instrument can be illustrated in many ways—the drying from surfaces of pools of water and "slides," the chills arising from letting wet clothes "dry on," and the cooling of a thermometer bulb by dropping ether on it. For regular observations the wet-bulb thermometer must be exactly similar to that used for observing the air temperature, and it should be mounted in the same screen, the two being about a couple of inches apart. All the details and precautions mentioned above for the thermometer hold good. The wet bulb should be covered with thin muslin perfectly free from grease, and kept moist by a short cotton wick leading to a small vessel of soft water. During frost the water-vessel should be removed, and the bulb painted over with water, using a camel-hair brush, about an hour before the observation is to be made.

When a large number of simultaneous observations with the direct and indirect hygrometers have been collected, an attempt may be made to construct a table by which the dew-points can be computed from the wet- and dry-bulb readings alone. This table will take the form of a series of factors, and the values obtained may be compared with those given by Glaisher ("Hygrometrical Tables," published by Taylor and Francis, price 2s. 6d.).

Rainfall.

The measurement of rainfall is effected by collecting the rain or snow falling on a surface of known area, and measuring the depth of water covering that surface. In the best rain-gauges, the surface so treated is enclosed by an accurately-turned brass ring, usually exactly five inches in diameter; the rain falling within this ring is caught by a tin or copper funnel fitted with a tube which leads to a glass bottle. The water collected in the bottle is poured into a cylindrical "measuring glass," which has a diameter considerably less than that of the brass ring: the depth of water received by the ring is thus greatly exaggerated in the glass, and small quantities can be measured with accuracy. A 5-inch rain-gauge, with graduated measuring-glass, costs about ten shillings, and a good instrument should be procured for regular observations. The construction of a good rain-gauge, however, need not be beyond the resources of a school workshop, and the exact measurement of the ring and the calculation of the relation of its dimensions to those of a graduated cylinder (which may be used as a measuring glass) afford good practice. For experimental and illustrative purposes, rougher apparatus may be used—the rain may be collected in a cylindrical tin such as is used for "Bath-Oliver" biscuits, and measured directly with a foot-rule, or weighed.

In exposing the rain-gauge, it should be remembered that the object is to obtain a fair average sample of the amount of rainfall. An open space should be selected with no wall or tree nearer than its own height above the ground. The gauge should be firmly planted with its rim or ring perfectly level, and one foot above the surface; and the rain should be collected and measured every morning, the amount being entered to the previous day. Where the school grounds are extensive, or the school buildings high, rain-gauges may be stationed at different points or at different elevations. The differences in the amounts recorded will give instructive illustration of the effects produced on the rainfall by the configuration of the ground, &c.

We have described briefly the nature of the equipment required for a small meteorological station, and the general lines to be followed in making the observations. More detailed information can be obtained in the "Hints to Observers" published by the Royal Meteorological Society (Stanford, price 1s.), or by the Meteorological Office (price 2s. 6d.). The cost of the instruments varies within wide limits, and, as has been said, some can be easily made. We give a rough estimate of the total cost of a really good set and of a cheaper set:

	Standard Set. £ s. d.	Cheaper Set. £ s. d.
Dry-bulb thermometer ...	0 12 0	0 1 6
Wet " " ...	0 12 0	0 5 6
Maximum " ...	1 0 0	0 6 0
Minimum " ...	1 0 0	0 4 6
Stevenson Screen ...	1 10 0	—
Board of Trade Screen ...	—	0 17 6
Rain-gauge and glass ...	0 10 0	0 6 0
	£5 4 0	£2 1 0
Direct hygrometer, about	£1 10 0	£0 12 0

The Schoolmaster and Commercial Education.—Any scheme of commercial instruction must, before all things, begin with the schools. Now the last person to whom the British parent and the British educationist think of going for advice on educational matters is the schoolmaster. It may be the schoolmaster's fault—it is certainly his misfortune—but such is the fact. People will go to the Chambers of Commerce, and they will go to the Universities; but the schoolmaster is not consulted at all.—Rev. Dr. H. de Gibbins, *Fortnightly Review*, June, 1899.

ON THE EARLY TEACHING OF FRENCH.

BY PROFESSOR WALTER RIPPMANN, M.A.

IX.

CONCLUDING REMARKS.

IT is impossible for me to give a complete course of instruction for beginners in French, owing to the limited space that remains at my disposal. Fortunately I can refer those who have followed me so far to a book which was first published twelve years ago, and has steadily made its way to the front, though for a long time it was barely known outside Switzerland. There it has now reached its sixth edition; and in this case we may certainly speak of an "edition," not "impression," for every successive issue has embodied the results of further experience. That is what gives the book its great value; it is the outcome of practice. Probably one reason that militated against its adoption here was its rather ungainly appearance; but an English edition has now been issued. I am glad to think that I have been instrumental in bringing this about.

In this volume ("Dent's First French Book") there is enough work for a whole year, and the teacher will find that matters of method are discussed and a running commentary to each lesson supplied in the companion volume ("Hints on Teaching French").

Here I shall conclude by giving a few instances of the many ways in which the wall-pictures may be utilised. I shall take the spring picture, as this was reproduced in the April number of THE SCHOOL WORLD; but the others naturally lend themselves equally well to such exercises.

The teacher asks a question connected with the picture. The children write the answer. When about half-a-dozen questions have been asked, the teacher calls on one of the children to give his answer. Then those who have a different answer hold up their hands, and one of them is told to read his. It will be found that a question often allows of four or five different answers, and that the children soon take a genuine pleasure in displaying their originality.

The teacher tells the children to address a question in writing to a person on the picture, say to Charles. (He is usually their favourite—perhaps on account of his prominent position, more probably because of the joy he evidently takes in life.) Each child then passes his question to his right-hand neighbour, who has to supply the answer. If the question is not quite clear to this child, he raises his hand, and the teacher helps him out of his difficulty. If there was a mistake in the question, he will point this out to the one who had written it, but not to the whole class. (As I have said before, and as I see more clearly every day, nothing is worse than to dwell on mistakes.) The children then read out question and answer; here again it will be noticed that there is a great deal of variety.

The teacher tells the children to give as many objects on the picture as they can, supplying each with the article (def. or indef.) and a suitable adjective—*e.g.*, *le petit garçon*. When the average child has written about a dozen of these, they are read out, the children ticking off the substantives as they occur. Each group of words having, according to the teacher's directions, been written at the beginning of a line, he can now proceed to let the children make complete sentences—*e.g.*, *le petit garçon joue devant le jardin.*

The children are told that they are to imagine themselves one of the persons on the picture, say Cécile, and to give an account of the family, of what she or her brothers are doing, of the house and its surroundings, &c. This can obviously be done by word of mouth as well as in writing.

In the same way the children may be asked to give a description of part of the picture—*e.g.*, the left or right part of the foreground, the background, the animals we see on it, what these are doing, &c.

I have given enough instances of the uses to which the pictures can be put; many more there are, which will occur readily to a resourceful teacher.

I have attempted in these articles to give some idea of what is known as the "reform movement," as far as it affects the teaching of young beginners. But the efforts of the "reformers" are not directed solely to effecting an improvement in the early teaching, as has sometimes been stated. The misconception has probably arisen because the mistakes of the older methods were here most obvious and attended by the gravest results, and therefore called for a speedy remedy, which the "reformers" have done their best to supply. Those who wish to learn more about their work, in its application also to more advanced teaching, will read with interest the following articles and books:—

"Chapters on the Aims and Practice of Teaching." Edited by Prof. F. Spencer. (Chapter III. on "French and German," by the Editor.)

"The Method of Teaching Modern Languages in Germany." By Mary Brebner, M.A.

"The Teaching of Modern Foreign Languages in our Secondary Schools." By Karl Breul. (The second edition has just appeared.)

"De la Méthode Directe dans l'enseignement des Langues Vivantes. Mémoire de M. Passy." (Published by A. Colin & Cie.)

Finally, I may perhaps be allowed to call the attention of modern language teachers to a holiday course at Marburg, at which Professor Vietor, the recognised leader of the "reformers," has promised to lecture on method.

The second of the two courses to be held will begin on August 2nd. A prospectus can be obtained of Mr. W. G. Lipscomb, Hon. Sec. of the Modern Language Association (University College School, Gower Street, W.C.).

PROGRESS IN THE CO-ORDINATION OF EDUCATION.[1]

County Boroughs.

IN the county boroughs a distinct advance has been made in educational organisation through the efforts which have been put forth to co-ordinate the work of the County Borough Councils with that of the School Boards and of the various local schools and institutions, and thus to bring these authorities into harmony. Endeavours to promote co-operation have been successfully undertaken or set on foot in no less than 23 county boroughs, among which Birmingham, Manchester, Plymouth, Salford and Sheffield take conspicuous places. The names of the other county boroughs are Barrow, Bath, Blackburn, Bootle, Bradford, Brighton, Bristol, Burnley, Bury, Dudley, Grimsby, Hull, Ipswich, Leeds, Oldham, Portsmouth, Rochdale and York.

Of these county boroughs, arrangements have been made or negotiations instituted between the Councils and the School Boards in Bath, Blackburn, Bootle, Bradford, Great Grimsby, Ipswich, Oldham, Plymouth, Portsmouth, Rochdale and Salford.

In Blackburn an arrangement has been made between the County Borough Council and the School Board respecting the free admission of boys and girls from the elementary schools to the evening classes of the municipal technical school, and also, it is believed, with regard to the provision of a day school for scholars in Standard VII. and upwards, and of central classes for pupil teachers.

In Bootle the establishment of evening continuation schools in the local board schools was undertaken by the County Borough Council, with the co-operation of the School Board, the details being carried out by a joint committee of representatives of these two bodies. The work is now entirely in the hands of the School Board, but the instruction has been made preparatory to that of the technical school, and about 40 free admissions to the school are annually offered.

In Bradford the technical college is being transferred to the Corporation, and a composite Technical Instruction Committee, consisting of representatives of the Corporation, the School Board, the West Riding County Council, the Clothworkers' Company, the Bradford Chamber of Commerce, the Grammar School, the Church Institute, and the Mechanics' Institute, has been appointed; the School Board now receive an annual grant of £1,200 from the Corporation.

In Great Grimsby the organisation of technical education has, for the past two years, been undertaken by a joint committee of members of the School Board and the Technical Instruction Committee of the County Borough Council, but the operations of the Committee do not appear to have given entire satisfaction to the local authorities.

In Ipswich a conference was held in July last between the members of the School Board and of the Museum, Free Library and Technical Instruction Committee to consider the question of educational co-ordination in the locality; the result has been that the Museum Committee have agreed to discontinue teaching those subjects, viz., book-keeping, shorthand, dressmaking and millinery, but not cookery, upon which no grants could be earned by them, but upon which the School Board could earn grants, and the School Board in return have agreed not to provide teaching (except in their day schools) on the syllabuses of the Science and Art Directory, or to work for evening school grants from the Science and Art Department.

In Oldham a proposal is being considered whether the two municipal technical schools can be utilised so as to obviate the necessity of building another higher grade school, which the School Board have contemplated doing.

In Plymouth a school of science has been carried on for over three years under the management of a joint committee of members of the Technical Instruction Committee and the School Board, the elementary course of the school being held in the higher grade board school and the advanced course in the municipal technical school; and further, the work of the municipal school in science and art has been correlated to that of the public elementary schools.

In Portsmouth endeavours have been made to co-ordinate the work of the Technical Education Committee and the School Board, especially in the matter of a school of science, which it was suggested should be established somewhat on the lines of the school in Plymouth, but no definite agreement has yet been arrived at. The organisation of technical and secondary education in this county borough is considerably hampered by the inadequate accommodation at the technical institute, but it is improbable that the provision of more commodious premises will be undertaken while the correlation of existing educational agencies remains unsettled. A sub-committee has, however, been appointed to consider the question of the erection of a new municipal technical institute.

In Salford the difficulty as to the exact place the technical institute should fill has been, to a large extent, solved by the adoption of a scheme for the co-ordination of the work of the School Board and the Technical Instruction Committee. This scheme provides (1) that certain higher grade teaching should be carried on in the organised science schools of the Board, and the more advanced scientific and technical work at the technical institute; (2) that no day or evening organised science classes should be held by the Committee; and (3) that no pupils should be admitted to the technical institute under 15 years of age. A system of co-operation between the authorities of Owens College, Manchester, and of the technical institute has also been satisfactorily determined.

In Birmingham the Municipal Technical School Committee, the School Board, and the authorities of Mason University College, the Municipal School of Art, King Edward's Grammar School and the Midland Institute have all been brought into the same harmonious combination, not by the adoption of any specific scheme, but through the prevalent desire to make the educational system of the city complete and systematic, and by the interchange of representatives amongst the various authorities.

In Brighton, previous to 1893, a technical school was formed as an annexe to the higher grade school, and was controlled by the School Board, but in that year the school was transferred to the County Borough Council; at the same time arrangements were made with the Brighton Grammar School to provide various classes under the direction of a joint committee, and this work is still continued.

In Bristol the question of overlapping of educational work is now under the consideration of a committee of representatives of the University College, the Merchant Venturers' Technical College, the School Board and the Technical Instruction Committee, with the view of combining all parties in a comprehensive plan for the supply of technical instruction.

In Burnley a composite committee, consisting of representatives of the County Borough Council, the School Board, the Grammar School, the Mechanics' Institution, and the Victoria University, have been recognised by the Science and Art Department as the authority responsible for science and art instruction within the county borough area: the School Board are establishing a school of science, which is to be co-ordinated to the school to be set up by the Secondary Education Committee.

[1] Extracted from the "Eleventh Annual Report of the National Association for the Promotion of Technical and Secondary Education."

In Manchester, over three years ago, an agreement was made between the Technical Instruction Committee and the School Board for the correlation of their educational work, and effect was given in May, 1897, to this agreement, which provides, among other matters, for the employment of teachers engaged by the respective authorities, for the arrangement of the curriculum of the science schools and classes, for scholarships and free admissions, for science and art and commercial instruction, and for the appointment of a Standing Committee to supervise the working of the agreement. Similar arrangements to those adopted by the Salford Committee and the Victoria University have also been made.

In Sheffield arrangements have been concluded for securing effective co-ordination and economical management between the School Board and the authorities of the technical school (now the technical department of the Sheffield University College) and of the school of art, by the discontinuance of certain instruction in the central higher grade school and the other two institutions, and by co-operation in the establishment and award of scholarships, and in an interchange of staff.

In York co-ordination with regard to science work has been effected between the two municipal schools and the local mechanics' institution.

There are other matters of importance to be noticed which have taken place during the past year in the county boroughs. The Directors and Trustees of the Burnley Mechanics' Institute have made a formal suggestion that the Corporation should take over the institute, in view of the lack of the proper equipment of certain class rooms, and the inadequacy of the laboratories for the students attending. In Chester the Governing Body of the science, art and technical schools are desirous that the Corporation should take over the management of the schools, which from the time of foundation have involved a capital expenditure of £19,000: in Leeds, where the sum of £6,500 has annually been distributed to a number of institutions, a sub-committee has been appointed to consider the question of the provision of a municipal technical school; while in Halifax the technical school has been this year transferred to the Corporation in commemoration of the jubilee of the town's incorporation, and steps are being taken to equip the engineering and spinning departments. It is also very satisfactory to record that in two county boroughs the local authorities have made special provision for commercial education—in Halifax a scheme of commercial education has been formulated, which it is expected will be of great service to the trade of the town and district, and in Liverpool a school of commerce, under the joint management of representatives of the Liverpool Chamber of Commerce, the University College and the Technical Instruction Committee, has been started in the buildings of the University College to give evening instruction in elementary commercial subjects.

Non-County Boroughs and Urban Districts.

The authorities in county boroughs have, however, not been alone in their efforts to promote co-ordination, for in several non-county boroughs similar steps have been taken. For instance, in Barnsley a representative committee has been appointed to take charge of technical education. This committee includes members of the Town Council, the West Riding County Council, the School Board, the Grammar School and five surrounding Urban District Councils; in Bedford a special committee, appointed to consider the best method of carrying on technical education in the locality, has recommended that the general local committee should comprise six members of the Bedfordshire County Council, three members each of the Bedford Town Council, of the Harpur Trust, and of the present committee, two members of the Ladies' County Committee, two headmasters of secondary schools in Bedford, and one member of the Bedford School Board; in Rotherham the committee comprise representatives of the Town and County Councils and the board and voluntary schools, and in Swindon representatives of the old and new Urban District Councils, the Wiltshire County Council, the School Board and the mechanics' institution.

In Burslem the committee have endeavoured to improve the character of the art teaching in the borough by adopting a scheme in conjunction with the School Board, by which scholarships tenable at the local institution are offered to students in the art classes of the Board.

In Dewsbury, where a bequest of £50,000 has been left for educational purposes in the town, a scheme of co-operation between the grammar school and the technical school has been adopted; the latter institution is undergoing extension, and it is pleasing to note that the school is annually receiving support from the rate funds of five proximate Urban District Councils.

In Kettering it is probable that a new school will be established as a combined grammar and technical school, on the lines of the schools already existing in Banbury and Northampton, and a preliminary conference has been held between the members of the Technical Instruction Committee and the Grammar School Governors and the representatives of the Charity Commissioners.

In Leigh the classes of the grammar school are now conducted in the buildings of the technical school in consideration of an annual rent, and the Committee has made an effort to establish central classes for pupil teachers, with the assistance of elementary school managers and teachers, and the work is conducted under the supervision of a joint committee.

In Penrith a joint scheme has recently been adopted by the local Technical Education Committee and by the managers and teachers of the elementary day schools in the district, whereby all scholars leaving elementary day schools will be admitted free the same year to evening continuation schools under the Committee; and, further, to encourage scholars to take advantage of this arrangement, the Committee have decided to award eight free scholarships, admitting scholars in evening continuation schools to art, science and manual training classes.

In Wakefield the Committee of the Technical and Art School have offered to hand over to the Corporation the buildings and adjoining land belonging to the institution, valued at £10,000, and this offer has recently been accepted by the Corporation; a rate of ½d. in the £ will probably defray the cost of municipalisation.

CURRENT GEOGRAPHICAL TOPICS.

By A. J. HERBERTSON, F.R.G.S.

Cuba.[1]

CUBA, the Pearl of the Antilles, is the largest land mass in the great midland sea that separates the south of the United States from the north of South America. It has been described as resembling a hammer-headed shark. It is about 730 miles long, as far as from Land's End to the Shetlands, and its width varies from 20 to 90 miles—roughly, from less than that between Forth and Clyde to about that between Mersey and Humber. Its area is over 40,000 square miles, a little more than four-fifths that of England.

The south coast, which is crossed by latitude 20° N., is

[1] See "Cuba and Porto Rico," by R. F. Hill (London, 1898), and the *National Geographic Magazine* (Washington, May, 1898), on which this article is based.

bounded by the Sierra Maestre, which tower above the sea to 8,600 feet. The sea itself is more than 16,000 feet deep here, which gives a height of nearly 25,000 feet between its floor and the top of the mountains. These mountains are a continuation of the north-western peninsula of Hispaniola, and their prolongation to the west is seen in the line of shallower water, the submarine ridge joining the south of Cuba to British Honduras, above which lies the Grand Cayman. This may be looked upon as the main range of the Antillean mountains, which are regarded as the continuation of the Andes of South America. The mountains are composed of conglomerates, and shales with intruded igneous rocks, which yield a rich soil. The slope is steep to the south coast, but is more gradual to the north, where the river Cauto drains the low lands of the west.

A second line of mountains is found in the centre of the island, also skirting the south coast, eastwards from Cienfuegos, and is broken by many fertile valleys. In the west are the Sierra de los Organos, which form the western backbone of the island and rise south of the north coast west of Havana. Sedimentary rocks of different ages form these mountains. Higher land may be traced in the same line as the Organos mountains east of Havana almost to the Sierra Maestre, but it does not form a marked backbone. The rest of the island is covered with a tertiary limestone, which rises to nearly 2,000 feet along the sides of the Sierra Maestre, but is much lower in the west. It forms a gently undulating land, and weathers into a very fertile soil admirable for growing sugar-cane.

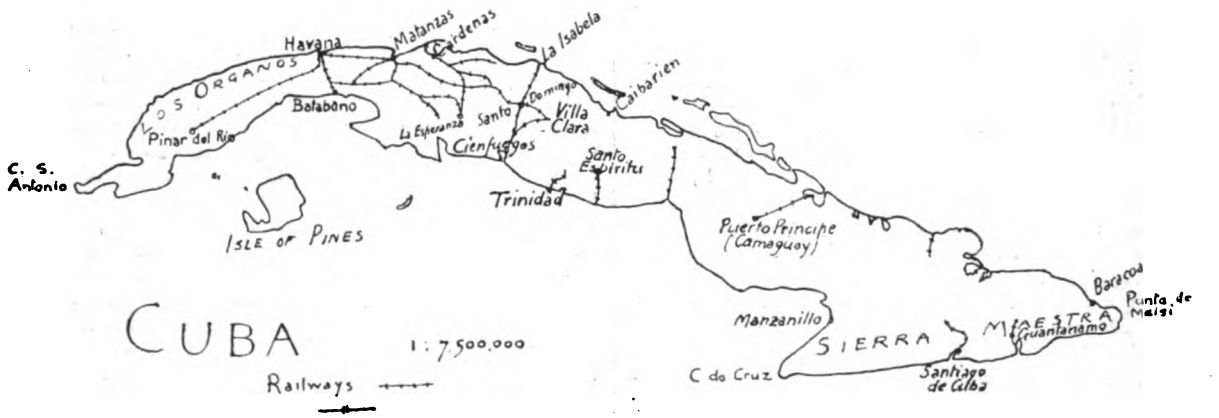
There are numerous rivers plentifully supplied by rains, which are abundant, especially in the summer months, and these water many wide and fertile valleys, which narrow to canyons near the sea on the north coast. On the south many streams form great coastal marshes. Underground rivers are naturally found in this limestone country, as well as caves and natural bridges.

Although we know little of the meteorology of Cuba, it is probable that the northern slopes of the eastern half of the island have a rainfall of over 60 inches, and on the west of the island between 40 and 60 inches. Cuba lies between the tropic of Cancer and 20° N., and therefore has a tropical climate, the range of temperature being small. The mean at Havana is about 77° F. for the year, but this falls to about 72° F. in the coolest months, December and January, and rises to about 82° F. in the warmest months, July and August. The considerable variation in altitude gives a considerable variation in temperature, the lowest being on the higher slopes of the Sierra Maestre. The trade winds are interrupted only in the winter months by the northers which cross the gulf from the United States. The island, however, is sometimes laid waste by severe hurricanes, which occur most frequently in autumn.

Palms, wild limes, orange-trees, mahogany and pines, are among the characteristic trees of this rich island. The northern slopes of the Organos mountains, west of Havana, are covered with pines, while the southern slopes of the same hills are the rich lands where the famous Cuban tobacco is grown. Most of the forest land of the west and centre of the island has been cleared to give place to the sugar plantations, one of the chief sources of wealth of Cuba.

The royal palm of Cuba is put to almost as many uses as the bamboo. The stem is extremely hard on the outside, and is used as timber. The inside is formed of looser fibres. The tender shoots form an article of food, which can be eaten raw, or boiled, or preserved in sugar. The stem and the great leaves are put to many purposes. When softened, it is easily manipulated, and may be formed into a sort of paper, shaped into buckets, basins, and other dishes. The food boiled in these requires no salt, as that is obtained from the vessel in which it is boiled. The roots of the palm possess medicinal properties.

Sugar-cane, tobacco, coffee, bananas, maize, oranges and pines, are the chief products of Cuba. The sugar-cane requires to be planted only once in seven years, and yields abundant crops, which were admirably treated by the most improved machinery before the outbreak of the recent rebellion, so that, while the rest of the West Indies were hurt by the competition of European beet sugar, Cuba continued to flourish just as Queensland did owing to its superior methods of extraction.



Tobacco can be grown in all parts of the island, but the southern slopes of the Organos mountains are the regions where the best tobacco is grown. Tobacco is cultivated by small farmers whose fields are close to the rivers, and the plant, which grows from six to nine feet high, is most carefully looked after. The eastern hilly lands are especially suitable for coffee, and this part of the island produces some of the finest bananas. The orange-tree grows naturally all over the island, and pine-apples are cultivated on the west and on the Isle of Pines. Rich meadow lands exist throughout the island, and form the food for many cattle.

The fauna, like that of other islands, is poor compared with the fauna of the mainland, the insects and birds being the commonest animals. Fishes are numerous, and the cayman infests the western waters.

Iron and manganese are the principal metals. These are found in the Sierra Maestre, and asphalt is obtained beneath the waters of Cardenas Bay.

Cuba is pitted with innumerable excellent harbours, and no part of the island is without good coastal communication. Inland communication is facilitated by 1,000 miles of railway, the greater part of which runs from Havana through the tobacco

and sugar districts west to the city of Pinar del Rio and east to the city of Villa Clara. The line is carried across the island to Batabano in the south of Cuba. (See map for chief railways.) The roads are poor and few.

A large proportion of the population of Cuba is creole, the remainder are whites, consisting of the Spanish officials and merchants, Europeans of other nationalities, and Americans, numbering probably not 100,000 in all. There are about a million creoles and half a million coloured people. Since the war the proportion of coloured people is probably much smaller, since three-fifths of them lived in the region of the renconcentraminto, and probably the whole population at present does not exceed a million.

Havana is much the most important city. It had a population of a quarter of a million, Santiago over 70,000 and Puerto Principe nearly 50,000 before the war broke out, and there were nine other towns with over 20,000 people.

Havana, the key to the New World, as it was called by its first governor, is situated on the north coast immediately to the south of Florida, and on the eastern extremity of the main range of the Organos mountains, whose rich products naturally find their outlet through it.

Mantanzas and Cardenas are ports further east on the same coast, and are outlets for the rich sugar district.

Cienfuegos is the chief port of this sugar district on the south coast.

Santiago de Cuba is situated on a fine natural harbour on the south coast, which has such a narrow entrance that the town can hardly be seen from the sea, surrounded as it is by the lofty Sierra Maestre, but it is the centre of the mining district of Cuba, and is of great strategic importance, as it commands the Windward Passage.

ITEMS OF INTEREST.

SEVERAL teachers have written to us asking whether our columns are open to correspondence on the subjects of the articles published from month to month. We are anxious to make it distinctly understood that, as far as space permits, the publication of any letters which teachers may send us embodying the results of their own experience in teaching will always be favourably considered. We have already stated our belief in the value of a free exchange of opinion. Letters sent to us should be as brief as is possible consistent with completeness; our desire to be of interest to the majority of readers will guide us in the selection of letters for publication.

THE Board of Education Bill was read for a third time, and passed, in the House of Lords, on May 15th.

"To secure united action for the furtherance of higher education in Ireland in its relation to Catholic and national interests," is the object of the foundation in Dublin of a new Association of Graduates of the Royal University of Ireland.

THE College of Preceptors has taken a new departure, by appointing a lady as one of its examiners in English Language and Literature. We refer to Miss Bertha Skeat, the daughter of Professor Skeat, and herself a distinguished English scholar.

A GRAMMAR school for girls is to be established in Leeds. A majority of the governing body will be furnished by the governors of the existing grammar school for boys. Some £12,000 has been set apart, under a recent scheme of the Charity Commissioners, for the purposes of the education of girls, and has somewhat strangely been assigned to the Leeds Girls' High School.

IN order to meet the needs of teachers who desire to requisition their books in time, the Committee of tbe National Home-Reading Union has made a special effort to prepare and issue the book list for the Young People's Section for next session, commencing in October. Teachers can receive the list of books on payment of the fee of 1s. 6d., which it is well to remember will also secure to them the monthly magazine of the Union. The magazine contains suggestive articles upon the selected books, as well as questions especially useful to teachers in testing the progress of their pupils.

THE endowment of a quarter of a million for the University of Birmingham has been secured. At a meeting of the canvassing committee on May 18th, it was announced that since the previous meeting £24,000 had been promised, and that this, added to the sum previously promised, including the £50,000 from Mr. Carnegie and the £37,500 from the anonymous donor, brought the total up to £254,580, or £4,580 in excess of the amount originally fixed upon. The anonymous donor, recognising that the endowment of £250,000, although sufficient for a starting point, must soon be largely augmented, has offered, if the fund is raised to £300,000 by the end of June, to contribute the last £12,500. The committe have now to find £33,000 to secure the additional £12,500 from the anonymous donor. If this is obtained it will make £50,000 altogether subscribed by Mr. Chamberlain's friend.

PARTICULARS of modern languages holiday courses which have been organised by the Teachers' Guild, and will be held at Lisieux and Tours, commencing early in August, were given in our April number. In addition to the courses already described there are many others which students and teachers will have an opportunity of attending this summer. Among them the *Technical Education Gazette* mentions the following: (1) Course at Caen (Normandy) from Monday, July 31st, to Saturday, August 19th, open to persons of both sexes; fee for one course of lectures, reading circle and conversation circle, £2 (if name is entered before July 10th). Full particulars may be obtained from Mr. Walter Robins, 9, Northbrook Road, Lee, S.E. (2) International meeting, Summer School of Modern Languages in Edinburgh, August 1st—26th. The last meeting was attended by over 100 students from 14 different countries. Lectures are given in French, and opportunities afforded for conversation and discussion. Inclusive fee £2 2s., or for one fortnight £1 10s. Particulars may be obtained from the Secretary, The Outlook Tower, Castlehill, Edinburgh. The following holiday courses suitable for teachers will also be held abroad under the direction of foreign teachers. (3) Course at Bonn for women, suitable only for advanced students, August 7th—19th. Apply to Fraülein J. Gottschalk, Hofgartenstrasse, 7, Bonn. (4) Course at Greifswald for teachers of both sexes, with special conversation classes for foreigners, July 10th—28th. Apply to Ferienkurse, Greifswald. (5) Course at Jena for teachers of both sexes, August 2nd—23rd. Apply to Herrn Hugo Weinmann, Spitzweidenweg 4. Jena is renowned for its course in Pedagogy. (6) Course at Marburg. Apply to Prof. Dr. Vietor, Marburg; or Mr. W. G. Lipscomb, University College School, W.C. (7) Courses at Paris from July 1st—29th and August 1st—31st. Apply to M. le Sécrétaire, l'Alliance Française, Rue de Grenelle 45, Paris. (8) Courses in Switzerland, at Geneva, Lausanne and Neuchatel, beginning in middle of July. Apply respectively to M. Bernard Bouvier, Bourg de Four 10, Geneva; M. J. Bonnard, Avenue Davel 4, Lausanne; M. P. Dessoulavy, Académie de Neuchatel.

IN connection with the National Eisteddfod of 1899 a Welsh Educational Exhibition will be held at Cardiff from July 15th to August 5th, in preparation for the Welsh Educational Exhibit

at the Paris Exhibition of 1900. In the non-trade section, the University, University Colleges, Intermediate, Technical and Higher Grade Schools, and Training Colleges of the Principality, will be fully represented. Particulars may be obtained of Mr. A. Taylor, Honorary Secretary, Technical School, Dumfries Place, Cardiff.

THE Bishop of London, at the recent distribution of prizes of the Philological School, Marylebone, in addressing the students, deprecated the idea that the primary object of education was to enable people to "get on" in life. The object of teaching was not that they should have so much stock-in-trade on their counter for ever, but that they should learn how to teach themselves.

THE annual meeting of the Froebel Society was held at the College of Preceptors on May 29th. After a brief presidential address, Lady Isabel Margesson read a paper on "The Importance of Self-Expression." Miss Kate Stevens, Hon. Secretary of the British Association for Child Study, gave the results of inquiries she had made into what some 300 girls in a North London School considered their favourite lesson, their easiest lesson and their hardest lesson. Reading appears to have been most popular with all girls up to the age of twelve years, while with girls over twelve history was the favourite study. Geography seems to be considered very difficult by most girls. Professor Earl Barnes, in discussing the results arrived at by Miss Stevens, pointed out the enormous influence exerted by the preferences of teachers. What the teachers admire is generally liked by the scholars. On the contrary, pupils are little influenced by the teachers' dislikes.

FROM the annual report of the Council of the Teachers' Guild which has just been published we learn that the Central Guild maintains its numerical strength of about 1,750 members, of whom more than 900 are in London and the inner suburbs. The sections in London do much to secure its position, and form the financial backbone of the Guild. The branches are in all stages of efficiency, some being most vigorous and active, others fighting against great local difficulties. Two, the West Kent and the Bristol and Clifton Branch, which have for some years past been weak, have been dissolved within the last year. The Glasgow and West of Scotland branch, which was in a critical condition last spring, has recovered its vitality, and is perhaps more vigorous than ever, while there has lately been a notable increase of membership in the Norwich branch, which now numbers more than 120.

THE following is the preliminary programme of the forthcoming jubilee celebrations of Bedford College:—Thursday, June 22nd, Students' Conference in the Portman Rooms, Baker Street, Miss Anna Swanwick in the chair. Speakers: Prof. Jebb, Miss H. Busk, Miss Manning, Mrs. Morgan Williams, Mrs. Bryant, D.Sc., and others. Friday, June 23rd, meeting at the Theatre of the University of London, Burlington Gardens, Prof. Jebb, Visitor to the College, in the chair. Speakers: His Grace the Duke of Devonshire, the Lord Bishop of London, the Right Hon. James Bryce, Mrs. Fawcett, and Mrs. Henry Sidgwick. To this meeting will be invited representatives of women's colleges and of colleges which admit women as students, all educational bodies, headmistresses, &c., and all members of the Students' Association.

AT the annual general meeting of the members of the Teachers' Guild on June 3rd, Mr. J. Bryce, M.P., &c., the newly-elected president, was introduced to the meeting by the retiring president, Dr. Isambard Owen, Vice-Chancellor of the University of Wales. In the presidential address which he subsequently delivered, Mr. Bryce said that as he thought schoolmasters and schoolmistresses were tired of the politics of education, he should endeavour to give an idea of how teachers and their profession appeared to an outsider. He then proceeded to deal in a luminous and instructive manner with such questions as: Should the teaching profession become a branch of the public service? Ought the teaching profession to become a close one? Dealing with the question of the representation of teachers on local and central educational authorities, he said he was certainly in favour of such representation, but there were many difficulties to be got over before this could be secured in a satisfactory manner. Mr. Bryce expressed the hope that teachers would pass an opinion on the change now going on in the direction of substituting physical science for literary and human subjects in school education. His own opinion was that this change had gone much too far—the present tendency being to produce a hard, dry, unfertile type of mind as compared with the type of mind which literary and human studies ought to produce. In conclusion, Mr. Bryce treated the so-called religious difficulty in schools in a sensible and helpful manner.

A PRELIMINARY exhibition in connection with the educational section of the Paris Exhibition is to be held in London, probably at the Imperial Institute, early in January, 1900. From this preliminary exhibition the selections will be made for the Paris Exhibition. All works are to be sent in by the middle of December, and the exhibition will last from January 4th to 27th. Communications should be addressed to the Secretary, Mr. J. Fischer Williams, 7, New Square, Lincoln's Inn, W.C.

AN interesting branch of the College for Women in connection with the South-Western Polytechnic at Chelsea is the Gymnastic Teachers' Training College, under the direction of Fraülein Wilke. Candidates are admitted only between the ages of 17 and 25, and must produce a doctor's certificate, giving evidence of sound health and strong physique. The practical subjects taught include: Gymnastics on the German, Swedish, and English systems; massage and medical gymnastics; and also fencing, cycling, dancing, swimming, life-saving, and outdoor games. The course of training extends over two years, and the inclusive fee for the whole course is seventy-two guineas. During the second year each student is expected to teach at least once a week, and the lesson is criticised by the teacher.

THE old buildings of Aske's School, Hoxton, which were recently acquired by the London County School, are being made suitable for the purposes of a technical institute. Next September, the trade classes which have been hitherto carried on at the Shoreditch Municipal Technical School will be transferred to the newly adapted buildings. It is also hoped that arrangements may before long be completed for the opening of new technical schools at Hammersmith, Brixton, and Poplar. At the present rate of development it will not be long before the provisions for technical instruction throughout the metropolitan area are complete.

THE Yorkshire Ladies' Council of Education have issued a prospectus of a Training School for Ladies qualifying for secretarial and business appointments in connection with the General Employment Bureau for Educated Women. The training courses are under the supervision of a special committee, who have engaged a staff of fully-qualified and experienced teachers for the several subjects. The following courses of instruction are provided:—(1) Course of training of three terms of thirteen weeks for ladies, to enable them to undertake all kinds of

secretarial work. (2) Commercial training for girls and women, qualifying them to take posts as cashiers, book-keepers, clerks, typists, shorthand writers, &c. This course is completed in one year. A simple preliminary examination will be required of all candidates for training, exception being made in the case of those holding certificates from the College of Preceptors, Universities. &c.

THE Scottish Association for the Promotion of Technical and Secondary Education continues to exert a useful influence upon educational opinion in Scotland, especially in the direction of the co-ordination of higher education. In addition to the relief of the residue grant from the charges made upon it under the Contagious Diseases (Animals) Act, a step which the Association has urged for years, the representations of this important body have brought about certain necessary changes in the regulations applicable to science and art schools. The Association has empowered its executive committee to prepare a Bill to be laid before Parliament for the consolidation and amendment of the Acts of Parliament (and of the orders of the Scotch Education Department under those Acts) relating to technical and secondary education in Scotland.

WE heartily commend an article by Mr. Phil Robinson, entitled "The Garden Revisited," which appears in the current number of *The Contemporary Review*, to the notice of those of our readers who are interested in Nature study. The author has watched with the greatest care what goes on in a cherry-tree during the month of May. The doings of the black-cap and chaffinch and the "misbehavishness" of the squirrel are described in the most delightful manner. The whole paper should prove an inspiration to the teacher who gives object-lessons. It will come as a revelation to those who are ignorant of the ways of the fowls of the air and the beasts of the field to read the charming account of the goings-on of blackbirds and thrushes, while the history of Mr. Robinson's long-tailed field mice is just what our experience tells us boys and girls revel in hearing or reading.

THE number of printed and manuscript items received at the Bodleian Library during last year amounted to 66,847. Of these 51,231 were received under the Copyright Act, 8,935 were donations or exchanges, and the remainder were purchases. The largest proportion of foreign books and papers came from Germany. France was the next largest contributor, and was followed by Italy and British Asia. An analysis of the additions to the Library under the Copyright Act shows that the number of periodicals received was 24,210, parliamentary papers 520, maps 11,865 (11,531 being Ordnance Survey Sheets), music 3,592, and other publications 11,044.

THE chief purchase last year by the authorities of the Bodleian Library was that of the celebrated MS. known as the Bower MS. This came from a ruin close to a buried city in Kashgaria, in which country it was obtained about 1890 by Lieut. Bower. It is written in the Gupta character on upwards of fifty long strips of birch-bark, and contains portions of works on medicine and divination. It has been declared by very high authorities to be not later in any part than the fifth century, while some part may even turn out to be earlier still. It is beyond question one of the very few oldest Sanskrit MSS. known, if not actually the oldest, and is many centuries earlier than any Sanskrit MS. previously in the library.

THE *School Board Chronicle* edition and manual of "The Code for Day Schools" (1899-1900), edited by Mr. Herbert Cornish, and published at a shilling, should prove an invaluable source of information to the managers of the twenty thousand elementary schools in connection with the Committee of Council on Education. This work is now in its eighteenth year of publication, and contains, in addition to the text of the Code and of the Instructions to H.M. Inspectors printed in full, a large collection of Departmental Minutes, circulars and official decisions which have been issued from year to year.

MESSRS. J. H. DENT & Co. have in preparation two additions to their "Modern Language Series," viz.: "The First German Book," by S. Alge and Walter Rippmann, and "German Daily Life," adapted by Walter Rippmann from Dr. R. Kron's "Der Kleine Deutscher."

FOREIGN.

AT his recent induction as Head-master of the School of Commerce at Cologne, which it will be remembered was established two years ago, Dr. Vogels declared it to be his ambition to introduce a curriculum of nine years' study at the school. It was also his view, he said, that the school should maintain the character of an academy of general education while keeping its special commercial object in view. It was impossible for a commercial school to send out ready-made merchants equipped with practical knowledge such as only the experience of their calling could impart. But the object of the school was to be of greater practical use to the extremely important commercial classes of Cologne than either the Gymnasium or the Realschule could be, since these institutions existed for a different purpose. The problem which had to be solved was precisely the union of special knowledge with general education. This could best be achieved by exercising a wise selection in the special subjects taught, and by grouping and teaching them in such a manner as to give them a real educational value. It was important to avoid overburdening the pupils with book learning and with barren theories. The principle must be borne in mind that school training was not an end in itself, but was intended to fit the pupil for practical life.

ONE of the short essays on social subjects in the June number of the *Century Magazine* is on the Swiss Housekeeping School at Geneva. This institution is one of the six different classes into which the Government schools of Switzerland are divided for pupils after they pass out of the primary schools, at twelve and thirteen. The object of the school is to familiarise young girls with all the domestic occupations, to teach them habits of work, order and economy. The pupils receive sensible instruction, more intended to enlarge their mental horizon than to fill their minds with learning. At present there are more than two hundred students, and the instruction is entirely free. The teachers are university men and women, or are drawn from high schools. Half the advisory board of the school, consisting of thirty-two members, are elected by the teachers of Geneva.

MR. WILLIAM CUNNINGHAM, Fellow and lecturer of Trinity College, Cambridge, read a paper in March last, at Harvard University, before the Harvard Teachers' Association, on "Training Teachers at Cambridge University." The paper, which is refreshingly frank, is printed in full in the May number of the *Educational Review* of New York. We should like, if space permitted, to make several selections; but one short quotation must suffice: "There are three courses of lectures given, one in each term of the year; one of these is on psychology in connection with teaching; another is on the history of education, and another is on practical educational matters. Those three courses of lectures are some of them short—six or eight lectures. That is all that is done in the University, and it is on the basis of this kind of instruction, and an examination at the end, that certificates are given. That is, as I believe, all we do, and I am afraid it is all we are likely to do."

IT is intended to open next year at the Paris Ecole des Beaux-Arts three special ateliers for women—for painting, sculpture, and architecture respectively. Only one lady pupil has as yet entered her name as an intending student in architecture, though doubtless the opening of the new atelier will soon attract others.

CURRENT HISTORY.

THE Congress at the Hague, called in consequence of the Tzar's circular, has opened. Many and diverse are the expectations thereanent. Few of us hope much from its conclusions. In a Rome-less world, it is pathetic to see the attempt of the nations to restore the *Pax Romana*. Since the division of the Empire in 395, what a weary struggle has Europe gone through, ever sighing for what the conflicting desires of men continually make impossible—a world of peace. The Holy Roman Empire of the Middle Ages, the Catholic Church and its one-time head, the Papacy, were attempts in this direction. When in the seventeenth century they had obviously finally failed, International Law tried to take their place, and Arbitration Societies have striven in this century to bring about the millennium. And all in vain! . So, though our desires are great, our hopes are not high. Would that they could be higher!

RUDYARD KIPLING is well again, and the English-speaking world rejoices. He is the product of the times, the interpreter of the British Empire to itself. Reading his works, we seem to hear a prophet proclaiming what might almost claim to be a new religion. The mission of England to the backward races, whose territories we have either annexed or at least brought into our "sphere of influence," promises to become, as it were, a new Church militant. Certainly, Kipling's works should teach us all what our duty is in the circumstances into which we have come, and should help us to realise the burden as well as the pride of being a world-wide Empire without parallel in history. Never, since Jesus Christ revolutionised morality, has such a task been given to a nation.

OUR octogenarian Queen has been lately visiting Kensington Palace, the home of her early years. Following her in thought, and recalling the events of those years the memory of which she must then have been reviving, we realise the length of her reign, and the changes which have taken place while she has governed. It would not be far from true to say that almost all that we to-day call the British Empire is no older than the Queen's reign. The constitution of the British Isles is scarcely older, for the Reform Act which inaugurated the present system had scarcely developed its possibilities when Her Majesty mounted the throne, and certainly Australia, Canada, the Cape and India connote for us quite other ideas than were possible in 1837.

WE hear that Russia is intending at last to assimilate her Calendar to that of Western Europe. They have stood out 150 years longer than we did in Britain. In 1751 we resolved to drop eleven days, and to decree that 1800 and 1900 should not be leap years. Russia intends to effect the change more leisurely. She has resolved to do without leap-years altogether till she finds herself in line with Western Europe. Why this plan should be adopted is not quite clear. Russian statesmen are in no fear of "general elections," and of hearing the cry, "Give us back our eleven days," and the change in the rule for synchronising every four years will merely be somewhat of a nuisance. But we must not dictate to other people in matters that concern themselves alone. We merely note that religious differences are in this instance retreating. Both Britain and Russia refused to follow the Calendar reform of 1582, because it was effected by a Pope. The "island-Empire" has long since conformed. Now the Greek Church follows suit.

THE SCHOOL PULPIT.

NOTABLE PASSAGES FROM SERMONS PREACHED IN PUBLIC SCHOOLS.

Constant Endeavour.[1]

WHAT is the difference that distinguishes the musician or the painter from the mere amateur? What is it but the long-continued discipline of hand, of ear, of eye which has made all the faculties of body and mind subservient to the purposes of the art? The man who has received no such training may have to begin with the same natural faculties, the same genius, the same inspiration; but they are not cultivated, and they have no command over the only means by which their fine conceptions can be expressed. And what is the cultivation which such genius always needs? It needs unwearied labour at what to another man would seem the drudgery of the art, what only ceases to be drudgery because the light of genius is always present in every trifling act. Nothing can be a greater mistake than to suppose that genius dispenses with labour. What genius will do is to inspire the soul with a power to persevere in the labour that is needed; but the greatest geniuses in every art invariably labour at their art far more than all others, because their genius shows them the value of such patient labour and aids them to persist in it. So, again, in public life, nothing would be a greater mistake than to suppose that a great statesman required no painful toiling over details in order to govern well, and that it was by flashes of intuition and the force of genius penetrating without any study into the truth of facts that he knew what to do. The fact is that, whenever such a man sees more deeply at the moment than another man, it is because previous study and thought have given him their results to use, and he only needs less study now because he has given to the same subject much more and more painful study before. No man really achieves anything permanent or truly great who has not both studied, and thought, and laboured much at all the details of the needful knowledge. Or if we turn from the statesman who legislates to the statesman who administers the law, the same rule holds. There is no such thing in true government as making general rules and leaving them as it were to execute themselves. Their operations will be totally different to what you mean unless you are diligent in seeing to their working in detail.

The rule holds good in every single occupation, nay, in every single amusement of life. The experience of any school will supply illustrations in abundance. It is the loving labour at his own tasks which makes a man a thorough scholar. It is incessant practice which makes a man skilful at a game. And much of this practice even at games would be dull enough if it were not perpetually encouraged by the hope of achieving a triumph by-and-by.

And why is all this? Apparently because our nature is so framed that in this way only can any kind of knowledge or skill or art or faculty, or whatever else we may call that which enables us to do what we wish to do really well, be so worked into us as to be completely ours. To see how to do a thing is not enough. The power of really doing it implies that the needful science or skill shall have penetrated us through and through until we do instinctively, almost mechanically, all that is needed for the purpose; until the little trifles which are so hard always to attend to and which are so absolutely necessary to true success cease to demand attention, because indeed it would require an effort not to do them; until in all trivial

[1] From a sermon preached in the school chapel to the boys of Rugby by the Archbishop of Canterbury when Headmaster of the school. The sermon is printed in full in "Temple's Rugby Sermons," Third Series. (Macmillan.)

matters we do the right thing as unconsciously, as instantaneously, as we put out our hands to break our fall whenever our foot slips under us as we walk. In actual life, the proportion of what is grand and large and striking, to what is petty and matter of detail, is always exceedingly small. And it is because we learn the one kind of lesson quickly and the other very slowly. Quickly, as it were by a flash, do we see a new truth; slowly, by long-continued practice, by many, many failures, through weariness sometimes tempting to give up the pursuit, through dulness which seems to dim the brightness that first inspired our souls, do we make this same truth a real part of our being.

This law, then, which seems to pervade all our life by God's will enters also into our religious life. Much of our religious life, if it is to be really good, must have this character of being incessant practice of what we already know well. We have to practise our duty until on all ordinary occasions it becomes quite instinctive; until on all ordinary occasions we do, almost without thinking what we are doing, the precise thing that is truest, and kindest, and justest, and purest, and most unselfish. Great temptations will sometimes beset us and will require something more than mere mechanical instinct to resist them. But we ought to be so trained in serving our Lord that all ordinary temptations shall be put aside mechanically without any effort at all. How beautiful is such a character when you see it! How beautiful it is to see a man go straight, as it were, without a thought, to the right thing! It is excellent to overpower a temptation, and being summoned to a battle to fight it through, and though much tempted yet to prevail by God's help. It is excellent to beat down the vain impulse or the cowardly impulse and speak the exact truth, even if there have been hesitation first and a visible weakness. It is excellent to resist the angry feeling that rises from within, and hold it in check and at last subdue it. It is excellent to turn from pleasure to duty, even if the eyes have half unwittingly turned back to gaze at what is left behind. But there is a peculiar beauty about the instantaneous, instinctive obedience to God's law which seems to make all battle unnecessary because the first impulse of the soul is to do precisely what ought to be done. Such goodness seems as it were to go right through all the nature, not to be put on outside like a garment which some strange emergency might any day strip off. Nor is it only more beautiful than any other character. To such a man, and to such an one alone, is revealed in its fullest sense the true nature of spiritual light and spiritual life. In spite of all that we say and think and read to the contrary, we perpetually measure good and evil by their consequences, not by themselves. He only who has made his goodness instinctive thoroughly appreciates what we all of us say and fancy that we know, that the good of a good deed is the doing of it; and that consequently there is no real distinction between great and small, between important and unimportant; the goodness of doing right is not in its greatness or in its importance, but in itself; and he who loves the true spiritual life will recognise its presence in the most trifling acts of obedience to God as much as in the most devoted service.

Types of Masters.—The highest kind of master is he who gets boys to work either because they like the master or like the work. One ought to make much more of personal influence. Boys will do anything for a man when an individual relationship has been set up between them. If the master wishes to get this influence he must make the boys feel that he looks at each boy as an individual, and not merely as one of a class. Private talks with boys are very valuable in this way, especially when the master can find anything to praise.—R. H. Quick, "Life and Remains of Quick." By F. Storr (Cambridge University Press).

JUNIOR OXFORD LOCAL EXAMINATION, JULY, 1899.

Guide and Monthly Test Papers, No. 5.

English Grammar.

Parsing and Analysis.

(1) Give instances of the parts of speech to which each of the following words may belong: round, after, that, the, stone, than, needs.

(2) Parse the italicised words: *Methinks* the news is good; *to*-day; woe is *me*; *No, thank* you; They are *none* the *less* lazy; He is quite *well*.

(3) Parse the following sentence fully: "Come, children, let us shut up the box and the puppets, for our play is played out."

(4) Distinguish between phrases, clauses and sentences. How many kinds of simple sentences are there? Give examples.

(5) Give examples of each of the following: (*a*) Indirect Object; (*b*) Infinitive Mood as Object; (*c*) a Contracted Sentence; (*d*) an Elliptical Sentence; (*e*) Complex Object. Analyse: (i.) We found the paper clean; (ii.) We made the paper clean.

(6) Give examples of the various ways in which the Subject of a Sentence may be enlarged.

(7) Construct a complex sentence with three Subordinate clauses of different kinds. Distinguish between Subordinate and Co-ordinate clauses, and illustrate your answer by reference to the sentences:—

(i.) Henry met John, who was in London at that time.
(ii.) Henry met the brother who was in London at that time.

(8) Analyse the following passage:—

My body was part of the sun and the dew,
Not a trace of my death to me clave,
There was scarce a man left on the earth whom I knew,
And another was laid in my grave.
I was changed, and in Heaven, the great sea of blue
Had long wash'd my soul pure in its wave.

History of England.

(1580—1603.)

(1) Give an account of Elizabeth's courtiers and statesmen. Which of them were famous in literature?

(2) Describe carefully the legal process by which Mary was put to death in 1587.

(3) What was the object of the Spanish fleet in 1588? How far did it succeed?

(4) What was the "Mariolate Controversy"? What persons suffered death in connection with it?

(5) Give a general account of Elizabeth's Parliaments, and her treatment of them. How often did they meet?

(6) What changes took place in this reign in English industry and commerce? Describe the Statute of Apprentices and the Poor Law.

Geography.

Revision Paper.

(Illustrate by sketch maps whenever possible.)

(1) What nations have "Spheres of Influence" in Africa? Give a list of the British possessions in this continent. What is the "Cape to Cairo" scheme?

(2) Give the names of the straits separating (i.) Italy and Sicily, (ii.) Borneo and Celebes, (iii.) Prince Edward Island and New Brunswick. Where are Juan de Fuca Strait, Cape Spartivento, Socotra Island, Mount Elburz? Name the countries and seas crossed by the Tropic of Cancer.

(3) Where are the following:—Romney Marshes, Clee Hills, Yes Tor, Ingleton, Point of Ayr, Gog Magog Hills? Which are the chief (i.) mining, (ii.) dairy produce, (iii.) grazing counties of England?

(4) Draw a sketch map of the Thames with its tributaries. Insert the following towns: Reading, Chatham, Oxford, Hertford, Guildford.

(5) Describe briefly the physical geography of Spain as regards (i.) surface, (ii.) river basins, (iii.) climate.

(6) What are the chief imports and exports of Spain? Account for the comparative unimportance of Spanish manufactures.

(7) Name the states of India under British protection. Give their capitals, and describe one of them from a geographical point of view.

(8) What geographical circumstances account for the difficulties which would be met with by an army invading India from the north or north-west?

(9) Describe and explain the ocean currents in the Atlantic Ocean.

Latin.

VIRGIL.—ÆNEID VI.

Revision.

(1) Translate:

(*a*) Ll. 295-304. Hinc via Tartarei . . . . senectus.
(*b*) Ll. 595-607. Nec non et Tityon . . . . intonat ore.
(*c*) Ll. 710-721. Horrescit visu . . . . dira cupido.

(2) Translate, with notes:

(*a*) maiorque videri
nec mortale sonans, adflata est numine quando
iam propiore dei. "Cessas in vota precesque,
"Tros," ait, "Aenea, cessas?"

(*b*) si potuit Manes arcessere conjugis Orpheus,
Threïcia fretus cithara fidibusque canoris;

(*c*) discolor unde auri per ramos aura refulsit.

(*d*) demens, qui nimbos et non imitabile fulmen
aere et cornipedum pulsu simularet equorum.

(*e*) ne quaere doceri
quam poenam, aut quae forma viros fortunave mersit.

(*f*) inventas aut qui vitam excoluere per artes,
quique sui memores alios fecere merendo.

(3) What allusion is made in this book to the following persons or places? Quote, when you can, a few lines relating to each: Daedalus, Turnus, Acheron, Ulysses, Rhadamanthus.

(4) Give the meanings of—carmina, invergit, scrupea, cortina, euantes, cuneus, epulae, jugum, obloquitur, vellus.

(5) Scan the following lines, noting any peculiarity:—

(*a*) educet, viden' ut geminae stant vertice cristae
(*b*) nomen et arma locum servant: te, amice, nequivi . . .
(*c*) Pometios, Castrumque Inui, Bolamque, Coramque
(*d*) Tisiphoneque sedens, palla succincta cruenta.

(6) Write a brief life of Virgil, stating the names of his works, and the plan and purpose of the Æneid.

CÆSAR DE BELLO GALLICO.—BOOK IV.

Revision.

(1) Translate:

(*a*) Ch. V. Est enim hoc Gallicae . . . respondeant.
(*b*) Ch. XXVI. Pugnatum est . . . . submittebat.
(*c*) Ch. XXXIII. Genus hoc est . . . . consuerint.

(2) Translate into English:—

(*a*) Fuit civitas ampla atque florens, ut est captus Germanorum.

(*b*) Cæsar scaphas longarum navium, item speculatoria navigia militibus compleri iussit.

(*c*) Propinqua die aequinoctii infirmis navibus hiemi navigationem subiciendam non existimabat.

(3) Explain and give the meanings of—legatus, supplicatio, tormentum, vectigales, certior factus, pasuum millia XII., a pueris, acies triplex, navis longa.

(4) Describe the situation of the *Mosa*, *Vosegus mons*, *insula Batavorum*, the *Morini*, and give the modern names connected with them.

(5) Briefly describe Cæsar's bridge over the Rhine. What was his object in constructing it?

(6) Why did Cæsar go to Britain? Briefly describe the campaign. Did Cæsar ever revisit Britain?

French.

A.

(1) Translate into French:

(*a*) If it is fine he will come.
(*b*) I have been told that gold has been found in Wales.
(*c*) Have you heard those pieces played?
(*d*) They have been here more than six years.
(*e*) He must have missed his train.

(2) Translate into French:

When Napoleon was besieging (*assiéger*) Toulon, which was then in the possession of the English, he was one day directing (*diriger*) the construction of a battery (*batterie*), and as the enemy perceived it they began firing (*faire feu*) upon it. Bonaparte, who wanted to send off (*expédier*) a despatch (*dépêche*), asked for a sergeant who could write. A sergeant came out of the ranks and wrote the letter. Scarcely was it finished when a cannon-ball fell between the general and him and covered them with dust. The latter, looking towards the English lines, said: "Gentlemen, I thank you; I did not think you were so polite. I wanted some sand for my letter."

B.

(1) Translate into English:

Schiller, dans une pièce de vers pleine de charmes, reproche aux Français de n'avoir pas montré de la reconnaissance pour Jeanne d'Arc. L'une des plus belles époques de l'histoire, celle où la France et son roi Charles VII. furent delivrés du joug des étrangers, n'a point encore été célébrée par un écrivain digne d'effacer le souvenir du poème de Voltaire; et c'est un étranger qui a tâché de rétablir la gloire d'une héroïne française, d'une héroïne dont le sort malheureux intéresserait pour elle, quand ses exploits n'exciteraient pas un juste enthousiasme. Shakespeare devait juger Jeanne d'Arc avec partialité, puisqu'il était Anglais, et néanmoins il la représente, dans sa pièce historique de Henri VI., comme une femme inspirée d'abord par le ciel, et corrompue ensuite par le démon de l'ambition. Ainsi les Français seuls ont laissé déshonorer sa mémoire.

(2) Write the following in the feminine plural:

(*a*) Il est allé à l'église.
(*b*) L'homme qui demeurait dans cette maison est mort.
(*c*) Celui, vieux, lui, lequel *and* Juif.

(3) Give:

(*a*) The rule as to the gender of *gens*.
(*b*) The difference between the homonyms—

saut, seau, sceau, sot;
mur, mûr, mûre;
croix, crois, croît, croît.

(4) Write in full the conditional, imperfect subjunctive and participles of *croire*, *mourir*, *rire* and *jeter*.

(5) Distinguish between *un air faux* and *un faux air*; *un livre triste* and *un triste livre*; *le dernier mois* and *le mois dernier*.

(6) Construct sentences to show the use and meanings of—*rien*, *chaque*, *plusieurs*, *maint* and *même*.

C.

For those who offer "L'abbé Constantin" (pp. 218-end).

(1) Translate the following passages: (*a*) p. 230, l. 10-p. 231, l. 2; (*b*) p. 245, l. 16-p. 246, l. 7; (*c*) p. 257, l. 13-p. 258, l. 8.

(2) Write short notes on—je vous en voudrais de cette pensée, papier bleuté, Guignol, estafilade.

D.

For those who offer "La Mare au Diable" (pp. 59-end).

(1) Translate the following passages: (*a*) p. 62, ll. 1-12; (*b*) p. 65, ll. 14-30; (*c*) p. 69, ll. 10-21.

(2) Write short notes on—prendre le chemin des affronteux, se sauver, en croupe, je m'y attends.

MANNERS MAKYTH MAN.[1]

MR. LEACH'S scholarly work on "English Schools at the Reformation" led us to expect a learned "History of Winchester College" at his hands. Though not disappointed in our expectations, we could have wished that the large amount of information that he has collected with such evident trouble might have been presented in a more readable form. We feel, however, indebted to Mr. Leach for this, the first attempt at a complete history of the *doyen* of public schools.

The charter of foundation for the "Saint Marie College of Winchester" in Oxford (*i.e.*, New College) was executed by William of Wykeham in 1379; that of its nursery, Winchester College, followed in 1382. The foundation statutes give some insight into the games and playgrounds of the period, for they prohibit "throwing of stones and balls and other things in chapel, cloisters, stalls and hall, and also jumping, wrestling and other reckless and disorderly games in them." We can but suppose that such horseplay out of school was counterbalanced by much industry within. If any incentive were needed, the wall of the schoolroom supplied it with the device, "Aut disce, aut discede, manet sors tertia, caedi," which may be rendered, "Learn, leave or get licked."

EFFIGIEM SERVI SI VIS SPECTARE PROBATI.
QUISQUIS EA HÆC OCULOS PASCAT IMAGO TUOS.
PORCINUM OS QUOCUNQUE CIBO JEJUNIA SEDAT
HÆC SERA CONSILIUM ME FLEAT ARCTA PREMIT.
DAT PATIENTEM ASINUS DOMINIS JURGANTIBUS AUREM.
CERVUS HABET CELERES DEC. RIDERE PEDES.
LÆVA DOCET MULTUM TOT REBUS OBUSTA LABOREM.
VESTIS MUNDITIEM DEXTERA APERTA FIDEM.
ACCINCTUS GLADIO. CLYPEO MUNITUS. & INDE.
VEL SE. VEL DOMINUM QUO TUETUR. HABET.

A TRUSTY SERVANT'S PORTRAIT WOULD YOU SEE.
THIS EMBLEMATIC FIGURE WELL SURVEY.
THE PORKER'S SNOUT NOT NICE IN DIET SHEWS.
THE PADLOCK SHUT NO SECRETS WILL DISCLOSE.
PATIENT THE ASS HIS MASTERS WRATH WILL BEAR.
SWIFTNESS IN HARE THE STAGGS FEET DECLARE.
LOADED HIS LEFT HAND APT TO LABOUR SAITH.
THE VEST HIS NEATNESS OPEN HAND HIS FAITH.
GIRT WITH HIS SWORD HIS SHIELD UPON HIS ARM.
HIMSELF & MASTER WELL PROTECT FROM HARM.

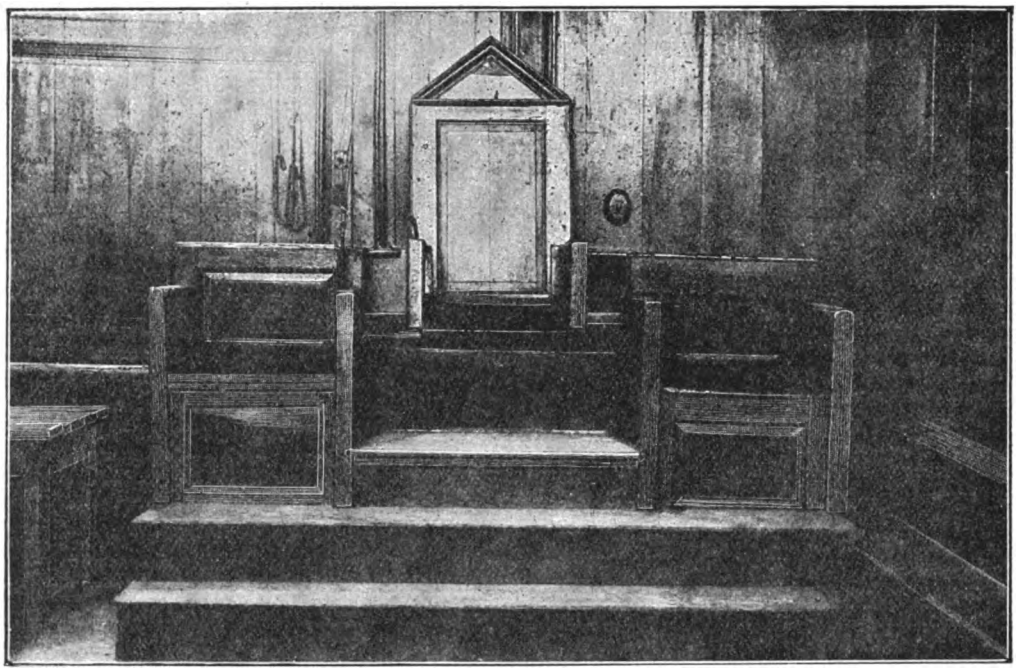
The following time-table of school-hours in 1550 should make the present-day schoolboy chuckle:—5. Get up, sing Latin Psalm in chambers; 5-5.30. Clean chambers, make beds, wash hands and face, brush hair; 5.30-6. Chapel; 6-9. School; 9. Hall, grace, breakfast; 9.30-11. Books, chambers (preparation or other private study); 11-12. School; 12. Hall, grace, dinner, during which chapter read by Bible Clerk; 1-3.30. School, verse tasks; 3.30. Bevers (a beer drinking); 4-5. School; 5. Prayers, go *circum* in cloisters; 6. Hall, supper (*caena*, modern tea); 6.30-7.45. Books, chambers; 7.45. *Merenda* (modern supper); 8. Chapel; 8.15. Chambers, bed.

The figure of the Trusty Servant is one of the "lions" of Winchester. The verses at the foot of the accompanying illustration from Mr. Leach's book sufficiently explain the emblematical picture.

Winchester, the first public school, was the mother of many—Eton and Westminster among the number. Arnold at Rugby drew his inspiration from William of Wykeham and Dr. Goddard, and consciously and avowedly reformed Rugby after the fashion of Winchester. Dr. Goddard was the first head-master of Winchester during this century. His method of governing was on the principle of confidence between masters and boys together with self-government by prefects. He was a man of most sensitive humour; while the high standard he maintained, his kindly relations with his boys, and the confidence he reposed in them, set a model to Arnold, which lost no whit in its transplantation to Rugby. The following is a typical Arnold anecdote:—"The future editor of Thucydides was one day set on to construe a difficult passage in his favourite author, and gave a rendering to which Goddard objected. Arnold ventured to advance one or two arguments in support of his rendering. 'I see what you have been reading, Arnold; but you mistake the meaning of the authorities you quote.' 'I don't think I do,' returned Arnold, sturdily. 'Very well,' said the head-master, quietly; 'then go to your place and we will hear someone who can construe it my way.' When school was up the Doctor retired to his library, and was relating what passed there to a friend, when there came a rap, and Arnold entered, looking very crestfallen. 'I have come to tell you, sir, that I have found out that I was wrong.' 'Ay, Arnold,' said Goddard, holding out his hand, 'I knew you would come.'"

We hope Mr. Leach's history will be read by all schoolmasters and be added to every school library. A careful study of what has been accomplished at so important a school as Winchester, and the methods which have lead to these results, is bound to have a good effect on a teacher's work.

[1] "A History of Winchester College." By Arthur F. Leach, M.A. (Duckworth.) 6s.



THE HEADMASTER'S CHAIR AT WINCHESTER COLLEGE (see p. 229).

HAND AND EYE TRAINING.[1]

THE Trustees of the Gilchrist Educational Trust established, in 1895, in connection with the University of Wales, a travelling scholarship for teachers. The object was to give Welsh teachers an opportunity of studying educational problems in other countries, so that by reporting upon them they might improve the methods in use in Welsh schools. Mr. Lewis, the author of the little book before us, was in 1896 elected the first Travelling Student, and selected as the subject of his inquiry, "Manual Instruction in France and Switzerland." It may be said at once that Mr. Lewis has collected a considerable amount of information, which should prove useful to teachers responsible for the manual instruction of boys and girls. Though manual instruction is largely taught in the French *Ecoles Primaires Supérieures* it takes no part in the curriculum of *Collèges* and *Lycées*. As our readers will know, a law was passed in France towards the end of the last century that every French citizen should learn a manual trade; but naturally enough such a law was not put into practice. Moreover, during the first half of the present century little was done to develop any kind of hand and eye training in French schools, and it was not until 1882 that manual training was made compulsory in all the primary schools of France. The course of instruction carried out in the general and industrial sections of the *Ecoles Primaires Supérieures*, and in some professional schools, is given in detail by Mr. Lewis, and will doubtless provide British teachers with several suggestions. The spirit of organization, exemplified by these amplified instructions to teachers, so characteristic of French education, explains the somewhat monotonous repetition of "the same exercises, the same objects, the same excellencies, and the same deficiencies," of which Mr. Lewis writes. The fourth section of the Report is concerned with a description of seven typical schools, with special reference to their manual instruction, and the illustrations with which the account is accompanied add much to its value.

In the elementary schools of Switzerland manual instruction has been obligatory for ten years, and in the professional schools at least three hours per week are devoted to this subject. It would appear that only those pupils of the higher schools who are destined to be teachers in primary schools are taught the use of tools. It is interesting to learn that the boys of a professional school often combine in the construction of complicated objects.

In applying the results of his observations to the requirements of Welsh education, Mr. Lewis decides that Welsh schools cannot do better than combine the advantages of the French system with those of Sloyd. His remarks upon the cost of manual instruction are as follows:—For wood work alone a room suitable for the teaching of twenty pupils simultaneously can be fitted up for £60; this sum being made up of £30 for benches, £20 for tools, and £10 for a lathe. If a room for iron work be fitted up, £10 might be expended on benches, £15 on vices, £25 on tools, £20 on a lathe, making a total of £70. For forge work an additional sum of £30 might be expended. If turning be taught every pupil, it would be necessary to have additional lathes. The annual cost of maintenance for wood work alone may be estimated as follows:—

Addition to salary of Science, Drawing, or Mathematical Master	£10
Instructor at 2s. an hour, ten hours a week ...	£40
Material	£12
Total	£62

We hope the report will meet with the attention it deserves.

[1] "Manual Instruction in France and Switzerland." By William Lewis, B.A. 50 pp. (Aberystwyth: Gibson.) 1s. 6d.

GREEK HISTORY FOR SCHOOLS.[1]

OF the making of many books on the "History of Greece" there is no end. The period of European history covered by that title, extending from the dawn of authentic knowledge, and more especially from about 600 till 146 B.C., has been the study of every advancing generation, each new group of scholars learning fresh lessons therefrom, according to their knowledge and experience.

It begins in the shadow land of legend; its myths have ever given exercise for the interpretative powers of successive schools of philosophic historians. During the historic period, many Hellenic states completed their life-history, passing through heroic kingship, aristocracy, tyranny, moderate oligarchy, and in some cases democracy, before they were absorbed by Macedon and Rome. At the end of the period of "free" Hellas, the lessons of all these varied experiments were summed up by Plato's great Pupil, Aristotle. Not only has he given to European political science a nomenclature; he has supplied us with the lessons which can be drawn from the story of the Hellenes, and each political thinker, under his guidance, tells the story anew, shaping it consciously or unconsciously by his own political experience.

After Thirlwall, Curtius, Arnold, Grote and others, we now have a history of Greece from the mother university of America. Dr. Botsford has told the old-world story for his New England pupils, and finds his parallels in the constitution of the United States. The book is well written, beautifully illustrated, and, specially in its last pages, well adapted to the all but beginners.

The author sees in the rivalry between Sparta and Athens—the contest which dominates the internal and to a certain extent the external history of Hellas—a struggle between oligarchy and democracy. We prefer, for ourselves, to regard it rather as a struggle between the forces of separatism and union, between isolation and confederation. Neither of these aspects is to be neglected, nor are they lost sight of by Dr. Botsford, but we think Sparta established oligarchies in the states under her control more as a political expedient to maintain her power than because she believed in them for their own sake..

This, however, is a matter entirely of personal opinion. In other respects, we can entirely agree with Dr. Botsford. The colonial development is well told, and above all, he has worked into his text with excellent effect passages from Sophocles, Æschylus, and others of the dramatic poets.

The "History of Greece" is a complete whole. We know of course that the ante-Christian period can be regarded as merely the early chapters in Hellenic history, and that Finlay taught us in this century what Gibbon told us before, that the Greek story illustrates better perhaps than any other the fact that history is continuous, a subject to which, as there is no beginning, so, properly speaking, there is not yet an end. But confining our view to the ordinary and orthodox standard, the history of Hellas makes a beautiful, almost a dramatic whole. Developing from the mists of antiquity, the states grow up, through all their various stages, into the youthful struggle with Persia, through the endlessly varying life of inter-state contest and internal experiments, into the brilliant expansion of Macedon and the conquests of Alexander the Great. And then we watch with sad, intense interest their absorption into Rome, and the arts by which

"Græcia capta ferum victorem capit."

Without a knowledge of Hellenic history and thought, we cannot understand our modern European history, we cannot fully comprehend the struggles of our own day. Nay, more, without such knowledge we lack the key to the history of the Christian Church, we fail to realise in all its fulness the Gospel and the message of salvation.

[1] "A History of Greece for High Schools and Academies." By G. W. Botsford, Ph.D. xiii.+381 pp. (The Macmillan Co., New York.) 6s. 6d.

RECENT SCHOOL BOOKS.

Modern Languages.

French Conversations. By Mlle. Dehors de St. Mandé. Book III., 34 pp.; IV., 31 pp.; V., 32 pp.; VI., 32 pp. (Sonnenschein.) 1s. each vol.—These little books, like the first two which we have already noticed, are for use in girls' schools only; they are arranged in exactly the same way, and deal with an amazing variety of subjects. Some of the headings will suffice to show this—*La Cuisinière fait une crème, La coupe d'un corsage, La demande en mariage, La noyade d'un rat.*

Grillparzer, Sappho. Edited by C. C. Ferrell, Ph.D. xxxiii.+143 pp. (Ginn, Boston.)—The editor says in his preface that, "As far as he has been able to learn, no work of the great Austrian dramatist has ever been edited either in this country or in England. This seems very strange!" Dr. Ferrell has overlooked Professor Rippmann's edition, which appeared a year ago. The introduction to the present volume is satisfactory on the whole, but the notes are hardly adequate. The renderings given are often in doubtful English, and the numerous instances in which Grillparzer was influenced by the extant fragments of Sappho are left unnoticed.

Molière, Le Bourgeois Gentilhomme. Edited by F. M. Warren. xi.+128 pp. (Isbister.) 1s. 3d.—This edition of a play often read in schools can be warmly recommended. There is a portrait of Molière, a clear introduction, and notes quite full enough for the average schoolboy.

É. Richebourg, Les Violettes Blanches. Edited by F. Julien. v.+69 pp. (Macmillan.) 1s. 6d.—A simple story, not without charm, perhaps better suited for girls than for boys. The text runs to 47 pages, and as it is easy, it can be taken in a term with a fairly elementary class. The annotation is mostly translation; the vocabulary is not as full as it should be.

F. Sarcey, Le Siège de Paris. Edited by I. H. B. Spiers. vii.+188 pp. (Isbister.) 1s. 6d.—Mr. Spiers has produced a good edition of Sarcey's amusing account of Paris during the siege. The value of the book is enhanced by the insertion of two maps, and by an alphabetical list of persons and places. A portrait of the author is the frontispiece.

J. Verne, Voyage au Centre de la Terre. Edited by R. L. A. Du Pontet, M.A. iv.+216 pp. (Arnold.) 3s.—It is unnecessary to point out how suitable most of Jules Verne's tales of adventure are for schoolboys. Of course, it is impossible to go through close on 200 pages in class in a single term, and it is not advisable to carry a text of this kind over into a second term. But it can very well be set for private reading, which deserves to be more encouraged. The notes are very brief and to the point.

Dumas Fils, La Question d'Argent. Edited by G. N. Henning. xiii.+136 pp. (Isbister.) 1s. 6d.—The editor assures us that this is the most suitable of all Dumas' plays as a text-book; we should prefer to say that it is the least unsuitable. The search for unedited texts is leading some a little too far. It is not that there is anything flagrant in this particular play; it is rather the atmosphere that pervades the whole which we consider unsuitable for children. The introduction is worth reading. The notes are disfigured by Americanisms.

La Main Malheureuse. Edited by H. A. Guerber. 106 pp. (Isbister.) 1s. — This pretty little story was well worth disinterring from the pages of "Le Magasin Pittoresque."

The text covers 60 pages; there are no notes, all explanations being given in the vocabulary, which is tolerably complete. This book should find favour in girls' schools.

Selections from the Correspondence between Schiller and Goethe. Edited by J. G. Robertson, M.A., B.Sc., Ph.D. xlix.+210 pp. (Ginn, Boston.) 80 *cents.*—Mr. Robertson, who is Lector in the University of Strasburg, has made a very good selection indeed from this unique correspondence. He has also furnished a careful and eminently readable introduction, giving a brief account of the life and work of Schiller and Goethe up to the time of their meeting, and of their friendship from 1794 to 1805. Copious notes give every desirable information on the subject matter of the letters and suitable translations wherever the text presents difficulty. We regard this as a very valuable contribution to the small number of really good reading-books for school and college.

Key to Exercises in Siepmann's German Primer. By T. H. Bayley, M.A. 78 pp. (Macmillan.) 3*s.* 6*d.* net.—Many teachers will be very glad to have this little volume. It contains careful renderings of all the exercises in Mr. Siepmann's Primer, which is deservedly popular.

E. von Wildenbruch, Der Letzte. Edited by F. G. G. Schmidt, Ph.D. v.+73 pp. (Isbister.) 1*s.*—A short story which grown-up people will read with interest, but which is almost too gloomy for school. The notes are satisfactory, and the text is printed in clear type.

Johanna Spyri, Rosenresli. Edited by Helene Boll. iv. +62 pp. (Isbister.) 1*s.*—This story of only 29 pages may be read with children towards the end of their second year in German. There are a few pages of notes, into which some philology is needlessly introduced. There is also a vocabulary to every page of the text, which may be welcome to some teachers. The edition appears to have been compiled with care.

A Welsh Grammar for Schools. Part II. Syntax. By Prof. Anwyl. (Sonnenschein's Parallel Grammar Series.) 2*s.* 6*d.*—This is the only grammar we know of which, in a concise form, attempts to express the syntax of the Welsh language on lines exactly parallel with those of other European languages. All other grammars of this size have treated the subject empirically, and have never succeeded in systematically classifying the various constructions. Professor Anwyl has succeeded in the attempt, and the book, unlike its predecessor, Part I. (Accidence), is of distinct practical value. Nor is its practical value lessened by the fact that quotations from 16th, 17th and 18th century literature have been introduced to illustrate the evolution of certain constructions. On the other hand, exception might be taken to the introduction of such rare and obsolete forms as "am y pared," "gyfeiryd ag," "gan lawr," "gan wawr," "heb waethaf," &c. The specimen, too, of direct and indirect speech is not a happy one. It is a too evident translation from English, savouring suspiciously of "dog-Welsh."

Classics.

An Introduction to Greek Prose Composition. By H. Pitman, M.A. 184 pp. (Macmillan.) 2*s.* 6*d.*—The exercises here, beginning with sentences of two or three words, advance gradually to continuous pieces. Useful hints are given throughout, and vocabularies to each exercise. The book should provide the beginner with all the preparation necessary for him to be able to use Mr. Sidgwick's book with advantage.

Plato: Ion. By J. Thompson, M.A., and T. R. Mills, M.A. 62 pp. (Clive.) 3*s.* 6*d.*—This is a very slight volume for the price, but contains the full fare in the way of introduction and notes which is associated with the "Tutorial Series." We do not like the phrase "extension of time" to describe the accusative (p. 37). Why not "duration"?

Tales of Early Rome. By J. B. Allen, M.A. 111 pp. (Clarendon Press.) 1*s.* 6*d.*—The text of these tales is simplified from Livy, the earliest chapters consisting of very elementary dissections of the author, while later the language approximates to the original. The notes will be most serviceable to those who use the author's grammar, and will look up the references. At the end are good exercises for translation into Latin.

Caesar. The Invasion of Britain. By A. H. Allcroft, M.A., and T. R. Mills, M.A. 82 pp. (Clive.) 2*s.* 6*d.*—The text comprises *De Bell. Gall.* iv. 20-v. 23, and it is an advantage to have the portions of the two books together for examination purposes. There is a very good map of south-east Britain, but that of Gaul is too cramped. Naturally there is nothing much that is fresh in the notes, which are as good as those of several other editions of the separate books.

Grammar and Composition.

English Etymology. A Select Glossary. By Kluge and Lutz. 234 pp. (Blackie.) 5*s.* net.—The authors inform us that their "primer" is intended not to supplant but to supplement Professor Skeat's Etymological Dictionary. All words the history of which bears on the development of the language at large are dealt with in alphabetical order. The book contains nothing but facts that are well established by the latest researches in comparative philology, and should prove useful to students. The typographical arrangement leaves nothing to be desired. The work is very thoroughly done. As an example we take "tooth"; we are given the Middle and Old English forms, singular and plural; the Teutonic base is illustrated from five languages, and an ablaut form, as appearing in Gothic, is added; next the Aryan base, extant in Sanskrit, Greek, Latin and Lithuanian forms. The connection with the Aryan root, signifying "eat," is established, and the form shown to be a participle in its origin. Professor Skeat's conjecture as to its evolution from root DA is not mentioned.

Elements of Prose. By W. A. Brockington, M.A. 148 pp. (Blackie.) 2*s.* 6*d.*—English composition, properly taught, is one of the best mental exercises that can be given. Yet how very rarely is it *taught* at all. A subject for an essay is given; the essay is written, and that, as far as the pupil is concerned, is generally the end of the matter. We are glad to welcome this addition to the slowly but surely increasing number of text-books dealing with this important subject. The rules and hints it contains are of the most practical kind, and are calculated to impress the student with the need of a careful choice of words and phraseology.

Practical Handbook of Elocution. By Rose I. Patry. 98 pp. (Sonnenschein.) 1*s.* 6*d.*—The numerous exercises in pronunciation, and the hints on gesture, posture and declamation, should render this little book valuable to the amateur reciter. It is, in fact, a kind of drill-book, and "is intended to assist the student in his daily practice."

Word Building, Derivation and Composition. By Robert S. Wood. Book VII. 128 pp. (Macmillan.) 1*s.*—We have nothing but praise for this excellent little handbook. The

exercises are very suggestive, especially those on the extension of the vocabulary and on the right use of words. Part III., on Correspondence, General and Commercial, is also worthy of commendation, though (necessarily, perhaps) somewhat short.

Edited Books.

The Works of Shakespeare. (Eversley Edition.) Edited by Prof. C. H. Herford, Litt.D. Vol. IV. 493 pp. (Macmillan.) 5*s.*—This volume maintains the same high tone as those already published, and the selection of plays illustrates the care of the editor for his subject matter. The rough and ready division so often adopted into comedies, histories and tragedies, it will be seen, is quite abandoned; so, too, is the somewhat fanciful theory of "period plays" advocated by Dr. Furnivall. Here "Pericles," supposed to be not more than about one-third Shakespeare's, and published in 1609, stands side by side with three plays, "Winter's Tale," "Cymbeline," and "The Tempest," all dated from the First Folio in 1623, and all exhibiting Shakespeare's genius in maturity. The editor's treatment of the last two plays is masterly. If at the conclusion of this series Professor Herford could be induced to issue all the introductions he has prepared for this edition in one single volume as a handy companion to the many editions of the mere text of Shakespeare at present in the field, such a work would be of great service to the increasing multitude of Shakespeare students.

British Anthologies. Edited by Prof. Edward Arber. Vols. IV., V., VI. (entitled respectively the Shakespeare, Jonson and Milton Anthologies.) Each 300 pp., with index of first lines, glossary, &c. (Frowde.) 2*s.* 6*d.* per volume.—It is a difficult task to praise this literary venture as it deserves. Professor Edward Arber, whose scholarly editions of old English texts are known to all who love our national literature, has taken in hand to prepare a complete historical national anthology of the poems and songs of the English language. We are promised volumes which will range from the days of Dunbar to those of Cowper, and if the succeeding volumes maintain the level of the three now under review, the editor will have deservedly earned the hearty gratitude of all those who love to drink at "the well of English undefiled." The variety of matter included is sufficient to satisfy the most captious taste. Love poems, of course, form the staple; but the poetry of English sporting life and of the camp and tavern is quite as strongly represented; and the addition of some political and social satirical verse makes the selection as complete as a catholic yet scholarly taste can desire. A very large portion of each of these three volumes is distinctly "caviare to the general." Poetry has been unearthed, and some authors disentombed whose existence is completely unknown to the ordinary student of English. This only adds an antiquarian interest to the high literary merit of each collection. This series of anthologies is, of course, in a lighter vein than Mr. Humphry Ward's well-known work on British poetry, but its distinguishing features are such as will secure it a high and unique position in the history of our latter-day attempt to really comprehend the genius of our mother tongue.

Maud, The Princess, Enoch Arden and Other Poems. By Alfred Lord Tennyson. 106 pp. (Macmillan.) 6*d.*—Another and most welcome addition to Messrs. Macmillan's "Sixpenny Series." Unlike the first selection of Tennyson's earlier work, there are comparatively few fragmentary pieces included in this little volume; but the lines on "Will" ("O well for him whose will is strong") and the ever popular "Crossing the Bar" are amongst them. "Aylmer's Field," "Sea Dreams," and "Lucretius" are also included. If the policy of popularising a poet by "democratising" the price of his works results in an increase of general culture (though this point is surely debatable), the issue of Tennyson's work in this cheap and handy form ought to be sufficiently accessible to give him currency even among those classes called "the uncultivated."

The Sir Roger de Coverley Papers. Edited by Mary E. Litchfield. 178 pp. (Boston, U.S.A., Ginn & Co.)—The very appearance and style of this excellent volume bid us hope at least for artistic and literary excellence in the treatment of its matter, and on a more careful examination we are not at all disappointed. Sir Roger has been the subject of late of much criticism, and his period has been extensively elucidated for educational purposes, but never better than in this case. The introduction is thoroughly well done, and the editress explains in a note why Tickell's share in the "Spectator" papers (No. 410) passes unnoticed in this work; but more valuable than this part is a chronological table which connects the lives of Steele and Addison with the literature and history of the time. A section entitled "Suggestions for Students" opens up a tremendous range of reading, which he who undertakes may fairly claim an adequate knowledge of the whole period of Queen Anne. The notes are rather too severely curtailed.

Macaulay's Essay on Milton is the subject of two recent editions. One by H. B. Cotterill, M.A. (Macmillan).—127 pp., 2*s.* 6*d.*—is an elaborate and careful piece of work; the other, by John Downie, M.A. (Blackie and Co.)—111 pp., 2*s.*—is only remarkable for its learned but somewhat cumbrous introduction. Mr. Downie, quoting Mr. Leslie Stephen, also adds a section of variations in the text of the essay which is elaborate enough, and yet (in spite of the just claim of Mr. Stephen to greatness as a critic) almost unnecessary in a school book on a classic of so recent date as Macaulay. Mr. Cotterill's work is much more interesting. It has about it a flavour of literature which in the other edition is replaced by a savour of pedantry. The introductory "Remarks on the Essay" are brief but clear, and to the point; the "abstract" is masterly, and so are the notes, which it would be difficult to supersede. Two chronological summaries, one showing the connection of Milton's life with English and foreign literature and politics, and another giving the authorities and references for Macaulay's, Milton's and Dante's lives, make the volume wonderfully complete. It deserves to be largely used. An original and not unpleasing feature is supplied by prefixing Tennyson's lines to the "God-gifted organ voice of England, Milton, a name to resound for ages" as a prologue, and a good Latin rendering of the same as epilogue to this well planned and well executed work.

History.

The Certificate History of England—1700-1789. By A. J. Evans and C. S. Fearenside. 464 pp. (Clive.) 3*s.* 6*d.*—This last volume of the well-known University Tutorial Series almost makes a record for completeness of information and condensation of matter. Like all the preceding volumes, this one is turned out in a thoroughly workmanlike way, and the competence of its two editors, if not already well known, is here amply demonstrated. Seldom has the history of the English Constitution (for instance) been so well reviewed as in the introductory chapter in which the varying balance of the interests of Church and State are most adequately, though succinctly treated; or a sketch so well done as that of the international history of Europe to A.D. 1714, with its twofold catastrophe in the breakdown of the Empire and of the Catholic Church, and the rise of the greater and lesser dynastic families of Europe. The

internal political history of England is also most fully dealt with, as is also the period of the French Revolution and the Napoleonic wars. This is a history with a purpose. It is written for certificate students. Consequently it bears the appearance of an examination text-book on every page. But those who have more deeply examined the history of Europe will here find that an immense amount of learning is concentrated in such a way that some of the profoundest points in political philosophy are stated with the utmost clearness and in their due historical proportion. Examination text-books in history are all too frequently compilations of dull annals. This is the philosophy of the history of the eighteenth century—so often ignored or slighted—distilled and "above proof." A carefully prepared map of Europe in 1700 A.D., with a "guide" detailing its main features, adds to the usefulness of the work. Altogether, this volume not only maintains the reputation of the University Correspondence College and its Press, but if historical scholars need a brief handbook as a guide to their severer studies, in these pages they may find one in its completest form.

Mathematics.

Graduated Test Papers in Elementary Mathematics. By Walter J. Wood, M.A. (Oxon.) 71 pp. (Macmillan.) 1*s.*—Mr. Wood has arranged forty tests, which are modelled on the examination papers in elementary mathematics set by the Science and Art Department. Each paper is consequently divided into three sections dealing respectively with arithmetic, the first book of Euclid, and algebra. The scope of each paper is clearly indicated, and answers to all numerical questions are supplied. To teachers in the habit of setting weekly or monthly papers the little book will prove very useful. The problems are judiciously chosen and skilfully graded.

Science and Technology.

Physical Geography. By William Morris Davis, assisted by William H. Snyder. xviii. + 428 pp., 9 plates and 261 illustrations. (Boston, U.S.A.: Ginn & Co.)—Professor Davis, of Harvard University, is such a distinguished authority on various branches of physiography that this book is sure to command respectful attention. The subject is very naturally divided into four parts: the earth as a globe, the atmosphere, the oceans, and the lands. The first of these divisions is briefly disposed of in a few pages. The section dealing with the atmosphere is refreshingly new, though much too short; the theory of the winds is more satisfactory than anything we have met with before. After a single chapter of some thirty-five pages on the ocean, we get a disproportionately complete treatment of the lands, occupying as it does eight of the twelve chapters which make up the book. Though we do not altogether agree with the relative importance given to the different subjects dealt with, we strongly recommend the volume to the notice of teachers of geography and physiography. It is profusely illustrated, brightly written, and if carefully studied, is bound to have a good effect on the teaching. The fact that the majority of the examples are American will help to broaden the outlook, and thus brighten the class work. Pupils like something fresh occasionally.

The Spirit of Organic Chemistry. By Arthur Lachman, B.S., Ph.D. xviii.+229 pp. (New York: The Macmillan Co.) 6*s.* 6*d.*—Students who are familiar with organic chemistry as it is presented in the numerous excellent text-books which have already been published will find Dr. Lachman's volume an excellent supplementary study. The development of what has become in recent years a bewilderingly complex subject is traced more or less historically from 1857, the date of Dr. W. H. Perkin's researches into the constitution of rosaniline. The reader who carefully follows the main argument of the book is bound to be impressed with the wonderful growth of modern synthetic chemistry. But it should be clearly understood that the book is only suitable for teachers and advanced students.

Outlines of Physical Chemistry. By A. Reychler. Translated by John McCrae, Ph.D. xvi.+276 pp. (Whittaker.) 4*s.* 6*d.*—The translation of this volume by Professor Reychler, of Brussels, has been very satisfactorily done by Dr. McCrae. The book is concerned with the enticing borderland between physics and chemistry. A glance through these "outlines" is enough to show that physics and chemistry are really inseparable. As would be expected, recent researches are largely dealt with, and the information is sufficiently up-to-date to contain an account of Dewar's work on the liquefaction of large quantities of hydrogen. It is in no sense a book for beginners, but for the highest forms on the modern side of large public schools, and for college students, it should prove very useful.

Seed Dispersal. By W. J. Beal, Ph.D. vii.+87 pp. (Boston, U.S.A.: Ginn & Co.)—Dr. Beal describes in a simple and interesting way the methods by which the natural scattering of seeds is assured. The book is well illustrated, but since many of the plants referred to are not common in this country, the British teacher of botany will be unable to make full use of the information so conveniently collected in a small compass.

Miscellaneous.

"Official" Drawing Books. 16 pp. (Macmillan.) 3*d.* each.—This series of twenty drawing books will satisfactorily carry a boy or girl from the first steps in drawing by the aid of squared paper on to simple cases of light-and-shade work. There is a suitable provision of exercises in which freehand and work with the ruler are combined, and four of the books are devoted to problems in geometrical drawing. The examples are drawn upon excellent paper, and though primarily intended for elementary schools, we are of opinion that they will be found to admirably meet the requirements of secondary schools. It is worth remarking that the copies are by no means exclusively cases of bilateral symmetry.

Artistic Colour and Brush Work for Higher Standards. By W. Schofield. (W. & A. K. Johnston.)—In the present series of drawing copies, the most interesting feature is the application of flat washes of water colour to bring out the patterns. This will give an additional interest to all students. The method possesses many advantages. It enables the student to detect more clearly any inaccuracy in his drawings, and brings out more distinctly the meaning and beauty of the designs. It further provides for that great desideratum—learning the use of the brush when young. Mr. Ruskin advises the use of the brush instead of the pencil point in his "Elements of Drawing." The colouring of the designs is a great advantage, and after going carefully through such a course as the one before us, few students will have any difficulty in planning original designs of their own. The flower studies are both new and interesting, and the group of still life, together with the figure studies, make up a new and charming work.

Lesson Papers in Religious Knowledge. (*Part I. S. Matthew.*) By Rev. G. H. Jones. 61 pp. (Simpkin Marshall.) 6*d.*—These useful papers are founded upon the edition of S. Matthew's Gospel in the "Cambridge Bible for Schools." By this means that very scholarly work may be brought within easy grasp of those average pupils who seem very imperatively

to need a guiding hand in the preparation of their divinity lessons. There are many useful hints upon translation, &c., scattered up and down these pages which may also be of assistance to those pupils who have some knowledge of the original Greek of the New Testament.

In Black and Red. Cambridge Verses and School Songs. By E. Sharwood Smith. 53 pp. (Andrew.) 1s.—This little booklet has an attractive appearance, and heightens our pleasure on examination of its contents. It is one of the glories of Cambridge to have bred poets, and not surely less to her credit to have made many accomplished versifiers. With Calverley at their head, the writers of this kind of literature have a position of some consequence, and these verses of Mr. Sharwood Smith will appeal to Cambridge men past and present as the youthful academic muse only can. One of Mr. Sharwood Smith's productions (the "Cricket Song," p. 25) has already appeared in these columns, and University athletics seem to have claimed no inconsiderable amount of attention from the writer's muse. In a more serious vein are the paraphrase of "Eheu Fugaces" (which is, however, *not* equal to the work of Mr. C. L. Graves), "Moon Glimpses" (in the cheerful company of Koheleth) and a translation from De Musset. Mr. Sharwood Smith, again, invites comparisons with Mr. Graves in his rendering of Horace (Odes II., 16), which is certainly not so happy as that of the "Hawarden Horace" ("Calm upon the broad Atlantic, Tossed by billows fierce and frantic, Pallid passengers inordinately crave," &c.). But then this volume isn't politics—even on their funny side.

PUBLIC SCHOOL ENTRANCE EXAMINATION PAPERS.

WE are able this month to continue our selections from the papers set in recent entrance examinations at some of the great public schools. It will be remembered that typical Harrow papers were published in our January issue. This month we reprint specimen papers set at Rugby, Charterhouse, and Cheltenham; and they will serve to show the standard of requirements at these schools. We are glad to acknowledge the kindness of the headmasters in placing the papers at our disposal.

LATIN.

Rugby.

A. *Grammar* (35 min.).

(1) Gender of ver, deus, imago.
Gen. sing. of paries, laus, ordo, cancer.
Gen. plur. of agricola, res, bos, imber.
Nom. sing. of rastri, pecudibus, Jove, alituum.

(2) Abl. sing masc. of alacer, pulcher, sospes, facilis.
Nom. plur. neut. of dives, velox, liber.
Superlative of amans, aequus, paullum.
Positive of strenuior, dextimus, audacissime.
Gen. sing. used of quicumque, nemo.

(3) Latin for: 700, 30th, eight each, nine times.
Latin for: how much gold; who of you? when? thither.
Latin for: at my house, on to the ship, with you.

(4) 1st sing. perf. ind. act. of fero, percello, tono, indulgeo.
Supine of maneo, vello, vincio.
Latin for: to measure, having embraced, be thou advised, it-is-of-use, he might become, about to go, I shall remember, I dared.

(5) Latin for: I am allowed to speak.
It happens that he has come.
It is the nature of any man to err.
What need is there of words?
We are at Rugby on September 21st.

B. *Translation* (35 min.).

(1) Eodem tempore Caius, vir optimus et magnae auctoritatis, interficitur.

(2) Mox exercitus quoque qui civitatem Ardeam cum ipso rege oppugnabat, eum reliquit; veniensque ad urbem rex portis clausis exclusus est; cumque imperasset annos quattuor et viginti cum uxore et liberis suis fugit.

(3) Quod ubi Hannibali nuntiatum est moram magis quam bellum metuens, oratores ad regulos eorum misit, colloqui semet ipsum cum iis velle; vel illi propius Iliberrim accederent, vel se Ruscinonem processurum ut ex propinquo congressus facilior esset; namque et accepturum eos in castra sua se laetum, nec cunctanter se ipsum ad eos venturum; hospitem enim se Galliae, non hostem advenisse.

(4) Jam seges est, ubi Troja fuit, resecandaque falce
Luxuriat Phrygio sanguine pinguis humus;
Semisepulta virum curvis feriuntur aratris
Ossa; ruinosas occulit herba domos.
Victor abes; nec scire mihi, quae causa morandi,
Aut in quo lateas ferreus orbe licet!

C. *Prose* (35 min.).

(1) His son was made king by the Romans.

(2) He hoped that the city would be taken.

(3) Let those who wish depart: we who fear nothing will advance.

(4) If you had gone to Athens, you would have seen him.

(5) At daybreak our men had crossed the river, and the enemy's line was already in sight. After urging his soldiers not to forget their former valour and successes, and to think that Cæsar himself, under whose leadership they had won so many victories, was present in person, the Roman general gave the signal for battle. A fierce fight followed; for, although the enemy were routed on the right, on the left they fought with the utmost courage. While the result was still doubtful, the officers of the 7th Legion were informed of what was taking place on the left, and they led their troops round to attack the enemy in the rear. Then at last they were surrounded, and were killed to a man.

Charterhouse.

(*Boys under* 13.)

[N.B.—When a word is underlined, the English is given below.]

(1) Translate:

(*a*) Erant Croeso, regi Lydorum, filii duo; quorum alter mutus erat, alter inter aequales omnibus rebus praestantissimus.

aequales, companions.

(*b*) Nitocris, Babylonis regina, plurima et splendidissima monumenta aedificavit. In sepulcro suo haec verba inscribi jussit: Si quis eorum qui post me reges erunt Babylonis, pecunia eguerit, hoc sepulcrum aperiat, et quantum pecuniae velit, sumat.

sepulcrum, tomb. *egeo*, to be in need of.
aperio, to open.

(2) Put into Latin:

(*a*) These things are easy (*facilis*) to a brave soldier.

(*b*) King Darius broke open (*violo*) the tomb of the Queen.

(*c*) The consul ordered (*jubeo*) the centurion to shut (*claudo*) al the gates of the city.

(*Boys between* 13 *and* 14.)

(1) Translate:

Itaque, nondum hieme confecta, proximis quattuor coactis legionibus, de improviso in fines Nerviorum contendit, et priusquam illi aut convenire aut profugere possent, magno pecoris atque hominum numero capto, atque ea praeda militibus concessa, vastatisque agris, in deditionem venire atque obsides sibi dare coegit. Eo celeriter confecto negotio, rursus in hiberna legiones reduxit.

de improviso, unexpectedly. *obses*, a hostage.

Parse *coegit* and *confecto*, with principal parts.

Decline *ille* throughout, and give the other degrees of comparison of *celeriter*.

(2) Put into Latin:

(*a*) We all know that Numa, the king of the Romans, was a very wise man.

(*b*) He asked whether conquered men were accustomed to give laws to the conquerors.

(*c*) The Nervii said that they would give Cæsar two hundred hostages.

(3) Arrange the following words as a Hexameter and Pentameter:

Collis minor monte, altior erat aequis campis;
Bina hinc corpora fugae miserae data sunt.

(*Boys over* 14.)

(1) Translate:

Interim, consilio ejus cognito et per mercatores perlato ad Britannos, a compluribus insulæ civitatibus ad eum legati veniunt, qui polliceantur obsides dare atque imperio Populi Romani obtemperare. Quibus auditis, liberaliter pollicitus, hortatusque ut in ea sententia permanerent, eos domum remittit, et cum iis una Commium, quem ipse Atrebatibus superatis regem ibi constituerat, et quem sibi fidelem arbitrabatur, mittit. Huic imperat ut civitates quam possit plurimas adeat, horteturque ut Populi Romani fidem sequantur, seque celeriter eo venturum nuntiet.

Give the principal parts of the verbs from which *cognito*, *perlato*, *permanerent*, and *venturum* come.

(2) Put into Latin:

(*a*) The slave begged (*oro*) his master to grant (*concedo*) him liberty.

(*b*) Next day Cæsar discovered (*cognosco*) that the mountain was held by his own men, and that the Gauls had moved their camp.

(*c*) We ought neither to fear nor to despise our enemies.

(3) Arrange the following words into Hexameter and Pentameter:

Collis minor monte, altior erat aequis campis;
Bina hinc corpora fugae miserae data sunt.

Cheltenham.

(*Classical Department.*)

(1) Translate:

Cæsar, postquam Pompeium ad Asparagium esse cognovit, eodem cum exercitu profectus, expugnato in itinere oppido Parthinorum, in quo Pompeius præsidium habebat, tertio die in Macedoniam ad Pompeium pervenit, juxtaque eum castra posuit; et postridie, eductis omnibus copiis, acie instructa, decernendi potestatem Pompeio fecit. Ubi illum suis locis se tenere animadvertit, reducto in castra exercitu, aliud sibi consilium capiendum existimavit. Itaque postero die omnibus copiis magno circuitu difficili angustoque itinere Dyrrhachium profectus est, sperans Pompeium aut Dyrrhachium compelli, aut ab eo intercludi posse, quod omnem commeatum totiusque belli apparatum eo contulisset.

(2) Parse in full the following words in the above passage:
Oppido, decernendi, die, posse, contulisset.

(3) Decline in the singular only:
Caput, vis, ipse, dives.

(4) Give the perfect and supine of:
Rego, fingo, spondeo, reddo, vinco.

(5) Translate into Latin:

(*a*) Cæsar came with all his forces to Dyrrhachium.

(*b*) But, having been informed that Pompeius would not fight, he started for Thessalia.

(*c*) He hoped to finish the whole war in one battle (to finish the war = bellum conficere).

(*d*) If Pompeius had conquered Cæsar he would be considered the greatest of all generals.

FRENCH GRAMMAR AND UNSEEN TRANSLATION.

Rugby.

A. *A and B on separate sheets.*

(1) Give the corresponding masculine forms of: tante—nièce—impératrice--héroine—servante—maligne.

(2) French for: blue coats, more money, she was hungry, the French language, a steam-boat, it is they.

(3) Form adjectives from: malheur, gloire, courage.
Form verbs from: sacrifice, négligence, défense.

(4) French for: we are quite ready—would you do it?—shut your eyes—he became a captain—I gave it to her—we have none.

(5) Write down 2nd person singular of:
Imperative of: s'en aller, appeler, fuir.
Present subj. of: devenir, vouloir, rompre.
Future of: vêtir, savoir, céder.
Past Participle of: sois, faudra, riait.

(6) English for: tout près, on frappe, gardez-vous de tomber, venir de parler, à meilleur marché, j'ai bien sommeil.

(7) French for: nearly—as for me—it snows—the year 1800—281—twice—behind.

(8) Give French for:
i. It was you who said so.
ii. We knew nobody who could help us.
iii. They must wait till we come.
iv. This happened to me two years ago.
v. How did you break your leg?
vi. Explain to her what you mean.

B. *Premières lectures françaises.*

Un jour que je suivais l'une des rues les plus longues de Paris, je fus frappé de l'activité d'un petit homme qui portait une hotte sur son dos et une grande poche en place de tablier. Il s'arrêtait à chaque borne, à chaque coin de rue, portait un bâton terminé par un crochet de fer, et jetait avec adresse et dextérité dans sa hotte ou dans sa poche différentes choses que je ne distinguai pas d'abord. Je ne comprenais rien à son travail; mais à force de le suivre, je vis qu'il ramassait des os, du cuir, du papier, des chiffons, du verre cassé, des cendres, etc. Poussé de plus en plus par la curiosité, je m'attachai à ses pas, je le vis causer avec un confrère et lui faire part de ses trouvailles, et enfin je finis par lier conversation avec lui. Il vit que je ne me moquais pas de son métier et que j'étais loin de le mépriser lui-même, puisque je lui proposai de boire une bouteille ensemble.

Charterhouse.

(*Boys under* 13.)

(1) Translate into French:

Your house is larger than mine. He is younger than I, yet I am taller than he. Have you seen him to-day? No, I shall see him to-morrow.

(2) Write out the 1st person sing. and plural of pres. indic. and future of *être*, *devoir*, *souffrir*, *venir*.

(*Boys between* 13 *and* 14.)

(1) Write out the pres. indic. and future of *aller*, *recevoir*, *tenir*, *craindre*.

(2) Translate into French:

He who is idle is not liked by his masters. Which of these hats will you choose, this one or that? If a man flatters you, do not trust him, he wants to deceive you.

(3) Translate into English:

Le lendemain, la tante de Paris arriva. Elle était venue pour trois jours; mais elle fut l'objet, de la part de son neveu surtout, de tant d'attentions, on lui témoigna une affection si vive et si sincère, qu'elle resta une semaine tout entière.

(*Boys over* 14.)

(1) Write out the pres. indic. future and pres. subj. of *s'en aller*, *mettre*, *voir*, *venir*.

(2) Translate into French:

He will show it to me. We have sent it to him. We were talking of it. Your plan is not bad, but I prefer his. Do your duty, they will do theirs. Do you know the gentleman whom we met yesterday?

(3) Translate into English:

C'était un homme grand, large d'épaules, un peu courbé par la fatigue et le travail, mais solide encore malgré ses soixante-quinze ans. Tous les soirs, en hiver, ses petits-enfants, rangés autour de lui, lui demandaient quelque histoire. Il avait vu tant de combats, souffert tant de fatigues, traversé tant de pays, connu tant d'hommes de toute race et de toute nation.

Cheltenham.

(1) Translate into French:

(*a*) Those apples are not so ripe as mine.

(*b*) The English are building many ships.

(*c*) Does he give them money?

(*d*) He has met them before.

(*e*) In Spain donkeys are larger than in this country.

(*f*) Where do your friends come from?

(*g*) They arrived on Monday; we shall start next Saturday.

(*h*) Make some fire; it is very cold.
(*i*) Are you tired? rest for half an hour.
(*k*) Is there no doctor in the village?
(*l*) There is one; but I do not know where he lives.
(*m*) Ask the postman, he will tell you.

(2) Translate into English:

J'ai des habitudes campagnardes, et je me lève avant l'angélus de six heures. C'est le bon moment pour travailler, surtout dans la chaude saison. A cette heure matinale, la rue est silencieuse et presque solitaire. De rares ouvriers filent le long du trottoir dans la direction de leur atelier. Le laitier commence a enlever les volets de sa boutique. Aux étages supérieurs tout est endormi: les moineaux sur les toits et moi, accoudé à ma fenêtre, nous sommes à peu près les seuls êtres occupés à jouir de la fraîcheur de la matinée et à contempler le soleil qui monte dans les nuages roses au-desssus du clocher de l'église voisine.

(3) Put in the plural:—un bel animal, cet émail, notre vieux matou; and in the feminine:—un paysan actif, le héros grec, son compagnon âgé, leur nouveau protecteur, ce joyeux compère, chacun de ces dieux vengeurs.

(4) Write out in full (five persons) the imperative of—avoir, être, demander, répandre, jouir, apercevoir.

(5) Give the comparative of—vieux, bon, mauvais, petit; and the superlative of—peu, beaucoup, mal, bien, hardiment.

(6) Give the two participles, the pres. ind. 1st. sing. and the past def. 1st. sing. of—sourire, combattre, craindre, détruire, résoudre, naître, ouvrir, tenir, croire, se taire, vivre, élire.

MATHEMATICS.

Rugby.

Arithmetic (30 min.).

(1) Subtract seven hundred and nine thousand and eleven from a million and one.

(2) Add together $18\frac{3}{5}$, $2\frac{1}{4}$, and $7\frac{3}{10}$; subtract $21\frac{1}{7}$ from the result.

(3) Multiply 3·007 by ·41; reduce $\cdot 318\dot{5}$ to a fraction.

(4) If 5 tons 3 cwt. 2 qrs. cost £20. 14s., what is the price per ton?

(5) Simple interest on £147. 15s. for 5 months at $3\frac{1}{2}$ per cent.

(6) Find the area of the walls of a room 19 ft. 6 in. long, 12 ft. wide, 9 ft. 4 in. high. What would be the cost of papering the walls with paper 1 ft. 9 in. wide at 3d. per yard?

Euclid (30 min.).

(1) Define plane angle, polygon, parallel straight lines, rhombus.

(2) If two angles of a triangle be equal to one another, then the sides also which subtend, or are opposite to, the equal angles, shall be equal to one another.

(3) The straight lines which join the extremities of two equal and parallel straight lines towards the same parts are themselves equal and parallel.

(4) To a given straight line to apply a parallelogram which shall be equal to a given triangle, and have one of its angles equal to a given angle.

Algebra (30 min.).

(1) Add $5x^3-14x^2+3x-5$ to $-2x^3+3x^2-3x+9$ and divide the sum by x^2-3x-2.

(2) Simplify $5\{a-2(3b-4c)\}-\{5(a-2b)-3c\}$.

(3) Find the highest common factor and the lowest common multiple of $10(x^2-5x+6)$ and $12(x^2-3x)$.

(4) Solve $2(3x-1)+(x-2)^2=(x-3)^2$.

and $\dfrac{5(x+1)}{x-2}-\dfrac{3x-1}{x+2}+\dfrac{12}{x^2-4}=0$.

Charterhouse.

(*Boys under* 13.)

(1) From a given point show how to draw a straight line perpendicular to a given straight line.

(2) Multiply $a^2+b^2+c^2-ab-bc+ca$ by $a-b+c$.

(3) How many times is 4s. 11d. contained in £10, and how much remains over?

(4) Add together $\frac{3}{11}$ of 1s. 10d., ·75 of 2s. 6d., and $1\frac{2}{7}$ of £1 2s. 9d.

(*Boys between* 13 *and* 14.)

(1) Prove that if a triangle has two sides equal it has also two angles equal.

(2) Divide $a^3+b^3+c^3-3abc$ by $a+b+c$.

(3) Find the cost of 413 things at £2 14s. $9\frac{1}{2}$d. each.

(4) Reduce 27 yards 1 foot 6 inches to the decimal of a furlong.

(*Boys over* 14.)

(1) If two triangles have two sides of the one equal, each to each, to two sides of the other, but the included angle of the one greater than the included angle of the other, then the base of that which has the greater included angle shall be greater than the base of the other.

(2) Find the value of ·317 of £1 14s. 3d.

(3) Simplify

$$(1\tfrac{4}{7} \text{ of } 5\tfrac{4}{11})-(1\tfrac{4}{13} \text{ of } 5\tfrac{4}{9})+(3\tfrac{7}{19} \text{ of } 2\tfrac{4}{17}).$$

(4) Solve the equation

$$4(x-2)(x+3)-3(x+2)(x-1)=(x+5)(x-7).$$

Cheltenham.

(1) Bisect a given angle.

(2) Any two sides of a triangle are together greater than the third side.

(3) If one side of a triangle be produced, then the exterior angle shall be equal to the sum of the two interior opposite angles: also the three interior angles of a triangle are together equal to two right angles.

(4) If a straight line be divided equally and unequally, the rectangle contained by the unequal parts, and the square on the line between the points of section, are together equal to the square on half the line.

(5) Draw a tangent to a circle from a given point either on or without the circumference.

(6) If from any point without a circle a tangent and a secant be drawn, then the rectangle contained by the whole secant and the part of it without the circle shall be equal to the square on the tangent.

(7) Four tourists spend £21 12s. in 9 days: what does each spend per day?

(8) Divide £12 14s. $3\frac{3}{4}$d. among two persons, giving twice as much to one of them as to the other.

(9) Find the value of

(1) $\frac{2}{3}+\frac{5}{6}+\frac{8}{9}-1\frac{1}{12}-\frac{17}{18}$; (2) $\dfrac{5\frac{2}{5} \text{ of } 7\frac{2}{8}}{8\frac{7}{24}-3\frac{5}{12}}$

(10) Divide 3·461 by ·02.

Express $4\cdot 44\dot{0}\dot{3}$ as a vulgar fraction.

Find the value of 2·0615 of 10s. 6d.

(11) Find, by Practice, the value of 177 articles at £8 6s. $9\frac{1}{2}$d. each.

(12) If the carriage of 13 cwts. 2 qrs. 21 lbs. costs £3 19s. 1d., what will the carriage of 3 cwts. 1 qr. 14 lbs. cost for the same distance?

(13) Find the simple interest on £6240 for $5\frac{1}{3}$ years at $2\frac{2}{5}$ per cent.

(14) Multiply $2x^2-3x+4$ by $3x^2-2x-5$.

(15) Divide x^6-8y^6 by x^2-2y^2.

(16) Find the G. C. M. of

$$11x^2+87xy-8y^2 \text{ and } 22x^3-13x^2y-10xy^2+y^3.$$

(17) Solve the equations:

(1) $12x-4=\dfrac{9x}{4}+5\frac{3}{4}$;

(2) $\dfrac{2x+y}{9}-\dfrac{y}{4}=1$; $\dfrac{x-y}{3}+\dfrac{x}{7}=2$;

(3) $\dfrac{6}{x+5}-\dfrac{2}{x+4}=1$.

(18) Simplify

(1) $\left(1+\dfrac{x}{a}\right)\times\dfrac{a^2}{a^2-x^2}\times\left(\dfrac{a}{x}-1\right)$;

(2) $\dfrac{1}{x-2}-\dfrac{1}{x^2-4}\dfrac{x+4}{x^2+4}$.

19) Divide $3\sqrt{32}$ by $4\sqrt{18}$, and find the square root of $12-6\sqrt{3}$.

Rugby.

ENGLISH.

(1) What foreign elements have been absorbed into the English language?

(2) What Celtic languages belong to the British Isles, or used to belong to them?

(3) Make up sentences to show the different ways of using the words *But* and *Still*, saying in each case what part of speech the word is.

(4) Analyse the following sentence: The king, a man of desperate courage, though he was wounded, and had little strength left, seizing his sword in his hand, cried out, "Forward! forward!"

(5) What do you know of Dogberry, Beatrice, Salvation Yeo, Sergeant Buzfuz, Lilliput?

GEOGRAPHY.

(1) What kinds of industries would you expect to find in a fertile plain, on moorland, near the mouth of a large river, on mountain slopes in a hot climate, on mountains in a cold climate?

(2) Where are the following large towns: London, Liverpool, Cardiff, New York, Damascus? What river is each built upon, and how old is each as near as you can say?

(3) What have been the chief events of the Spanish-American war?

(4) Draw a map of Ireland, or France, putting in rivers, lakes, mountains, and six chief towns.

ENGLISH COMPOSITION.

What is to be said for and against the plan of connecting England and France by a tunnel under the sea?

CORRESPONDENCE.

The Editors do not hold themselves responsible for the opinions expressed in letters which appear in these columns. As a rule, a letter criticising any article or review printed in THE SCHOOL WORLD *will be submitted to the contributor before publication, so that the criticism and reply may appear together.*

Education in Sweden.

THE greater part of the last two summer vacations I have spent in Sweden. While there I saw and heard a little of its educational system; and, as there are probably many of your readers as ignorant of it as I lately was, I think it well to lay before such as are interested some of the information I have received upon the subject. Since returning from Sweden I have seen a "special report" (Education Department, 1898) on the secondary schools of Sweden, and to it I refer those who wish to be acquainted with their origin, management and curricula.

We have only to read current literature bearing upon education and a few books to become fairly familiar with the educational systems of France and Germany, but that of Sweden is comparatively little known in this country. Yet it appears to be as worthy of study as many subjects that have absorbed much attention.

If we compare the nations of Europe to the members of a family, it may not be inapt to liken King Oscar's dominion to a retiring and unassuming child who, in an unobtrusive way, is quietly doing its work and developing the forces that shall bring it future renown, while some of its brothers and sisters are loud in their self-assertion and inclined to glory in the maturity of their powers—others hanging their heads with the consciousness of the feebleness and contempt that have come as the due reward of their past folly; and it may be that when some of the nations are in their dotage, young Scandinavia shall have reached its prime. And if, continuing the figure, I may say to this unobtrusive child a word on the subject of its education, I pat it on the head, and say, "Well, done, good and diligent child, you are persevering and earnest, but take care not to overstrain your powers. There is a possibility of having too much school work. Teachers and tutors are all very well, but you want a little more time for play, a little more scope for exercising, on self-chosen lines, the youthful powers that now you are inclined to trammel by following too exclusively the behests of the schoolmaster and professor. To speak plainly, it seems to me that it is taking a great deal of *schoolmastering* and *professoring* to turn a Swede into "a learned man," and that it is questionable whether it is well to keep men nearly half "the allotted time" in intellectual leading strings.

But it is of facts, not of opinions, that I propose to write, and for the greater part of the following statement I have the authority of Pastor Wetterlund, who is a teacher in the High School at Wenersborg.

Since the year 1846, or thereabout, education has been compulsory in Sweden. For the "People" there are "Folk Schools" which children may enter at about seven years of age and leave when they have attained to a certain proficiency in the following subjects:—reading, spelling, writing, arithmetic, nature knowledge, history, geography and knowledge of religion. The age at which the required proficiency is attained is usually from about twelve to fourteen years. Some pupils must naturally fail to reach the desired standard of attainment, and in their case less may be accepted. The teacher is also the examiner, but certificates are distributed by the chief pastor, who conducts a formal examination once a year. There are also Government inspectors.

The teachers in these schools are drawn from two sources. Young men and women who are educationally qualified to the extent required of boys and girls leaving the "Folk Schools," and who have attained the age of eighteen years, may become teachers after being educated at a training seminary for four years, three of which are devoted specially to the further acquirement of the subjects they have to teach, and the last to training in method.

The teachers of the "Folk Schools" are thus largely drawn from among the "people," and as the required standard of attainment and culture is not high, such teachers are not included among those who follow learned professions.

Further, young women who have received a high-class education sometimes enter the training seminary and become teachers in "Folk Schools." Of recent years many educated young men also, even those who have taken the degree of B.A. and have been at a university, have become teachers in them. In the country the offices of "pastor" and "teacher of Folk School" are sometimes combined.

Higher education is provided for boys at Government schools which, like the "Folk Schools," are free so far as fees for lessons are concerned. There are sometimes charges to meet other expenses, but the highest is twenty-seven kronor (hardly thirty shillings) a term. There are two terms in a year. Poor children need only pay about seven kronor.

To the high schools boys are not admitted until they are nine years of age, and then only if able to pass the entrance examination. For those who are promoted yearly, the course, in seven-class schools, extends over nine years, at the end of which a lad who passes successfully the final examination may take the degree of B.A.

According to the "Special Report," "the average age at which the 'Leaving Certificate' is obtained is about 19¼. The examination for the 'Leaving Certificate' is a highly important test. The Government appoints a number of "Censors" (usually University professors) to participate in the conduct of this examination. The candidates are examined both by written work and orally. The written examination lasts from four to six days, and is held on the same dates at all the schools

in the kingdom. The papers are set by the head of the Ecclesiastical (and Educational) Department, in accordance with the suggestions of the Censors. The working of the papers takes place at the different schools under the supervision of such of the staff as the head-master may appoint."

"A number of private schools are organised on the model of the public secondary schools, and most of them receive support from the Treasury." In order to receive a Government grant the schools have, of course, to fulfil certain conditions.

Girls receive higher education in private schools in which fees are charged, but in which are a number of free places for girls who gain Government scholarships. These are given according to the judgment of teachers and directors. At Gothenburg there is a large and very good school which is in part supported by gifts of rich merchants and others, and to which some girls are admitted on the plea of poverty.

Although girls are not admitted to the Government high schools, they are eligible for the examinations held in connection with them, and there is at Stockholm a Government institution for training women as teachers suitable for high-class schools.

The universities, which are open to both men and women, are, like the schools, free, but there is a matriculation fee of a few kronor. The course for physicians usually extends over about ten years, for lawyers six, for teachers (upper masters) eight, for pastors six. This time may be, on the one hand, slightly shortened, or on the other greatly prolonged, according as the student is quick or slow. Licentiates in arts, by writing a good thesis on a specified subject, may become doctors of philosophy, women as well as men. Last year Miss Cleve, daughter of a professor of chemistry, took this degree at about twenty-four years of age. This is said to be a miracle. Another lady was last year applying (I have not heard whether successfully) for a professorship. She was Doctor of Law, and had previously been acting as interim professor.

JESSIE WATSON.

Dollar, N.B.
June 1st, 1899.

PRIZE COMPETITION.

Result of No. 5.—Ten Noblest Men in British History.

OUR fifth competition proved very popular. The number of entries was large and the competition keen. In the opinion of the majority of those of our readers who sent in replies, the successful writer of boys' books should select ten from the following list of names of noble men for his forthcoming book of biographies. The names are arranged in the order of the number of votes they received :—

Duke of Wellington.
Nelson.
King Alfred.
Gordon.
Philip Sidney.
Simon de Montfort.
= { Oliver Cromwell. / Gladstone. }
William Wallace.
= { Francis Drake. / James Wolfe. }

Three names came next in order with an equal number of votes, viz., Robert Bruce, Edward the Black Prince, and Walter Raleigh. It is interesting to notice the large number of names mentioned in the lists received. No fewer than seventy-six British men are considered by one reader or another to have sufficient claims to nobility of character to merit a place in such a book as was described.

No competitor gave more than eight correct names, and four replies contained this number. The prizes are awarded to (1) Miss Agnes G. Bowman, Rosslyn, Liscard, Cheshire, who last month gained a second prize, and (2) Miss J. E. Marshall, Rochelle, Cork. Their lists are printed below, the names in italics not occurring in the winning list :

(1)	(2)
King Alfred.	King Alfred.
Nelson.	Simon de Montfort.
Duke of Wellington.	Francis Drake.
Gordon.	Philip Sidney.
Livingstone.	Oliver Cromwell.
Oliver Cromwell.	*William Wilberforce.*
Gladstone.	*John Howard.*
Robert Bruce.	Duke of Wellington.
Philip Sidney.	Gordon.
Wolfe.	Nelson.

Miss A. M. Gedge, Merchant Taylors' Girls' School, Crosby, and Miss J. Partridge, Brockenhurst, Hants, also mentioned eight names correctly.

In awarding the prizes as above, the order in which the names occur on the lists sent in has been taken into account, the prizes being secured by those replies which most nearly approximate to the winning order.

By an unfortunate accident the list of towns sent in last month by Mr. David M. J. James, Gordon Schools, Huntly, N.B., was incorrectly examined. His name should have been placed with the second prize winners, as he mentioned nine correct towns. The share of the prize to which he was entitled has therefore been sent to him, in addition to the prizes sent to the persons whose names were announced in the May number.

Competition No. 6.

Many teachers are anxious to utilise the long vacation in making up the arrears in their reading of current literature. The question arises at the beginning of every summer holiday—What books ought I to make a point of obtaining for the weeks of recreation? To help them in their selection we offer two prizes of books of the published value of one guinea (to be chosen from the catalogues of Messrs. Macmillan & Co. Ltd.) for the two lists of **six books** of any kind, fiction or otherwise, which, in the opinion of the majority of those of our readers who enter for the competition, are most suitable for reading during the vacation. The books should have been recently published—that is, should bear the dates 1898 or 1899 on the title-page. The lists of books must be accompanied by the coupon printed on p. iii., and must reach the editors of THE SCHOOL WORLD, St. Martin's Street, London, W.C., on or before Saturday, July 1st, 1899.

OUR CHESS COLUMN.

No. 6.

I CONTINUE to receive letters from teachers expressing their satisfaction at the existence of this feature of THE SCHOOL WORLD. Mr. J. J. Glynn, who has charge of an important school in New South Wales, has been kind enough to send me two problems, one of which he himself composed. I hope to give it for competition shortly, though, as a rule, I shall publish games actually played ; these are more suitable for schoolboys.

N. P. Wood, one of the winners in the April competition, writes pointing out that mate in four may also be effected by

2. Q—Kt4 (ch.) and 2. Q—B3 (ch.). My thanks are due to him for this emendation. He also informs me that the club of which he is hon. sec.—Nonconformist Grammar School, Bishop's Stortford—would like to play home and away matches with neighbouring schools. I shall be pleased to hear from any school that is willing to adopt this course.

It is highly desirable that chess should take its place amongst inter-school competitions. We have cricket and football fixtures; why not chess? Except the annual match of the two 'Varsities, and the various inter-college matches, there seems to be no instance, in England at any rate, of educational institutions meeting in friendly rivalry over the chess-board.

There is no reason why this should be the case. I am, of course, aware that schools frequently play against chess clubs of adults (and not infrequently beat them), but I want to see a chess fixture-card in every school that has one for cricket or football. Teachers may find ample reward for the time they devote to the school chess-club, not only in the knowledge that they are providing present amusement for their pupils, but also in the conviction that chess forms one of the best safeguards against the many temptations that assail the youth just entering the world. "The moral gain is really great." (See letter of a headmaster, quoted last month.)

The prize winner this month is:—A. D. Punchard, Garfield Road School, New Southgate.

Correct solutions were also received from:—N. J. Chignell; N. B. Dick; G. C. Fry; H. Norminton; A. V. Poyser.

The least number of moves in which Black can mate in the game set for competition is eight. Q—Q6 is the best way of beginning. A mate in eight is always possible.

The names at the head of the monthly competition list are:—N. P. Wood, 4; F. G. M. Beck, 3; A. D. Punchard, 3; N. B. Dick, 3; A. V. Poyser, 3.

The following game will be found very interesting:—

White.	Black.
1. P—K4.	1. P—K4.
2. Kt—KB3.	2. Kt—QB3.
3. B—B4.	3. B—B4.
4. P—B3.	4. Kt—B3.
5. P—Q4.	5. P x P.
6. P x P.	6. B—Kt5 (ch.).
7. B—Q2.	7. B x B (ch.).
8. KKt x B.	8. QKt x P.
9. Castles.	9. P—Q3.
10. Kt—Kt3.	10. Kt x Kt.
11. Q x Kt.	11. Castles.
12. R—Ksq.	12. Kt—R4.
13. P—K5.	13. Q—Kt4.
14. P x P.	14. Kt—B5.
15. B x P (ch.).	15. K—Rsq.
16. P—Kt3.	16. P x P.
17. Kt—B3.	17. Kt—R6 (ch.).
18. K—Kt2.	18. Q—B3.
19. B—Q5.	and Black mates in 4.

Send solutions in before the 30th inst. The prize or prizes will be pocket chessboards and men as last month, or books of equivalent value.

Rules.

I.—Write on postcards only.
II.—Give name, date, and school address.
III.—Address all communications to

The Chess Editor,
The School World,
St. Martin's Street,
London, W.C.

CALENDAR.

[*Items for the July Calendar should be sent in by July 1st.*]

June, 1899.

Friday, 16th.—Mr. Balfour distributes the prizes at the Leys School.
Monday, 19th.—Cambridge University Higher Local Exam. begins.
Tuesday, 20th.—Scholarship Examinations begin at Felsted and University College Schools, and at University College, Sheffield.
Examinations of Cambridge Teachers' Training Syndicate.
Friday, 23rd.—Jubilee Celebration of Bedford College, London.
Examination for Classical and History Exhibitions at Worcester College, Oxford.
Saturday, 24th.—Local Music Examinations begin in connection with Trinity College, London.
Monday, 26th.—Duke of Cambridge opens new buildings of King's College School, Wimbledon.
Scholarship Examination at Univ. College, Bristol.
Tuesday, 27th.—Examination for Natural Science Scholarships at Merton, New, and Corpus Christi Colleges, Oxford.
Wednesday, 28th.—Matriculation Exam. of Royal University of Ireland begins.
Thursday, 29th.—*As You Like It* at Radley College.
Friday, 30th.—Scholarship Examination at Fettes College.

July.

Tuesday, 4th.—Scholarship Examinations begin at Epsom, Bath, and Brighton Colleges.
College of Preceptors, Teachers' Diploma Examination.
Wednesday, 5th.—Scholarship Examinations begin at Eton, Repton, and Lancing.
Scholarship Examinations at Royal Holloway College.
Thursday, 6th.—Scholarship Examination begins at Sherborne.
Monday, 10th.—Junior Examination of London Chamber of Commerce begins.
Intermediate Examinations in Arts and Science begin (London University).
Scholarship Examination, King Edward's School, Birmingham.
Tuesday, 11th.—Scholarship Examinations begin at Westminster, Bromsgrove, and Oundle Schools.
Wednesday, 12th.—Scholarship Examinations begin at Malvern College and King's School, Canterbury.

[Scholarship Examinations are held early in July at the following public schools, in addition to those named in the calendar:—Winchester, Charterhouse, Lancing and Leamington Colleges, St. Peter's School, York, and Berkhamsted School.]

The School World.

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The Editors will be glad to consider suitable articles, which, if not accepted, will be returned when the postage is prepaid.

All contributions must be accompanied by the name and address of the author, though not necessarily for publication.

The School World

A Monthly Magazine of Educational Work and Progress.

NO. 7. JULY, 1899. SIXPENCE.

CHAPTERS IN SCHOOL HYGIENE.

By C. E. SHELLY, M.A., M.D., &c.

Consulting Medical Officer, Haileybury College.
Joint Hon. Sec. of Medical Officers of Schools Association.

II.—Dormitories.

THE average adult spends a third of his life—eight hours, more or less, out of the twenty-four—in his bedroom. In order to make full use of this period of rest it is obvious that all the attendant conditions should be such as are most favourable to that re-creation of mental and physical energy for which healthy and sufficient sleep is not less requisite than is suitable and abundant food. But during the period of school life, say from nine to nineteen years of age, a still longer sleeping time—from twelve to nine hours—is requisite; while the need for securing this under continuously healthy conditions is even more important than in the case of the adult.

THE CAUSE OF STUFFINESS.

The close, unpleasant character of the air which one notices on entering an ill-ventilated sleeping apartment in the morning is due, not to the relative loss of oxygen, but to the presence of organic matter exhaled from the used-up tissues of the sleeper *viâ* his lungs and, to a less extent, by his skin. This organic matter, itself in process of decomposition, contains alkaloidal substances ("ptomaines") such as are commonly produced in the pre-putrefactive stage of the decomposition of flesh and similar matters. It is, in fact, the incompletely decomposed and still dying portions of the body which are being excreted—as both useless and noxious—during the time which should be specially devoted to building up fresh and healthy tissues in their place. Death, indeed, works as it were with both hands for the total destruction of the body: "his brother Sleep" rebuilds even while he cleanses—if only he be allowed to work under suitable conditions. And without exaggeration, those conditions might be summarised by saying that the sleeper must be allowed every facility for inhaling pure air, while he is safeguarded from re-breathing his own dying body.

HOW TO ENSURE HEALTH-GIVING SLEEP.

To ensure restful, health-giving sleep, then, it is necessary that there should be an abundant and continuous supply of fresh pure air to furnish the oxygen which the body needs for its cleansing, for its repair, and for its growth; that, at the same time, adequate means be provided for the continuous withdrawal from the atmosphere of those noxious products of body waste and change which are being constantly thrown off into the air surrounding the sleeper, and which, if they be permitted to accumulate in sufficient amount, produce *malaise*, disease, or even death, according to the degree of their concentration; that these changes of the surrounding air be effected without the production of dangerous and chilling draughts; that the body temperature be properly maintained; and also that quiet and darkness be secured so far as possible. In all these matters care and forethought are as important for the child as for the adult. They are even more important: for the child is more susceptible to the action of insanitary conditions, has less natural powers of resistance, and possesses none of the acquired immunity which may in time be gained by the adult, within moderate limits at least. Moreover, in early life the tissue-changes are more active and more speedy; the maintenance of health in the child depends on a more rapid reconstruction of the body; in other words, the tissues waste more speedily, and waste products must therefore be got rid of, and fresh energising material provided for growth and repair, with a corresponding rapidity. Hence it is that, despite his smaller bulk, the child's need for space and air in his bedroom is at least equal to that of an adult. The late Sir John Simon was strongly impressed with this aspect of the growing child's requirements, and pointed out in one of his reports to the Privy Council that "even healthy children, in proportion to their respective bodily weights, are about twice as powerful as adults in deteriorating the air which they breathe."

OVERCROWDING AND EPIDEMICS.

There is yet another aspect of this question which must possess a special interest for both schoolmaster and parents; and although it applies more or less to all the buildings in a school,

whether these be occupied by day or night, its influence is particularly potent in respect of the sleeping rooms, which are continuously occupied for so much longer than are any of the others, and in which the evil may acquire special activity. The connection between overcrowding and the development of epidemics of infectious disease has long been recognised; it is also known that in proportion as the overcrowding is excessive or prolonged, the disease is prone to acquire a more virulent form. The foul air of a close and ill-ventilated sleeping room, loaded with unstable organic matter, forms indeed a "culture-medium" peculiarly suited to the rapid increase of the microbic germs of infectious disease, favouring also their acquisition of greater virulence or infective power; while at the same time the sleeper's susceptibility is increased, and his normal power of resisting illness of every kind is depressed, by the continued inhalation of the poisonous re-breathed air.

An Ideal Sleeping Apartment.

Single, separate bedrooms should not be provided for school children in health under any circumstances. They are only one degree better than the mediæval study-and-bedroom combined, in that they are not occupied during both day and night. And both are mentioned here only to be condemned. The kind of sleeping apartment proper in a school is the dormitory, suitably constructed and arranged. The dormitory should not be too large, in view of the necessity for securing proper supervision of, and discipline amongst, its occupants, and because the difficulties of providing equable and efficient warmth and ventilation are greatly increased when dealing with rooms above a moderate size. Nor should it be too small; because, amongst other reasons, the continuous and contemporaneous supervision of a large number of small rooms is practically impossible. A dormitory possessing adequate accommodation for some thirty-five sleepers probably touches the practical maximum. A master's room may adjoin and open into it with advantage. Hollow walls help materially to the maintenance of an equable temperature in all weathers. But this hollow space should not communicate with the interior of the dormitory at any point, otherwise this space becomes in time a depository of organic filth, and can be cleansed by no method short of the destruction of the building.

Size and Character of the Dormitory.

The size of the room will be proportioned to the number of its occupants, to each of whom should be allotted not less than eight hundred cubic feet of space. With a smaller cubic space it is not possible to change the air so frequently as to maintain its purity without producing unpleasant and dangerous draughts. In reckoning this amount, the height of the walls should not be taken into account above ten (or, at most, twelve) feet. The better way is to allow to each sleeper floor-space equal to not less than four times the superficial area of his bedstead. The wall height, from floor to ceiling, may be fourteen feet. More than this is practically useless for ventilation, and increases the difficulty of properly warming the room in cold weather. The walls themselves may be variously treated; but they should not be covered with any material, such as paint and varnish, impermeable to air. If this be done, one great and valuable channel of natural ventilation is closed, and the surface will frequently become damp and sticky owing to the condensation of more or less impure moisture. A good plan is to line them with oiled and varnished match-boarding for about six or seven feet in height, and to have the surface above distempered in a light warm tint, subject to terminal brushing and annual renewal. The floor should be practically impervious, not merely to prevent the accumulation beneath it of dirt and moisture, but also to prevent heated and foul air making its way into the dormitory from the rooms below. In the case of a boarded floor, the end in view can best be attained by treating it like a yacht's deck, wedging open the interstices between the boards (packing the grooves with oakum, unless the boards are tongued and grooved), and then running in the *best* marine glue, as hot as possible. The glue, being adherent and elastic, gives and takes as the boards swell or contract with damp or drought, and a continuous impermeable surface is thus secured. The ceiling may be treated according to taste, so long as it is *kept* clean, but if there be a room above, the space between ceiling and floor should be separately ventilated to the open air.

Windows and Ventilation.

Windows should be spaced so as to secure even illumination. Their united area should be equal to about one-tenth of the floor space. They should extend to the ceiling, should be placed, alternately, on both sides of the room whenever possible, and the upper sashes should be kept open from the time the dormitory is vacated in the morning, unless the weather makes this absolutely impossible, until an hour before sunset in winter time, and later in summer according to circumstances. In this country, windows cannot be depended upon as a certain means of adequate ventilation, during the sleeping hours, all the year round. To this end other channels for the inlet of fresh and for the outlet of foul air must be provided. On the whole the simplest and most practical method is to fix a number of Tobin's tubes along the inner aspect of each outside wall, and to provide large exit shafts (two or more in number according to the length of the room), their openings equally spaced along the middle line of the ceiling, each shaft being carried up to or above the ridge of the roof, and terminating in an extraction cowl. The Tobin's tubes may be about

six feet high, the summit of each being sloped upwards at an angle of 45° to the wall, and fitted with a grating. The external opening of the horizontal portion of each tube should also be covered by a removable grating, and further protected by a projecting dome or mushroom-shaped cover against the direct incidence of too violent winds. The lower section of each tube should be removable, to allow of the whole interior being thoroughly swept clean during the holidays. The total *nett* area of the inlet openings should bear to those of outlet the proportion of at least 3 : 2. In erecting new buildings, very little extra expense is incurred if the joining lines of walls, floor and walls, walls and ceilings, &c., be all "coved," so as to replace right angles by fully-rounded curves; and this is more than compensated for by the time and trouble saved in easily and thoroughly removing dust (*i.e.*, dirt).

Artificial Lighting.

Wherever it is available, the electric light is found to be not only the most healthy, but also in other ways the most economical mode of artificial illumination. If gas be used, the incandescent Welsbach light is the best. But "by-pass" burners should not be fitted, since the gas consumed for, say, twenty-two hours out of the twenty-four, by the by-pass flame is unhealthy as well as wasteful. Only one burner should be thus fitted in each dormitory, so as to allow of light being at once obtainable if wanted.

How to Warm a Dormitory.

Small rooms may be pleasantly warmed by open fires, but in larger dormitories suitably disposed coils of hot-water or hot-air pipes afford a more manageable and more equable source of heat. The pipes should not be cased in, and should be so placed as to be easily kept free from dust, which is apt to get "burnt," and so to smell. In cold weather the heat should be turned on for an hour or two before and while the pupils are undressing, and similarly before and while they are getting up. The pipes should not be kept hot all the night through. Nor is it wise to make provision for supplying artificially warmed air (even though this be fresh) to the dormitory. Unless the sleeper's breathing organs are in an unduly irritable condition (and in that case he should be under treatment in the school infirmary) the continuous breathing of warmed air tends to produce a relaxed and enfeebled state of the respiratory mucous membrane, and effectively predisposes to the several forms of "catching cold." Moreover, since warmed air is expanded air, its inhalation implies the deprivation of a quite appreciable amount of the all-important oxygen so necessary both for depurative and constructive purposes. If the body be properly protected from undue cold and injurious draught, and the nasal passages be unobstructed, the breathing of the coldest air ever obtainable in this country tends only to produce sounder and more refreshing sleep, as well as to the development of a more vigorous constitution and more healthy respiratory organs. No living or sleeping room should ever depend for its warmth upon the heat given off from burning gas jets.

Cubicles Undesirable.

The dormitory should be open, *i.e.*, free from all avoidable obstructions to air, light, and visual inspection. To sub-divide it by partitions into a number of tiny sleeping hutches or "cubicles" is to reproduce in a specially aggravated form the worst evils of the small, close, unventilated, uncleansible, and secret single bedroom. A partial recess, to hold a small washstand, can be arranged, if desired, behind or beside the head of each bed. The bed-head should clear the wall by at least twelve or eighteen inches, and no corner should be occupied by a bedstead. The mattress should be level and firm; nothing is better than horsehair or reindeer hair; with a good bolster, no pillow is necessary. The only floor covering allowed should be a rug alongside each bed, and these rugs should be taken up and well shaken, in the open air, every morning.

Other Points.

Pure drinking water should be obtainable in each dormitory from the tap of a Berkefeld or Pasteur-Chamberland filter. This is best placed near the burner fitted with a by-pass, so that it may be easily reached at night, if wanted.

The doors of each dormitory should be wide, two-leaved, and opening easily outwards on to a broad landing, as well as inwards into the room, so as to permit of ready exit, in the event of an alarm of fire for example. A periodic "fire-drill" is an excellent practice.

A most useful addendum to each dormitory is a small room fitted with two or three shower baths. It is easy to arrange for the water being slightly warmed (as well as the room) in the colder months; and a very moderate amount, even less than two gallons per head, affords the means of speedily cleansing the whole body surface at least once daily, with most excellent results in the direction of moral health and bodily vigour.

The Essentials of Secondary Education on the Moral Side.—The aim of our English schools must be to produce, not tame experts or pigeon-holed specialists, but to co-operate with the pupils' homes in producing *doers*, men and women of high principle, vigorous in mind and body, ready for the varied calls of life and duty, alive to the responsibilities as parents and citizens, able to discern the deeper significance of apparently humble tasks, and of natural relationships, thinking it a greater thing to set a good example than to broach fine theories, and recognising moral agreement amid much intellectual difference. —Dr. R. P. Scott in "What is Secondary Education?" Rivingtons).

THE SYSTEM OF THE WINDS.

By PROF. WILLIAM MORRIS DAVIS,
Professor of Physical Geography, Harvard University, U.S.A.

THE method of presenting the general circulation of the atmosphere in elementary teaching is often unsatisfactory, if one may judge by the meteorological chapters of several text-books in current use. The main facts are more or less completely brought forward, but in so disjointed a manner that the pupil is not impressed with the wonderful system of which they are the essential parts. I venture, therefore, to submit the following plan of presentation, in the hope that the emphasis given in it to the general features of the atmospheric circulation will commend itself to British teachers. It should be understood that in the concise form of presentation here adopted there is no attempt made to demonstrate various statements or to explain them to young scholars. For demonstrations teachers should consult good reference books on meteorology; for elementary explanation, experience alone alone gives satisfaction.

PLANETARY WINDS.

In consequence of the persistent difference of temperature between the equatorial and polar atmosphere, a circulation is established comparable to that which may be observed between two rooms, the one warm and the other cold. The rotation of the earth causes the atmospheric currents to flow obliquely instead of along the meridians, and introduces various changes in the distribution of pressure.

It is futile to attempt any thorough explanation of this complicated problem in elementary teaching. The distribution of pressure, often shown by means of charts in recent text-books, is not an appropriate subject for elementary teaching, however important it may be to the meteorologist. Differences of pressure at sea level are insensible without instrumental aid.

The upper currents, interesting to the advanced student, are of less general importance than the lower currents, of which the chief members are the trade winds (N.E. and S.E.) between latitude 28° and the equator, the prevailing westerly winds (W.S.W. and W.N.W.) between latitude 30° and 70°, and irregular polar winds (N.E. and S.E.) about the poles. The trade winds are relatively constant, hence their name, meaning that they follow a trodden path (see Skeat's "Etymological Dictionary"). The westerlies and the polar winds (Fig. 1)[1] are frequently interrupted by storms, many of which seem to be great eddies produced by the interaction of the general currents of the atmosphere. Between the trades and around the heat equator there is a belt of calms and light, baffling breezes, known as the equatorial calm belt or "doldrums." Between the trades and the westerlies there are belts of light, irregular winds and occasional calms, known as the tropical calm belt[1] or "horse latitudes." It is thus seen that the several members of the atmospheric circulation are arranged in belts or zones, divided by parallels

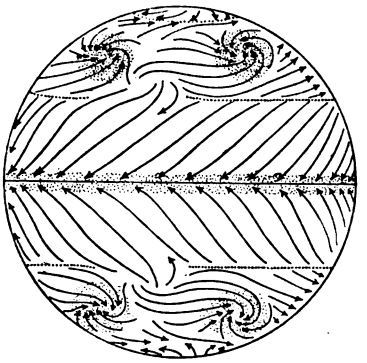

FIG. 1—The Planetary Winds.

of latitude. The irregularity in these belts, caused by the irregular distribution of land and water, will be explained later. As the wind belts seem to be essential features of a planet having an atmosphere warmed around the equator, they may all be included under the term *planetary circulation.*

RAINFALL AND OCEAN CURRENTS.

The distribution of rainfall may be, in a general way, explained as depending on the planetary circulation. The doldrums are prevailingly cloudy and rainy, because here the inflowing trades slowly raise the warmer and lighter air in front of them, thus causing the heavy and frequent *equatorial rains.* This form of statement is much to be preferred in place of: "The warm air around the equator rises, and the trades rush in from either side to fill the vacuum thus produced." It should further be noted that the air of the equatorial belt becomes cloudy and rainy because it is cooled by its own expansion as it is raised to levels where the pressure upon it is less and less; it is not cooled "by rising into the cold upper regions of the atmosphere."

The trade winds are prevailingly dry, because their temperature increases as they advance into latitudes of stronger sunshine. Deserts occur where the trade winds blow across low lands, but the windward slope of mountain ranges in the path of the trades receives plentiful rainfall, because the winds cool as they rise and expand. The horse latitudes are prevailingly dry because here the air slowly settles down to supply the trades and the westerlies which blow obliquely away on either side; the descending air is warmed by compression, and hence is not cloudy. The westerlies and the polar winds yield rainfall from their *in-*

[1] The figures which illustrate this article have been kindly lent by Messrs. Ginn & Co., from the author's "Physical Geography."

[1] The meteorological tropics, marking the division between the trades and the westerlies, are about five degrees further from the equator than the astronomical tropics.

flowing eddies, 500 to 1,000 miles in diameter, known as cyclones; while the outflowing eddies, known as anti-cyclones, are prevailingly clear and dry. These eddies seem to drift eastward with the general movement of the atmosphere in temperate and higher latitudes, and it is to their passage that most of our ordinary weather changes are due.

The surface currents of the ocean also find explanation in connection with the planetary winds. The surface waters are blown westward by the trades, and eastward by the westerlies. Each ocean (North and South Atlantic, North and South Pacific, and Indian) thus gains a systematic eddying movement of its surface waters.

TERRESTRIAL WINDS.

In consequence of the oblique attitude of the earth's axis there is a change of seasons. The heat equator migrates north and south of the geographical or astronomical equator; in the summer hemisphere the temperate latitudes are warmed, and the rigour of polar cold is relaxed; in the winter hemisphere the temperate latitudes are cooled, and the rigour of polar cold is increased. Hence in the summer hemisphere, where the equatorial-polar difference of temperature is weakened, the winds are slower; in the winter hemisphere, where the equatorial-polar difference of temperature is strengthened, the winds are faster. The changes are especially marked in the westerly winds and the eddying disturbances of the temperate latitudes, where winter is the windy, stormy season, while summer is the fair-weather season. The changes and their various consequences may all be regarded as features of a special kind of planetary circulation known as the *terrestrial circulation*.

SUB-EQUATORIAL AND SUB-TROPICAL BELTS.

There are certain peculiar consequences of the annual migration of the calm belts in the terrestrial circulation. When the heat equator stands farthest north (lat. 5°-10° in July or August) the north-east trades are cut short, and the south-east trades are brought forward; but as the south-east trades cross the geographic equator from the southern to the northern hemisphere they change direction so as to blow from the *south-west*. Similar changes occur when the heat equator stands farthest south. Hence there are two narrow belts on either side of the geographic equator—the *sub-equatorial belts*—which are alternately occupied by the normal trade wind and by the deflected extension of the trade wind from the other hemisphere, as in Fig. 2; and the winds of these belts may be called the *terrestrial monsoons*.

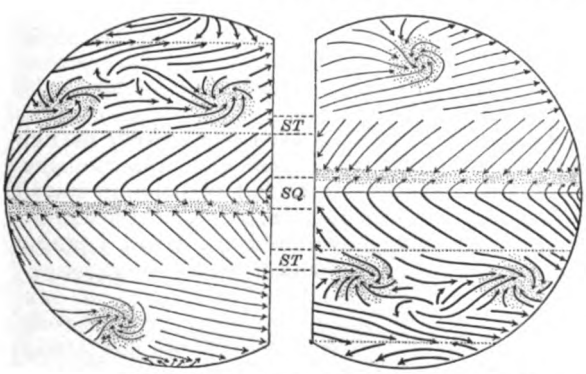

FIG. 2.—The Planetary Circulation in January and July.

A corresponding migration of the belt of light, irregular winds ("horse latitudes") between the trades and the westerlies defines the *sub-tropical belts*, occupied by the head of the dry trades in summer and by the edge of the stormy westerlies in winter, as in Fig. 2.

The terrestrial features of rainfall are of much importance. The northing and southing of the equatorial rains broadens the belt of equatorial forests, and determines a belt of most productive country on either side, before the deserts of the trades are reached. The Sudan is the most famous district of this kind; in the coming century it will be exploited and made to play a new part in the commerce of the world. The rise of the Nile, of long-enduring historical importance, is a direct result of the northward movement of the equatorial rains. The llanos of Venezuela and the campos of inner Brazil are alternately benefited by the equatorial rains that annually migrate north and south across the forests of the Amazon.

Again, the sub-tropical belt has its rains in winter when occupied by the stormy westerlies; it is dry in summer when occupied by the descending air of the horse latitudes or by the drying trades. Here agriculture needs aid from irrigation, as in Algeria and Spain, southern California and middle Chili. There is no difficulty here in giving a truly geographic flavour to the systematic treatment of the winds.

The ocean currents exhibit some interesting terrestrial features. As far as observations go, they indicate a slight acceleration of the east-flowing currents of temperate latitudes in winter time, thus confirming the winds as their cause. A more peculiar feature is found in the constant association of the counter-currents on one or the other side of the equator with the season and place of the deflected trade-wind monsoon; but as this is a relatively advanced topic, I need here only refer to a special account of it in the *Scottish Geographical Magazine* for October, 1897, vol. xiii., p. 515.

INDIVIDUAL ELEMENTS OF THE TERRESTRIAL CIRCULATION.

Thus far no account has been taken of the continents which interrupt the prevailing oceanic surface of the earth. They are not geometrically arranged, and hence their effect on the distribution of temperature and on the course of the winds is

irregular; but if considered as causing deformation in the otherwise systematic wind belts, the more important local features may be easily understood and remembered. These features may be called *individual*, because they are in large part independent of one another. The following paragraphs suggest an order of treatment that may be followed to advantage.

MIGRATION OF HEAT EQUATOR.

If the position of the heat equator in January and July, as indicated on isothermal charts, be transferred to an outline Mercator chart of the world, the sub-equatorial belts over which it

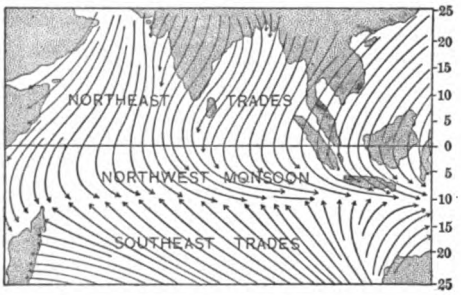

FIG. 3.—Winds of the Torrid Indian Ocean in January.

annually migrates are seen to be irregular and unsymmetrical instead of regular and symmetrical, as in the ideal terrestrial circulatiou. The changes from the ideal to the actual are easily explained as effects of the irregular distribution of land and water, and of the unsymmetrical development of the oceanic currents; the asymmetry of the latter

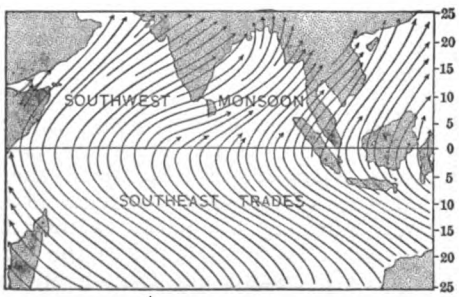

FIG. 4.—Winds of the Torrid Indian Ocean in July.

being itself an effect of the irregularity of the former. For example, the heat equator advances far north to the plains of northern India in July, and goes only 5° or 10° south of the equator in January. Conversely, there is a strong southward migration on Australia, and a weak northward migration on the Pacific. On Africa the migration is strong both north and south, much stronger than in the mid-Pacific. (The causes of the unequal changes of temperature on land and water are fully set forth in my "Elementary Meteorology.") Again, the heat equator remains north of the geographic equator all the year round in the eastern parts of the Atlantic and Pacific

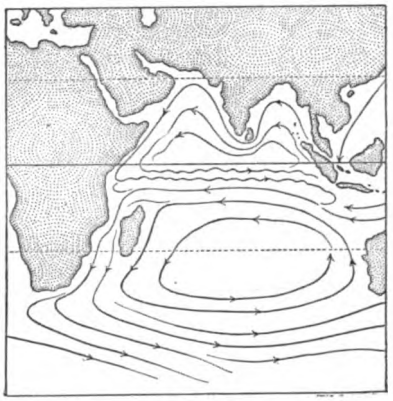

FIG. 5.—Currents of the Indian Ocean in January.

oceans, because the torrid parts of these oceans receive so much more cold water by currents coming from the south than from the north. Th monsoons of the sub-equatorial belt are, therefore, very unequally developed in different parts of the world. They are of great extent in the northern Indian ocean and on the adjacent lands, but the narrower area of alternating S.E. and N.W. winds in the southern sub-equatorial belt of the

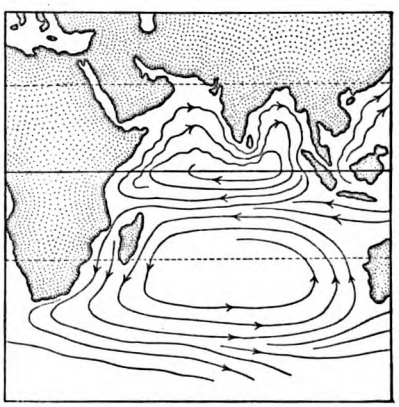

FIG. 6.—Currents of the Indian Ocean in July.

Indian ocean should not be overlooked, particularly as the N.W. winds are in their season here associated with the most distinct counter current that is known south of the equator. These features of the winds are shown in Figs. 3 and 4, and of the currents in Figs. 5 and 6.

WINDS OF TEMPERATE LATITUDES.

The westerly winds of the south temperate zone are little interrupted by continents; they are well developed in nearly all longitudes. The outward passage of a sailing vessel from Great Britain to New Zealand is therefore laid around Cape of Good Hope; the homeward voyage around Cape

Horn. In the north temperate zone the winds, like many other climatic features, are strikingly unlike those of the south temperate zone. The lands are warmer and colder than the oceans of the same latitude in summer and winter; hence the winds tend to flow landward in summer and seaward in winter; but this tendency is seldom strong enough to do more than to cause a moderate variation in the seasonal direction of the winds (Figs. 7 and 8). Only in south-eastern Asia is a strong summer inflow developed. Besides the effect through changes of temperature, the highlands and mountain ranges act as obstacles to the path of the wind; hence the westerlies of the eastern Atlantic are in part turned toward the trades, and the trades of the western Atlantic are in part turned toward the westerlies, and thus a wind eddy is formed around each great ocean, and the current eddy is thereby re-enforced, as in Fig. 9.

Mountain ranges are of great importance in provoking rainfall on their windward slopes, and in leaving the lowlands dry to leeward. Hence the eastern border of Australia is habitable, while much of the interior is a desert; hence the Andes of the torrid zone are well watered on the eastern slopes, while in the temperate zone it is their western slope that receives rainfall. As this element of the subject is more familiar than the others it need not be further considered here.

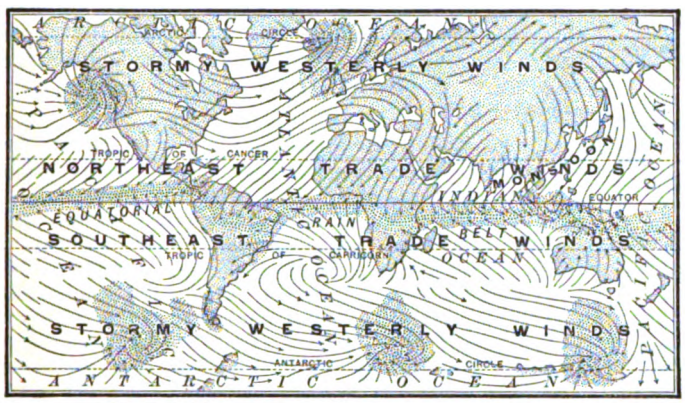

FIG. 7.—The Winds of January.

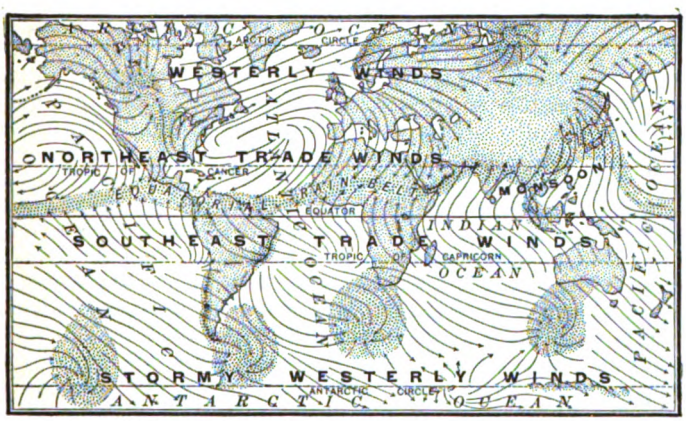

FIG. 8.—The Winds of July.

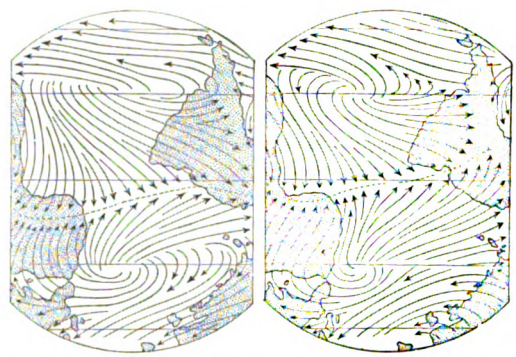

FIG. 9.—The Wind Eddies of the Atlantic in January and July.

The leading idea in this plan of presentation is the association of individual or local features with the general circulation of the atmosphere, so that the parts may be seen to be essentially related to the whole to which they belong. The systematic advance from the simple planetary circulation, through the more complicated terrestrial circulation, to the highly complicated actual circulation with its many individual features, has at least the advantage of decreasing the inherent difficulties of the subject, and at the same time giving an orderly arrangement to all the facts that are considered.

ON THE TEACHING OF ENGLISH COMPOSITION.

By J. C. NESFIELD, M.A., Merton College, Oxford.
Author of "English Grammar Past and Present," "English Grammar and Composition," &c.

IV.—UNITY OF SENTENCE AND PARAGRAPH.

CLOSELY connected with the subject of Order is the principle of Unity, *i.e.*, the limitation of a sentence to one leading thought at a time. There are two methods by which a student might be practised in giving effect to this principle; first, by requiring him to break up sentences in which the rule of unity has been violated, and sub-divide them in such a way as to give a separate sentence to each leading thought; second, by placing a string of little sentences before him and requiring him to combine them in such a way that the rule of unity shall not be violated,

that is, to make as many sentences out of them as there are leading thoughts.

The following is an example of the first method. Current literature furnishes many such examples, and these are better than manufactured ones :—

A small detached house known as Menton Villa, on whose site the Cottage Hospital now stands, was taken on lease, and a provident dispensary was opened and carried on there, for about a year and a half, with (as one of the founders has expressed it) "only small success."—*Ealing Guardian*, p. 5, May 6th, 1899.

In this rambling sentence two leading facts are stated: (1) the establishment of a provident dispensary on the site described; (2) the small success that attended it after a year-and-a-half's trial. The sentence, then, should be broken up into two, which might be worded as follows :—

A small detached house known as Menton Villa, on whose site the Cottage Hospital now stands, was taken on lease, and a provident dispensary was opened there. This was carried on for about a year and a half, but (as one of the founders has expressed it) "with only small success."

The second method (not less useful than the first, though little or no attention seems to have been paid to it hitherto) is illustrated by the following example, in which four short sentences are given by the author, with a full stop at the end of each of them :—

For some days Edward's death was kept a secret. Then Queen Jane was proclaimed. But the proclamation was received in silence. The people were unwilling to see their rightful heir excluded.—"Short History of England," by Mark Hunter, M.A.

It may be questioned whether the care here taken by the author to preserve the severest simplicity of style does not defeat its own object. The four full stops imply that there are four leading thoughts, whereas in point of fact there are two. I believe, therefore, that the connection of ideas would be more obvious and come with more force to the reader's mind, if two sentences were put together out of the four given in the original :—

(1) A few days after Edward's death, which was kept secret for the time, Jane was proclaimed Queen. (2) But, as the people were unwilling to see the rightful heir excluded, the proclamation was received in silence.

Here the two leading thoughts or facts are the proclamation of Jane as queen, and the silence with which the proclamation was received. Accordingly, we have given one sentence to each of them. Then, observe the order of the parts in each sentence. In (1) the leading fact is given at the end of the sentence—the position of emphasis; a phrase denoting the time of the event is placed first, as is usually done in our language, and a subordinate clause in explanation of this phrase is placed in the middle. In (2) the leading fact, as before, is placed last, and the qualifying clause, which gives the reason of the fact, is placed first. In this way the attention of the reader is held in suspense, as it should be, until the leading fact is mentioned at the close.

The unit of composition next above the sentence is the paragraph. A paragraph consists of a series or collection of sentences all bearing upon some central fact and connected with one another in various ways by unity of purpose. The central fact thus explained, illustrated, or enforced, is called "the theme" of the paragraph. The sentence embodying the theme holds the same kind of relation to the other sentences of the group that the principal clause of a complex sentence holds to the subordinate clauses. In the following example the theme of the paragraph is the exuberant vegetation of Finland in its summer glory of rich colour :—

(1) The vitality of the human could not vie at all with this vegetative vitality. (2) The pale-hued peasant leisurely handling his hay, piling it on high on the slow sledge (now doing its summer service of sliding along stubble instead of ice), sank into insignificance amid his environment of flowers girdling the shorn field like a huge garland. (3) Perhaps the difference lay in that they had slept under the snow, while he had been wakeful, possibly hungry, above it, so that they, not he, throbbed with the joy and wonder of resurrection. (4) It seemed to me that in them the land was singing a loud, jubilant doxology, singing it in colour instead of in sound, but with as just and rare a music.—Extract from article on Finland, in *Macmillan's Magazine*, May, 1899.

This paragraph is a perfect example of unity. In sentence 1 the theme is implied rather than expressed by the word *this*, which connects the present paragraph with the one preceding it. The vegetative vitality of Finland during the summer months is here set forth by contrasting it with the inactivity and slow movements of the inhabitants. Sentence 2 adds force to this contrast by giving a particular example: it is therefore an illustration of sentence 1. What is irrelevant to the point, though interesting on its own account, is rightly enclosed in a parenthesis. Sentence 3 suggests an explanation of the fact stated in sentence 2, with which it is grammatically connected by the pronouns *he* and *they*. Sentence 4 not only reiterates the theme contained in sentence 1, but enforces it by drawing an eloquent comparison between the music of sound and the music of colour.

In the literary prose-course prescribed for the year the teacher will no doubt find ample opportunities for showing the student how to analyse the paragraph into the theme and the group of sentences subsidiary thereto. In the composition of an essay, which the student will come to in time, it is important that he should understand how to preserve the unity of his paragraphs, and the readiest way of teaching him this is by examples from his text-book.

V.—Condensation.

By "condensation" I mean not merely, or even principally, the removal of superfluous words, but the "boiling down" (to use a colloquial phrase, which will be more readily understood) of paragraphs and longer extracts, so that the most salient points may be retained and emphasised, and what is tautological, irrelevant, or of secondary importance may be discarded. I have no space for more

than three examples, which I give in the order of difficulty, beginning with the easiest :—

(1) The Jubilee year (in the Roman Church) was first instituted by Pope Boniface VIII, in 1300 A.D., for the remission of sins and the punishment thereof, and all the faithful, who should confess, take the sacrament, &c.—*Daily Telegraph*, p. 9, May 12th, 1899.

This is a very simple example. The words "*and the punishment thereof*" are obviously superfluous, for there can be no remission of sins without a remission of the punishment that awaits them. The remission of a sin without a remission of its punishment would be a contradiction of terms.

(2) Avoid disputes as much as possible. In order to appear easy and well-bred in conversation, you may assure yourself that it requires more wit as well as more good-humour to improve than to contradict the notions of another; but if you are at any time obliged to enter into an argument, give your reasons with the utmost coolness and modesty, two things which scarce ever fail of making an impression on the hearers. Besides, if you are neither dogmatical, now show either by your actions or words that you are full of yourself, all will then more heartily rejoice at your victory. Nay, should you be pinched in your argument, you may make your retreat with a very good grace. You were never positive, and are now glad to be better informed.—*Spectator*, No. 197, October 16th, 1711.

So far as I can see, there is nothing tautological or prolix in the wording of the above extract. In fact, considering the style in which much of the *Spectator* is written, it is unusually free from verbiage. Yet the substance of it can be given in nearly half the space and without loss either of perspicuity or of energy :—

If possible, avoid disputes in company. It requires more cleverness and tact to improve than to contradict the notions of another, and if you stir up an argument, you might betray a lack of both qualities. But if an argument is forced upon you, calmness and modesty in stating your opinion will always help you. For if you prove your point, the bystanders will rejoice in your victory; and if you fail to prove it, you can show that you are pleased at having learnt something new, and retire with a good grace.

The third and last example that I shall give is one huge sentence from Clarendon's "History of the Great Rebellion," which runs as follows :—

And after the king's blessed return to England, he had frequent conferences with many of those who had acted several parts towards the escape; whereof some were of the Chancellor's newest alliance, and others his most intimate friends; towards whom his Majesty always made many gracious expressions of his acknowledgement; so that there is nothing in this short relation, the verity whereof can justly be suspected, though, as is said before, it is a great pity that there could be no diary made, indeed, no exact account of every hour's adventure from the coming out of Worcester, in that dismal confusion, to the hour of his embarkation at Bright-hemsted, in which there was such a concurrence of good-nature, charity, and generosity in persons of the meanest and lowest extractions and conditions, who did not know the value of the precious jewel that was in their custody, yet all knew him to be escaped from such an action as would make the discovery and delivery of him to those who governed over and amongst them of great benefit and present advantage to them, and in those who did know him, of such courage, loyalty, and activity, that all may reasonably look upon the whole as the inspiration and conduct of God Almighty as a manifestation of His power and glory, and for the conviction of the whole party which had sinned so grievously; and if it hath not wrought that effect in them, it hath rendered them the more inexcusable.

It requires some effort of attention to make out the sequence of ideas in this prodigious sentence. If we simply broke it up into a series of separate sentences, the result would perhaps be more intelligible, but the paragraph so formed might be longer instead of shorter than the sentence as it stands. If, however, we look only to the drift of this jungle of words, viz., (*a*) the accuracy claimed by the Chancellor for the short narrative that he has given of King Charles' adventures after the battle of Worcester, and (*b*) the regret which he expresses that no exact diary was kept at the time, we might recast this extract in the following form, which, besides preserving the unity of the paragraph, and placing its theme in the foreground, is shorter by one quarter than the original, and is not at all difficult to comprehend and follow. (The reader will of course understand that when the author of the history from which this extract is taken speaks of the "Chancellor" he is referring to himself.)

Since the king after his return to England had many a friendly talk with those who had helped him to escape, and some of these were among my closest allies and most intimate friends, the accuracy of the short narrative that I have given cannot be questioned. It is a pity, however, that no diary was kept, showing day by day, or even hour by hour, what strange adventures he went through from the moment of his flight from the battle-field at Worcester to that of going on board the ship at Bright-hemsted, and how much kindness was shown him all this time, not only by the highest, but even by the lowest of the people. The latter, though they might not have known the full value of the precious life that they held in their hands, were at least aware that, if they had given him up to the government, they would have been liberally rewarded. This concurrence of generosity on the part of those who did not know the value of the king's life, with courage on the part of those who did, must have been a direct inspiration from the Almighty. Had such a diary as this been published at the time, it would either have deterred the rebels from further guilt, or made their guilt the more inexcusable.

Having thus made five sentences out of one, we may now show in passing how the paragraph containing them should be analysed. The theme of the paragraph—the accuracy of the historian's narrative—is given in the first sentence; and here the principle of "suspense" is secured by the position of the clauses, the principal clause in which the theme is expressed being placed last, and the subordinate clauses that give the proofs of the theme being placed first. The second sentence contrasts the short narrative that he has been able to give with the much more valuable diary that ought to have been kept while the events were fresh. The third, fourth, and fifth sentences contain a series of reflections suggested by the thought expressed in the second sentence. Thus the "unity" of the paragraph is complete.

It is not the object of this paper to offer any

suggestions for the teaching of *précis*-writing, which is a distinct art in itself, with special rules and methods of its own. But *précis*-writing, as I need not add, is indispensable in certain callings, and the practice of condensing and recasting unwieldy and prolix extracts such as the above would obviously be useful as a step towards it, besides being a valuable preparation for the more difficult task of original composition.

VI.—Paraphrasing from Poetry to Prose.

I allude to this subject in passing, not for the sake of recommending the practice of paraphrasing from poetry to prose, but to advise all teachers and (if I may venture to do so without appearing to encroach) all examiners to avoid it. It seems at first sight a just as well as a convenient mode of testing a candidate's power of writing prose; and it has been much used in examinations for this purpose. If I were asked what sort of help might be given to a student to enable him to acquire proficiency in this practice, I should give him some such rules as the following:—(1) Read over the whole extract well, so as to make sure that you thoroughly understand its meaning; (2) For all words that are archaic or uncommon substitute words such as are met with in ordinary prose; (3) For all uncommon constructions substitute the grammatical forms used in ordinary prose; (4) Rearrange the parts of each sentence in the regular syntactical order; (5) Cancel epithets that contribute nothing to the purport of the sentence, but conduce merely to poetic ornament; (6) Change figurative language as far as possible into direct and literal statement; (7) If a tersely expressed metaphor is too good to be spared or is not sufficiently obvious, enlarge upon it a little, or expand it into a simile; (8) Supply all parts of speech, such as articles, prepositions, or conjunctions, that have been omitted for the sake of the metre; (9) Condense as much as you can, and avoid long and involved sentences.

For those who desire to keep up the practice of paraphrasing, or find it necessary to do so for the sake of coping with an examination, I can think of no better rules than the above. But the question remains, Does all the ingenuity thus spent in getting rid of the style, the metre, and the phraseology of verse help a student to write good prose? I think not. "Poetry," says Whately, "is not distinguished from prose by superior beauty of thought or of expression, but is *a distinct kind of composition;* and they produce, when each is excellent in its own way, distinct kinds of pleasure." In support of this view I reproduce herewith what I have said elsewhere ("English Grammar and Composition," p. 295) on the subject of turning poetry into prose:—"If we break up the metrical structure of a piece of poetry, we find it inflated and bombastic prose. If we remove this defect by altering the words, we find it better prose than before; but still it is not good prose. The fact that the same style which gave pleasure in one form of composition proves offensive in the other shows that poetry and prose are not mutually convertible without injury to both." Poetry, in short, can no more be turned into prose than prose can be turned into poetry. Each has a distinct province of its own.

If these views are borne out by the experience of others, as they are by my own, the practice of paraphrasing, that is of turning good poetry into bad prose, is the last thing to be recommended either to teachers as a mode of teaching prose composition or to examiners as a mode of testing it. It may be convenient perhaps to an examiner to employ this method for finding out whether the candidate *understands* the poetry that he has read, but there are many other ways of ascertaining this without imposing upon him the disagreeable task of destroying the beauty of the verse by the vain attempt at putting it into good prose.

(To be continued.)

ON THE TEACHING OF HISTORY.

By A. Johnson Evans, M.A.

VI.—Parliament.

So many misconceptions are current as to the origin and history of our British Parliament that the beginning of wisdom in this matter must be to drive them out wholesale.

First of all, Parliament was **not** created to **check the King.** The Whiggism of our popular historians has led them to emphasise the story of the attempts to control the royal prerogative, and this to such an extent that the whole of our history, as commonly told, consists of struggles for "freedom." We must learn to put this notion from our heads, and to realise that, at certain periods at least, what was wanted was not "freedom," but good government. Secondly, Parliament is **not "of immemorial antiquity."** We have taken as gospel truth the programs of political parties specially when they have triumphed. It has always been the habit of English statesmen to appeal to the "men of old time" for principles of politics, and to believe that the "reformers" of every age were in reality only restoring a primitive purity. But we must also put aside these pleasing prepossessions, and believe of the British constitution, as of the Papacy, that it is *not* "semper eadem."

Thirdly, Parliament is **not "representative of the people."** Not to speak of children and women, it is not "representative of the people" even to-day, in the sense that it is chosen by the people at large. Certainly it was not so in the seventeenth or eighteenth centuries, and when we reach the Middle Ages in our retrospect, the "people" themselves disappear, and we find instead "classes" clearly distinct from the "masses." We commonly hear the phrase the "Parliament of the three Estates," and because we believe, all wrongly, that our modern Parliament is "substan-

tially the same" as it has ever been, we think the phrase is quite as suitable to the modern institution as to the ancient. But let us consider. What *is* an "Estate"? The best definition would appear to be "a class of the community represented as such in the national assembly." The Parliaments of the Middle Ages *were* approximately "assemblies of estates." The clergy were one, the nobles another, the counties a third, the chartered towns a fourth, and there were possibilities of others. But our modern Houses of Commons are nothing of the kind: the only representatives of an estate that sit now in that House are the members for the Universities, whom modern radicalism would like to exclude. The best parallel to take, in order to learn this contrast, is to be found in Roman history. The comitia centuriata was an assembly of estates, differentiated by their wealth; the comitia tributa was an assembly of the citizens, based on their local habitations. It is the comitia tributa that our modern House of Commons resembles, with its members chosen for districts where clergy, gentry, middle class, and working men vote promiscuously at the polling booths. The King or Queen is *not* an estate.

Fourthly, the **early history** of the Parliament is **not known**. It has become so famous and so powerful that we are all interested nowadays in its early stages, and would give much could we come across some authentic contemporary accounts of its beginnings. But just as Shakspere the man is as great a mystery as his works are famous, so with the British Parliament, and specially the House of Commons. So unimportant did the mediæval chroniclers think it that, even when they have recorded a summons, they are not careful to say if the body met; they use the vaguest and most scanty phrases to describe its composition. We *know* nothing with certainty of the manner of the elections, the origin of the Speaker, or the differentiation into two Houses.

Fifthly, and consequently, there is much misapprehension of famous events in the thirteenth century. **Simon de Montfort** was **not** the **founder** of the **House of Commons**, nor indeed was anyone else. If one name *must* be chosen, it would rather be that of Edward I., who made many experiments in constitution framing, and whose Parliament of **1295** is so important in the history of our country. But indeed it was not until the reign of Edward III., if at all in the Middle Ages, that Parliament became an established institution. Its importance came much later.

Sixthly, the word Parliament does **not** mean anything **definite** or special. Its etymology shows at once that it may be used to designate any conference for discussion, and it seems to have been used as an alternative for the more classic word *colloquium*, or for the word *concilium*. It might, or it might not, include a House of Commons. It is only a legal fiction, important in deciding a lawsuit, but misleading as history, which dates the House of Commons as a necessary factor in Parliament from 1295.

Seventhly, an assembly of Estates was **not** a **peculiarly English** institution in the Middle Ages, nor were *our* States General even the first to be held. Dr. Stubbs tells us that Aragon had town representatives in 1162, Castile (whence Edward I. brought his wife) in 1169, Sicily in 1232, Germany in 1255, and France in 1302. The institution, therefore, was the result of a general movement. Towns had become wealthy, and therefore politically important. Kings found them useful allies against nobles. We in England were specially fortunate—firstly, because our shire-moots afforded precedents for procedure, and a solid basis on which to rear our constitution, and secondly, because our kings were strong enough to weld together the various forces for their own support, instead of playing them off one against the other.

Eighthly, Parliament was **not wanted** by anyone, and was called only to meet some sudden need for which such an assembly was the only remedy. Just as the Exchequer had been organised in Norman times to increase and regularise the royal revenue, as the itinerant justices had been used in Angevin times to add to the resources of the King and administer an improved jurisdiction, so "Parliaments" were called, and specially representatives of the *communes*—*i.e.*, the shires and boroughs—to provide the King with extraordinary revenue, or to give their moral support to one or other of wavering parties. And the summons to Parliament was just as unwelcome as exchequer or itinerant justices had been. The counties did not want to pay the expenses of their representatives, nor to provide additional funds for the King. Much more did the burghs dislike the special expenses of their representatives and the larger proportion in which they were assessed. Burghs tried to avoid being put in the sheriffs' list, just as private individuals try to avoid the same nowadays when it implies service on juries.

Study the subject in Dr. Stubbs' "Constitutional History," or in such manuals as Medley's or Taswall-Langmead's, to see how slowly the share of the House of Commons grew in determining the amount or the assessment of taxation, how late and how fitful was their control of the expenditure, with what tentative steps they obtained even a humble share in the work of legislation. For the Middle Ages, certainly, "the laws," to use the words of a Stuart judge, were "the King's laws," the revenue was *his* revenue, whether coming in the ordinary course when he "lived of his own," or by parliamentary method when the kingdom was in danger, and therefore in need of greater resources than usual. Even the privileges and powers of the Houses of Commons were held by them because they were the *King's* parliaments, and were used by him in his time of power or by some noble such as John of Gaunt, who had over-influenced the King.

THE smaller the amount of original mental activity, the less can we look for virtue, at any rate in the full variety of its possible activity. Stupid people cannot be virtuous. The brain must be developed.—"Herbart."

POINT UNDER POINT.

By HENRY CLARKE, M.A. (Lond.)

IT would be difficult to say anything new on so well-worn a subject as simple multiplication and division. The object of this short article is to advocate, from the point of view of the practical teacher (1) a strict adherence to the decimal system, whereby the value of a digit is known from its position relative to the decimal point; (2) the adoption of such methods as may enable the worker to state the value of each digit as soon as it is obtained; and (3) the avoidance of indirect methods.

As multiplication and division are merely compendious methods of performing a series of additions and subtractions respectively, the rule that requires point to be kept under point ought to be as rigorously observed in the former as in the latter. The following methods of multiplying are often employed:—

Multiply 987· by 523.

987·	987·
523·	325·
2961·	4935
19740·	1974
493500·	2961
516201·	516201·

Both methods are objectionable; the former because the less important partial products are obtained before the more important ones, and the latter because (1) the inversion of the digits of the multiplier is a violation of the rule of place-value of digits, and (2) the units, tens, &c., of the product do not fall vertically under the units, tens, &c., respectively, of the factors. The following method is preferable:—

(1)

2 0		
987·		
2		
523·		
2		
493500·		
19740·		
2961·		
5		
516201·		

(2a)

3		3
1987·654		
2		
123·4567		
1		
198765·4		
39753·08		
5962·962		
795·0616		
99·38270		
11·925924		
1·3913578		
5		
245389·2035818		

If there are figures after the decimal point the same method should be employed, and point falls naturally under point (see 2a), or retaining only three decimal places (see 2b). As a further illustration, multiply as in (3):

(2b)

3		3
1987·654		
2		
123·4567		
1		
198765·4		
39753·08		
5962·962		
795·062		
99·383		
11·926		
1·391		
5		
245389·204		

(3) ·00019 by ·00205.

4 5		
·00019		
3		
·00205		
8		
·00000038		
·00000095		
7		
·0000003895		

In applying this method *ce n'est que le premier pas qui coûte*, for all is easy when the position of the extreme digit on the right in the first line of work is fixed. In fixing it it will be well to make use of the indices of the powers of 10.

Now $1000 = 10 \times 10 \times 10 = 10^3$
$100 = 1000 \div 10 = 10^2$
$10 = 100 \div 10 = 10^1$
$1 = 10 \div 10 = 10^0$
$\cdot1 = 1 \div 10 = 10^{-1}$
$\cdot01 = \cdot1 \div 10 = 10^{-2}$

&c., every division by 10 lessening the index by 1.

Powers of 10 are multiplied by adding the indices of the powers, and it should be noticed that any addition of a negative index is equivalent to the subtraction of a positive one.

Thus $1000 \times 100 = 10^3 \times 10^2 = 10^{3+2} = 10^5$
$100 \times \cdot1 = 10^2 \times 10^{-1} = 10^{2+(-1)} = 10^{2-1} = 10^1$

The first line may now be treated as follows:— To the index of the lowest power of 10 in the multiplicand add the index of the highest power of 10 in the multiplier; the sum is the index of the lowest power of 10 in the first line of work, and thus the position of the extreme digit on the right is fixed.

Thus in (1) $0 + 2 = 2$
in (2) $-3 + 2 = -1$
in (3) $-5 + (-3) = -5 - 3 = -8$

It should also be observed that the index of the highest power of 10 in the product is always either the sum of, or one more than the sum of, the indices of the highest powers of 10 in the factors.

Thus in (1) $5 = (2 + 2) + 1$
in (2) $5 = 3 + 2$
in (3) $-7 = -4 + (-3)$

One of the advantages of this method is that the first line is an approximation to the answer.

The method of dividing by shifting the point so as to make the divisor a whole number, though so widely employed, is objectionable, because of its indirectness.

Thus, divide 1·039 by ·23.

Shift the point two places in both divisor and dividend:—

$$23\cdot)103\cdot9(4\cdot5$$
$$92$$
$$11\cdot9$$
$$11\cdot5$$
$$\cdot4$$

Here instead of dividing 1·039 by ·23 we have divided 100 × 1·039, *i.e.*, 103·9 by 100 × ·23, *i.e.*, 23·. This gives, of course, the correct quotient, but a remainder 100 times as great as the true remainder:—

$$\cdot4 \div 100 = \cdot004$$

The following method has the advantage of being direct and of compelling the worker to fix the place-value of the first significant digit in the quotient as soon as (or, better still, before) that digit is obtained:—

(1) $\overset{2}{523}\cdot)\overset{5}{598312}(\overset{3}{1144}\cdot$

523

753
523

2301
2092

2092
2092

....

(2) $\overset{2}{523})\overset{4}{516201}(\overset{2}{987}\cdot$

4707

4550
4184

3661
3661

....

(3) $\overset{\bar{1}}{\cdot 23})\overset{1}{1}\cdot\overset{1}{039}(\overset{0}{4}\cdot 5$

92

·119
·115

·004

(4) $\overset{\bar{3}}{\cdot 00015})\overset{\bar{3}}{\cdot 0225}(\overset{2}{150}$

·015

·0075
·0075

....

(5) $\overset{1}{47}\cdot 93)\overset{\bar{3}}{\cdot 018560}(\overset{\bar{3}}{\cdot 000387}$

14379

·0041810
·0038344

·00034660
·00033551

·00001109

In applying this method use is again made of the indices, "grades," or "characteristics," as they have been variously named. Powers of 10 are divided by subtracting the index of the divisor from that of the dividend, and it should be noticed that the subtraction of a negative index is equivalent to the addition of a positive one.

Thus $1000 \div 100 = 10^3 \div 10^2 = 10^{3-2} = 10^1$

$100 \div \cdot 1 = 10^2 \div 10^{-1} = 10^{2-(-1)} = 10^{2+1} = 10^3 = 1000$

$\cdot 01 \div \cdot 001 = 10^{-2} \div 10^{-3} = 10^{-2-(-3)} = 10^{-2+3} = 10^1$

It must be noticed first of all that in a division sum the first significant quotient figure is always obtained by dividing the entire quotient into either (*a*) an equal number of figures in the dividend, or (*b*) one more than an equal number. Of the division sums worked above (1) and (4) are examples of (*a*); (2), (3), (5) of (*b*). In the former case mark the index of the highest power of 10 in the dividend; in the latter mark the index of the highest power but one. From the marked index in the dividend subtract, in both cases, the index of the highest power of 10 in the divisor; the remainder is the index of the highest power of 10 in the quotient. This index should be at once marked over the quotient space, and the first quotient figure put under it. It is then at once seen where the decimal-point must be placed.

Thus in (1) $5 - 2 = 3$
∴ the first quotient-figure is in the *thousands* place;
in (2) $4 - 2 = 2$
∴ the first quotient-figure is in the *hundreds* place;
in (3) $-1 - (-1) = -1 + 1 = 0$
∴ the first quotient-figure is in the *units* place;
in (4) $-2 - (-4) = -2 + 4 = 2$
∴ the first quotient-figure is in the *hundreds* place;
in (5) $-3 - 1 = -4$
∴ the first quotient-figure is in the *ten-thousandths* place.

As in multiplication, point falls naturally under point, and contraction may be employed when desirable.

Thus: divide 245389·2035818 by 123·4567

$\overset{2}{123\cdot4567})\overset{5}{245389\cdot2035818}(\overset{3}{1987\cdot654}$

121932·50

10821·473

944·9375

80·74068

6·666661

·4938268

.....

$\overset{2}{123\cdot4567})\overset{5}{245389\cdot20}(\overset{3}{1987\cdot654}$

121932·50

10821·47

944·93

80·74

6·67

·50

·01

The use of indices, it should be remarked, is not essential to these methods of fixing the point.

Thus in Example 2, above, of multiplication, since $\frac{1}{1000} \times 100 = \frac{1}{10}$, it is clear that the extreme digit on the right in the first line of work must be put in the *tenths* place, *i.e.*, one place to the right of the decimal-point.

Again, in Example 4, above, of division, since $\frac{1}{100} \div \frac{1}{100000} = 100$, it is clear that the first quotient-figure must be put in the *hundreds* place. The other examples may be similarly treated.

A word may be said in conclusion on the method of extracting the square root of a number. The decimal point may, with great advantage, be marked at every step of the work, so that the true value of the remainder may be clear to the eye.

(1) 1 | $\overset{2}{1}/50\cdot/06/28/$ ($\overset{1}{1}2\cdot25$ Root.

1

22 | 50·
44·

24·2 | 6·06
4·84

24·45 | 1·2228
1·2225

·0003 Remainder.

(2) ·06 | $\cdot 00/\overset{\epsilon}{38}/$ ($\cdot 0\overset{2}{6}$ Root.
·00 36

·0002 Remainder.

The place-value of the first significant digit in the root should be determined at once by the following rule:—

Divide the index of the highest *even* power of 10 in the number by 2; the quotient will be the index of the highest power of 10 in its square root.

Thus in (1) $2 \div 2 = 1$
in (2) $-4 \div 2 = -2$
in (3) below, $0 \div 2 = 0$

In practical work the usual contracted methods should be employed, *i.e.*, when one more than half the digits in the root have been obtained by the ordinary method, the rest may be obtained by division only, and this division itself may be contracted. Also any non-significant noughts may be omitted, *e.g.*, extract the square root of 2 to six decimal places:—

(3)

1	0 0	(1·414213
	2	
	1	
2·4	1·00	
	·96	
2·81	·0400	
	·0281	
2·824	·011900	
	·011296	
2·8282	·00060400	
	·00056564	
2·82841	·000038360	
	·000028284	
2·828423	·000010075900	
	·000008485269	
	·000001590631	

1	2	(1·414213
2·4	1·00	
2·81	× 8400	
2·824	11900	
2·828	6040	
	384	
	101	
	16	

WHERE TO SPEND THE HOLIDAYS.

A Consideration of Ways and Means.

"WHERE to go" is one of those hardy annuals which no periodical professing the slightest concern for the welfare of its readers can, in these days, afford to ignore. The strain of teaching, and, still more, of what is known in secondary schools as "duty," wears down the nervous energy of even the strong; hence there is perhaps no professional class to whom holidays are so distinctly a necessity. But whether necessary or not they are compulsory, and at the end of July the teacher finds himself face to face with a hiatus of six or seven weeks which has to be filled in somehow and somewhere. Happy the man who, when the hour of liberty arrives, hails it as one for which he is already prepared with some well-matured plan; unhappy he who is cut adrift unawares, and who goes forth not knowing whither he goes.

The schoolmaster who has paid his debts may—stay at home; he who has not may fly abroad. Continental travel is an admirable prophylactic against dulness and duns; he who is bored by neither may find everything essential to his heart's delight and his heart's ease in the manifold scenic charms of

Great Britain and Ireland.

Thanks to the enterprise of our chief railway companies, convenience and cheapness have brought travel within almost universal range, and the compartment which is to bear us away in a few hours to sylvan solitudes or gay seaside resorts is usually at our very doors. Assuming that London is our centre, the south coast railways will carry us for a few shillings to Kent and Surrey villages where, in the opinion of those competent to judge, an ideal holiday may be spent. Good inns are to be found, and here English rural life is seen in its rich garb of summer and harvest. Hence Deal, Dover, Folkestone, Eastbourne, and the whole galaxy of southern watering places are accessible. Or we may bend our course towards the Thames Valley, and join the London and South-Western system; we may proceed to Salisbury, Winchester and Bournemouth, explore the Isle of Wight, the lanes of Devonshire, the romantic coasts of Cornwall, or concentrate our energies on Lynton and Lynmouth. A tourist ticket, available for two months between Waterloo and Lynton, costs 36s. 6d., third class; between Waterloo and New Quay (*via* Wadebridge and coach), 40s. 6d. A similar ticket to Jersey or Guernsey involves but the modest outlay of 30s. Tourists may also book to the Channel Isles by Great Western Railway. This company issues tourist tickets to the Scilly Isles, first class and saloon, 90s. 6d.; second and fore cabin, 62s. 6d.; third and fore cabin, 51s. 6d. Or typical English scenery is accessible, not to mention historic and other associations, at such places as Leamington, Stratford-on-Avon, Malvern, Cheltenham, and the Severn Valley. The London and North-Western Railway furnishes an elaborate programme of tours, and will convey us to North Wales, the Lake District, the Isle of Man, and Scotland and Ireland. From Euston to Snowdon and back costs but 37s. 3d.; a circular tour in the Lake District, 47s.; a tourist ticket to the Isle of Man, 34s. 6d. The following circular tour in Scotland—by rail to Glasgow or Gourock, thence by Mr. D. MacBrayne's steamer to Ardrishaig, Crinan Canal, Oban, Ballachulish, Fort William, and the Caledonian Canal to Inverness, returning by rail to Aberdeen, thence by Caledonian Railway, *via* Perth, Dunblane, and Stirling—involves an outlay for travel of 75s. There is a liberal allowance for breaks in journey, both by rail and steamer. A similar circular tour in Killarney, Connemara, and the West of Ireland, costs 77s. from Euston, *via* Kingstown. The Midland Railway has also an excellent programme of tours. The Derbyshire part of this company's system would alone furnish facilily for a delightful holiday. Not to mention Matlock and Buxton, Bolsover Castle and Hardwick Hall, Haddon and Chatsworth, there are inexhaustible charms about Ambergate, Whatstandwell, Bakewell, Miller's and Monsal Dales, Dove Dale (where Dean Hole would have us put up at the Izaak Walton Inn), Eyam (an "antique mountain village, made classical by the Great Plague"), Castleton, Bonsall, and Via Gellia. And then the Derwent, with its "bright, trout-haunted streams, the Ashop, the Noe, the Wye, the Amber, and the Ecclesbourne!" Turning to the programme of the Great Northern Railway, we notice excellent arrangements for tourists visiting Yarmouth, Cromer, Scarborough, the Dukeries, &c. This company issues an admirable series of artistic booklets dealing with the principal places of attraction which their lines serve. The cost of a tourist ticket from King's Cross to Scarborough is 34s. Tourists visiting Scotland should procure the Official Guide of the North British and West Highland Railways. Golfers are well catered for by the Great Eastern Railway Company; while the watering places reached by this company—

Cromer, Lowestoft, Yarmouth, Hunstanton, Felixstowe, Clacton-on-Sea, Harwich and Dovercourt—are a never-failing attraction. The Norfolk Broads, too, present a type of English scenery quite unique to those unfamiliar with East Anglia. Yachting and other aquatic pastimes may here be enjoyed as perhaps nowhere else in England.

SEA TRIPS AND CRUISES ROUND THE COAST.

Mr. F. C. Burnand's advice as to holidays for literary men may perhaps be largely applicable to weary preceptors: "Make short sea trips, giving three or four days to each trip. Up one side of England, canal through Scotland, down the other side of England, and back to starting point. 'Trip it lightly' to Ostend, thence to Bruges. To Dunkirk and Rosendäel, to Calais and the parts thereabout, to Boulogne, Paris-Plage, up to Montreuil and back again. Take no journey for which more than a portable bag—portable by someone paid for the purpose—is essential."

The British and Irish Steam Packet Company run first-class passenger steamers twice weekly between London and Dublin, *viâ* Portsmouth, Plymouth, and Falmouth; fares, including stewards' fees, first cabin (return), 38s. 6d.; second cabin, 27s.; deck, 17s. First and second cabin tickets, available for 16 days, are issued at 31s. 6d. and 22s. respectively. The cabin tariff adds an additional sovereign (more or less, according to class) for provisions. There are numerous tours round the Irish coast arranged by this company. For full particulars apply to J. Hartley & Co., 19, Leadenhall Street, London, E.C. The Clyde Shipping Company (London Office, 138, Leadenhall Street, E.C.) offers numerous attractions to those who delight in sea voyages. Granted fine weather, and from the Thames to the Clyde, *viâ* Belfast, must be a grand trip. Fare £2 10s. the round journey; victualling extra. The voyage lasts a week, and may entail one day ashore, involving hotel expenses. This company arranges circular tours in connection with other lines of steamers. There are cruises to numerous West Highland ports, to Dundee and Aberdeen, and to the South of Ireland. The London and Edinburgh Shipping Company (M'Dougall and Bonthron, Limited, 72, Mark Lane, London, E.C.) run boats to Leith from London. Return tickets (available 12 months): first cabin, 34s.; second, 24s. 6d.; victualling contract for voyage, 10s. 6d. and 7s. 6d. respectively. Dr. Lunn arranges a 15 days' cruise round the British Isles for 12 guineas. The Polytechnic has a 13 days' cruise for 8 guineas.

HOLLAND AND BELGIUM.

Messrs. Thos. Cook & Son (Ludgate Circus, London, E.C.) issue tickets for a tour to Brussels and Waterloo. The excursion leaves London (Liverpool Street Station) at 8.40 p.m. every Friday and Saturday, returning from Brussels by evening service on the following Monday or Tuesday. First class travel and hotel, £3 15s.; second, £2 12s. 6d. The same firm has a tour to The Hague and Amsterdam for £2 17s. 6d.; or a week in Holland and Belgium, including visits to The Hague, Scheveningen, Amsterdam, Leyden, Haarlem, Rotterdam, Antwerp, Brussels, Field of Waterloo, for an outlay of £5 5s. A week in the Ardennes costs £5 15s. A two weeks' tour to Belgium, the Rhine, and Holland, £7 17s. 6d. Dr. Lunn (5, Endsleigh Gardens, Euston, London, N.W.) has arranged a series of tours to Cologne and Antwerp for £3 13s. 6d., including second-class ticket to Cologne, and three days' hotel accommodation. A unique holiday under the same auspices is a twenty-one days' cycling tour in Holland, Belgium, and the Rhine Valley, for £8 5s. 6d. This sum includes second-class return ticket, London to Antwerp, *viâ* Queenborough and Flushing, and twenty days' hotel accommodation, each day including dinner (or supper), meat breakfast, and attendance. The distances covered average about 30 miles per day. Truly a wonderful piece of organisation, and a splendid return for so modest an outlay. Trips to Holland and Belgium are also organised by the Polytechnic, 309, Regent Street, London, W.

NORMANDY AND BRITTANY.

Dr. Lunn has arranged a six days' cycling tour, on the lines already mentioned, from Havre to Rouen, Pont Audemer, Lisieux, Caen, Trouville, and back to Havre, for the sum (including cost of cycle ticket) of £3 12s.; also a seventeen days' cycling tour in Normandy and Brittany (limited to 15 passengers) for £10 10s. Dates of departure July 27th and August 17th. But independently of this there will be a seventeen days' cycling tour over the same route for £6 15s. 6d. Messrs. Thos. Cook and Son issue tickets (only) for circular tours in Normandy and Brittany, valid for two months on L.S.W. Railway and steamers, and thirty days' on the French railways. For instance, here is a tour costing £5 first class, £4 second—Waterloo, Southampton, Guernsey, Jersey, Granville, Avranches, Pontorson, Mont St. Michel, Dol, St. Malo, St. Servan (Paramé), Dinan, Dinard, St. Brieuc, Rennes, Chateaubriant, Angers (St. Serge), Pontorson, St. Malo, Southampton (direct or *viâ* Jersey and Guernsey), Waterloo. A personally-conducted tour to Normandy, organised by the Polytechnic, will leave London on Friday, July 28th. Cost, £4 15s., including trains, boats, coaches, hotels and gratuities; time, one week.

PARIS, VERSAILLES, &c.

The interest of Paris is to many perennial, and those who would spend a holiday there can reach it as easily as Edinburgh or Glasgow. The Polytechnic arranges weekly trips, with six days' hotel accommodation, together with all assistance that may be required for excursions, &c. The accommodation will be provided at the Grand

Hotel International, Avenue d'Jena, or, if preferred, at a first-class pension three doors off the Champs Elysées. Total cost £4. Dr. Lunn has a shorter trip for £3 13s. 6d.

Switzerland, The Engadine, and Italian Lakes.

A remarkable excursion to Switzerland is that organised by Messrs. Cook—a week in Switzerland for £5 5s., at either Lucerne or Geneva. This leaves London every Friday, and affords an exceptional opportunity for visiting some of the most beautiful scenery in Europe. The fare of five guineas includes substantial accommodation for six days, and the services, out and home, of a competent conductor. A fortnight in Switzerland, under the same direction, can be had for £10 10s.; a three weeks' tour, including the Italian Lakes, for £14 14s.; a seventeen days' tour to the Engadine and Italian Lakes for £13 13s. The Polytechnic also arranges a week in Switzerland for £5 5s., with extension tours to Chamounix (5 guineas extra), or Grindelwald (3½ guineas extra), or Interlaken (3½ guineas extra), or Italian Lakes (5 guineas extra), or Rome and Venice (11½ guineas extra). Dr. Lunn, who seems to have made a speciality of Switzerland, has tours as follows:—Geneva tour, £6 6s.; Geneva and Chamounix, £8 8s.; Grindelwald, £6 16s. 6d.; The Engadine, Italian Lakes, and Lucerne, £9 19s. 6d.; The Engadine, The Tyrol, Munich, and Constance, £10 10s.

Norway, Sweden, and Denmark.

Dr. R. Bowdler Sharpe says:—"Norway for the overworked professional man is the haven of rest *par excellence*." He recommends those who are run down in health to go out by the Wilson line, and to make their headquarters in some such centre as Christiansund—"the Venice of the North." Particulars of sailings to Norway and Sweden can be obtained from Thos. Wilson, Sons & Co., Limited, Hull. This firm also arranges tours, their tickets covering saloon fare, victualling, hotel accommodation, road, rail, river, and lake steamers, and meals *en route*. A ten days' tour to Christiansand (to be distinguished from Christiansund) costs 8½ guineas, a ten days' tour to Christiania the same, a twenty-four days' tour to Christiansand and Christiania 14½ guineas. Messrs. Wilson have also organised a splendid series of holiday tours to Sweden, where natural charms of a high order are to be found. The Albion Steamship Company, Limited (Baltic Chambers, Newcastle-on-Tyne), offer pleasure cruises to the Norwegian Fjords by their fine steamer, the *Midnight Sun*, sailing from Newcastle on July 29th, August 12th, and August 26th. This is the shortest route to Norway, and the fares, according to position of state-rooms, run from 10 to 25 guineas. First-class passengers alone are carried, and all applications for berths must be accompanied by a deposit of £5. To avoid disappointment early application is essential. The Orient Company (5, Fenchurch Avenue, London, E.C.) book passengers for pleasure cruises to the Fjords, North Cape, and Spitzbergen. An inexpensive way of seeing something of Denmark and Scandinavia is to go *via* Harwich and Esbjerg. Tourist tickets, available for 45 days, are issued from London to Harwich, Esbjerg, Copenhagen, Malmö, Stockholm, Gothenburg, Fredericshaven, Esbjerg, Harwich, London. First class and saloon, £8 7s. 6d.; second class and saloon, £6 16s. Fuller particulars may be obtained from Messrs. Tegner, Price & Co., 107, Fenchurch Street, E.C., who are the London agents of the United Steamship Company of Copenhagen. Tourists joining a Polytechnic party can enjoy a thirteen days' cruise amongst the Fjords for the modest sum of 9 guineas, which, with a fee of 7s. 6d. to cover incidental expenses at the various ports of call, embraces the whole of the necessary outlay. The cruise covers a distance of about 3,000 miles, and the route comprises Stavanger, Buken, Hardanger, Mauranger, and Sor Fjords, with visits to the grand Bondhus Glacier; the Laatefos and Espelandfos (waterfalls), afterwards proceeding to Bergen, whence are overland excursions along the "Royal Route" to Vossevangen and Stalheim. The party stays overnight at the beautiful Stalheim Hotel, proceeding on the following morning to Gudvangen (where the vessel is rejoined), and along the Naero and Sogne Fjords to Molde, thence to Romsdal, whence there is an excursion to Horgheim. After visiting Aalesund, the Geiranger, Merok, and the Jorund Fjord, the steamer proceeds along protected waters to Bergen, and thence home. Dr. Lunn has a similar trip for ten guineas, also a nineteen days' cruise to the North Cape for 16 guineas. Messrs. P. H. Matthiessen & Co., 25, Queen Street, Newcastle-on-Tyne, book passengers by the steamers *Ragnvald Jarl*, Captain Thane, and *Vega*, Captain Eckhoff, for a twelve days' yachting cruise to the chief Fjords for £12. Twenty days' cruise to the North Cape for £25, sailings every Tuesday, Thursday, and Saturday. This is the royal mail route.

The Northern Capitals of Europe.

A cruise to Christiania, Stockholm, St. Petersburg, and Copenhagen, extending over twenty-five days, and costing 21 guineas, is organised by Dr. Lunn. Leaving Hull on Saturday, August 19th, the steamer reaches St. Petersburg on the 31st. Land excursions are extra. Full particulars should be ascertained. These capitals may be visited independently by the Wilson line.

Cruise to the Mediterranean.

The Orient Company conveys passengers to Morocco, Spain, South of France, Sicily, &c. The Wilson line runs steamers every fortnight, leaving Hull for Marseilles, Genoa, Leghorn, Naples, and Valencia. The round voyage occupies six to seven weeks, and the fare is £25, including victualling whilst at sea and in port. These are

trading vessels, but the returns for the outlay are considerable. The co-operative cruises of Dr. Lunn do not start till December; but anyone delighting in semi-tropical weather could make his own terms at one of our ports, and spend a most enjoyable and educative month or six weeks flitting between the busy ports of the Mediterranean. To some men this is the ideal method of travel. Our own coasts may be exploited in the same way. A Newcastle skipper will take you a long voyage for a trifling consideration, and when the decks of a collier are swept they are as clean as a new pin.

MISCELLANEOUS TOURS.

Travellers whose chief delight is in great cities may find their way to Berlin, to Vienna, to Rome, to Madrid. Or a bracing and novel holiday may be enjoyed by a cruise to Iceland, with its unique scenery of lava and snow, glaciers and hot springs, and, above all, its volcano. A steamer leaves Leith on August 3rd, and arrives back on September 2nd. The fare is £42. Messrs. Cook conduct a select tour "Through the Dolomites" for 30 guineas; to the Bavarian Highlands for 25 guineas; to Dalmatia, Bosnia, and Herzegovina for 46 guineas; to Germany and Austria for 34 guineas; and to the Rhine, Black Forest, and Switzerland for £39. Messrs. Gaze & Sons advertise a "Thousand tours and trips from one shilling to one thousand shillings." The one-shilling tours are to Chingford, Harrow, Mortlake, &c. For 999s. the tourist may visit America, and for 1,000s. he may go to Constantinople, with coupons for thirty days' hotel accommodation by the way.

Where shall we go?

THE PHONOGRAPH AS AN AID TO LANGUAGE TEACHING.

By ALFRED T. STORY.

ALTHOUGH the phonograph was for a long time regarded merely as a scientific toy, of late useful employment has been found for it in some departments of commercial life. Hitherto, however, it has failed to be taken advantage of in a sphere wherein, one imagines, it is destined to be of special and almost paramount importance, namely, as an aid to the teaching of foreign tongues.

In no country perhaps are languages studied so generally as in England, and in no country, it may be added, is that study so often futile. This arises in the main from the fact that the common and popular method is wrong. From books alone, languages, as instruments of living speech, cannot be learned. It may be said indeed that in learning any tongue the first thing to be taken into account is the ear. That organ and the tongue are so intimately associated that, as a rule, what the one perfectly hears the other can repeat.

The difficulty that is felt in at first understanding a foreign tongue when spoken by a native arises from the fact that the ear does not fully catch and record the sound; or if it does hear perfectly it is so unused to the new sounds as counters of thought, so to speak, that it stumbles in the process, and thus the idea contained in a sentence is missed. In reality, at first in all language learning there is a process of translation to be gone through, and this must continue until the sounds in the new tongue have become so familiar by repetition that the thought at once leaps, as it were, to the sound.

Now it is just this need of repetition of the sound to the ear that is the great bar to the learning of languages. Teachers, even if obtainable, cannot always be at hand. Sometimes—in country places, for instance—French, German, or other teachers are not to be had; and if they be procurable an occasional lesson only makes progress very slow. Hence the frequent insuccess of language study in England.

It is in this respect that the phonograph may be made so useful. On its cyclinders or records a series of lessons—say in French or Italian—may be arranged just as a teacher would give them; but in place of being once or twice repeated, as in the case of the teacher, they may be iterated and reiterated until the ear has become so familiarised with the sounds that they can never again be forgotten. I have myself tested the phonograph in this regard, and have no doubt as to its capabilities.

When my attention was first drawn to the subject I was enabled to test the powers of the phonograph on a Swedish instrument. It was fixed up in a small room adjoining a larger one, and by the power of adjustment connected with the instrument it was possible to make the amount of sound emitted suit either the small or the large room. The smaller room was about the size of an ordinary breakfast-room, and it was evident that if the younger members of a family were learning French a given lesson might be repeated several times during the meal, and thus the ears of those present be familiarising themselves with the sounds which the tongue was afterwards to repeat. The teacher's tongue may tire, but the "record" of the phonograph does not. There is no appreciable weakening of the sound after hundreds of repetitions.

The larger room afforded space enough for a class of from twenty to thirty persons, and the instrument could be so adjusted as to be heard perfectly in every part. An English teacher not able to speak French might give a French lesson, say on the verb *être*, "to be," leaving the pupils to get their pronunciation from the phonograph, which would repeat the sounds for them again and again.

I should say that these experiments on the Swedish instrument were, in the first instance, for elocutionary purposes, that being the idea first suggested for utilising the phonograph; and it was singular to notice how valuable the trials

were. Many "records" were taken, and the results tested. Apart from anything else, you saw at once the value of a little elocution.

The ordinary person speaking into an instrument makes a very poor "record." He begins perhaps in a high tone of voice: it is almost like a shout as it comes out of the instrument again; but before he has got half through his sentence his voice has dropped away to nothing, and the repetition can hardly be heard across the room.

Another, who has learned the secret of sustained voice production, and knows when and where to breathe, makes a record the sounds of which are always equal. This is a great advantage in teaching to speak, whether in the native or in a foreign tongue, and it is a feature in which the phonograph may be made specially perfect. In the experiments in question a "record" made by an English clergyman was peculiarly remarkable. It was a poem—I think, "The Wreck of the Hesperus"—and the delivery of it was so exceedingly fine that one could not but think that a series of such elocutionary models, in prose and verse, repeated before classes in board or other schools, must have a very beneficial effect in regard to the speaking of the mother tongue.

But even more admirable than the clergyman's record was that of a trained actor. This was a French record, and it showed, as hardly anything else could, what unlimited possibilities lie in the phonograph as a language teacher—the enunciation, the emphasis, and the general delivery being so uniformly excellent.

These various experiments suggested the feasibility of arranging a Phonographic Primer for the French language, the lesson to be printed in the ordinary way, so that the pupil might have it before his eyes while the instrument was pronouncing it for him from the "record." Two or three simple lessons were accordingly written out and spoken into the instrument. These consisted of the conjugation of the verb *être*, "to be," *avoir*, "to have," &c., and of the numerals *un*, *deux*, *trois*, *quatre*, &c., up to twenty; also some simple sentences.

Although the examples were spoken into the instrument by an untrained, and to some extent uneducated man, they made a valuable record. They came out perfectly as spoken, some of the words in the spoken sentences showing a falling off in strength from being uttered, as it were, on the last end of a breath. But there was nothing of this when the record was made by one practised in taking breath and in giving full value to every sound.

The experiments demonstrated fully that the phonograph may be turned to great advantage as an aid in the teaching of languages, not necessarily as superseding a native teacher, but by way of adjunct; and in cases where a teacher is not available, as an aid to private study, in giving the exact pronunciation of words, and over and above that, the rhythm and cadence of the tongue as spoken by educated persons. It might be made the more valuable in this respect by adding examples of the manner and the delivery of practised, and even of eminent, speakers.

This, of course, would be combining something of elocution with language teaching, and they should naturally—at least, to some extent—go together.

I need only add that while the phonograph can never supersede the native teacher, it might be made very useful in elementary classes, for familiarising the ears of children with the changes of the verbs, &c., and likewise in private study, and in large commercial houses to aid and encourage the younger clerks to take up the study of languages.

There is another way in which the phonograph might be made exceedingly valuable as a help to the acquisition of foreign tongues—that is by procuring native "records" of the various languages of the East as an aid to those who have to study those languages, as future judges, administrators, &c.

LEISURE-HOUR PURSUITS: PHOTOGRAPHY.

By H. E. Hadley, B.Sc. (Lond.), A.R.C.Sc. (Lond.), Headmaster of Kidderminster School of Science.

(*Concluded.*)

VII.—Essential Apparatus in the Dark Room.

An efficient equipment for the dark room would include the following articles: Four ¼-plate opaque xylonite developing dishes; two 12 × 10 granitine dishes; six 30-oz. glass-stoppered bottles and six 4-oz. ditto; one measuring-glass; four ¼-plate printing frames; one trough, with vertical slots, for the fixing bath; two racks for drying negatives; a print washer (¼-plate size, with rack); balance and set of weights. The whole of this apparatus might be purchased at a cost of about £2 10s.

Text-books.—The beginner would obtain sufficient information on practical details from C. H. Bothamley's "The Ilford Manual" (The Ilford Manufacturing Co., 1s.); for more advanced work "The Barnet Book of Photography" (Percy Lund, Humphries & Co., 1s.) can be recommended. Meldola's "Chemistry of Photography" (Macmillan, 6s.), and Abney's "Treatise on Photography" (Longmans, 3s. 6d.) are useful books for reference on theoretical points.

VIII.—Prints from Negatives.

The beginner is recommended to use P.O.P. (Printing Out Paper) until he is thoroughly conversant with the general principles of obtaining prints; the "Paget," "Ilford," and "Eastman's Solio" brands are the most popular. At a later date platinotype paper may be used, which, although it does not give so much detail as P.O.P., has the advantage of greater permanence.

IX.—INITIAL PRECAUTIONS.

The following points should receive careful attention before any practical work is commenced:—

Be sure that no stray light is leaking into the dark room through the door or window. After remaining in the dark room for a few minutes the eye becomes accustomed to the darkness, and any stray light can then be readily detected. If the edges of the door are not light-tight they may be made so by tacking some tailor's list round the edges; the keyhole may be covered with a piece of brown paper.

Be sure that the dark-room lamp is sufficiently screened. This question may be answered in the following manner: Cover one-half of an unexposed negative with cardboard, and hold the negative near to the dark-room lamp for one minute. Develop the negative in a dish which is covered with a piece of cardboard in order to prevent any further action of the light. If the exposed half becomes much darker than the protected half, the lamp is not sufficiently screened.

Be careful to eliminate all dust from the camera and dark slides. Carefully dust the inside of the camera and dark slides. A useful precaution is to smear the inside of the camera-bellows with a little glycerine. Always dust the surface of the plates before putting them into the dark slides, using for this purpose a wide camel-hair brush, which should be kept scrupulously clean and dry.

X.—TIMING EXPOSURES.

Before proceeding to experimental work it is well to consider how, with the apparatus at the worker's disposal, the whole range of exposures may be accurately obtained. A Thornton-Pickard Time and Instantaneous Shutter will give any exposure from $\frac{1}{80}$ sec. to $\frac{1}{15}$ sec.; and if the new Thornton-Pickard "Time" Exposure Valve is added to the rubber ball of the shutter, this range may be extended up to 3 secs. Longer exposures may be obtained by taking the lens cap on and off, and timing the interval by means of the seconds-hand of a watch; or it is easy to acquire the habit of mentally counting seconds with considerable accuracy, and in this manner timing exposures from 1 sec. up to 10 secs.

As a last resource it may be remembered, if the exposure with a diaphragm of given size cannot be accurately timed, that a larger stop may be used so as to expose by means of the shutter; or a smaller stop may be used so as to give an exposure which may be mentally timed.

The symbols (f/11·3, f/16, &c.) of the diaphragm scale refer to the diameter of the diaphragm when adjusted to the various scale divisions; thus, when adjusted to the mark f/16, the $diameter = \frac{focal\ length\ of\ lens.}{16}$ The consecutive scale divisions are determined in such a manner that the superficial area (or *aperture*) of the diaphragm is doubled at each consecutive scale mark; thus, f/16 gives one-half the aperture of f/11·3, and twice the aperture of f/22·6. Since the amount of light transmitted through the lens is directly proportional to the aperture, it follows that an exposure of 1 sec. with f/16 is the same as $\frac{1}{2}$ sec. with f/11·3, or as 2 sec. with f/22·6.

XI.—PRELIMINARY EXERCISE IN OUT-DOOR PHOTOGRAPHY.

Experience is the best teacher as to what constitutes a proper exposure, but considerable help may be obtained by using some simple form of exposure table. "Exposure Tables for Paget Prize Plates" (Paget Prize Plate Company, Watford), or "Dibdin's Automatic Exposure Meter" (Cadett and Neale, Ashtead, Surrey) are compact and readily carried in the coat pocket, and may be purchased for a few pence; these tables are drawn up for a plate of a certain rapidity in each case, but if a photographer is using any other brand of plate it is easy to determine once for all the correcting factor by a preliminary experiment.

Suppose the time to be a fairly bright day in summer, and between 2 p.m. and 4 p.m. Select some simple subject, *e.g.*, a house fairly distant, with light foliage trees in the foreground. For this subject we will assume that the exposure table gives an exposure of 1 sec. with f/32 (under the above conditions of quality of light). After focusing the picture, adjust the diaphragm to f/32 and expose five plates, giving a different exposure to each in the following manner: Plate No. 1, $\frac{1}{4}$ sec.; No. 2, $\frac{1}{2}$ sec.; No. 3, 1 sec.; No. 4, 2 secs.; No. 5, 4 secs. Develop all the plates under exactly the same conditions, and carefully compare the results. A good negative should show good contrasts and also plenty of detail in the shadows; an over-exposed negative shows want of contrast but plenty of detail, and an under-exposed negative shows too much contrast and no detail in the shadows. If plate No. 3 is the best, then the exposure table requires no correcting factor; if plate No. 4 is the best, then the exposures given in the table must always be doubled when the same brand of plate is used as those employed in the above experiments.

XII.—A FEW PRACTICAL HINTS.

(i.) Expose a negative sufficiently to give details in the shadows, and leave the bright lights to look after themselves. *Over-exposure* is a good fault, and it can be remedied; but *under-exposure* is serious, and cannot easily be got over.

(ii.) During development always cover the dish with a piece of cardboard (or an inverted dish), and occasionally raise the cover to see how the development progresses.

(iii.) Feel your way carefully when developing, and avoid the danger of the development taking place too rapidly. Begin with the full quantity of No. 1 solution (*Pyro*, or other reducer), and only one-half the normal amount of No. 2 solution (the *accelerator*). The brightest lights, such as the sky or reflected sunlight, should begin to appear in about 30 secs.; if this does not happen, gradually add more accelerator, but add no more if the

development appears to progress slowly and surely. If the entire image appears suddenly, pour off the developer quickly, and flood the plate with a ten per cent. solution of potassium bromide; pour this away after a short interval, and cautiously proceed with the development.

XIII.—The Programme of a School Camera Club.

The programme should be arranged in such a manner that the work done may be systematic, educational, and of permanent value. The club should be under the control of a member of the teaching staff who is conversant with photography, and also well acquainted with the district surrounding the school. A list of suitable subjects for photographing should be drawn up, the selection being based upon the historical or topographical importance of the subject. The programme might be extended so as to include subjects of more direct interest to the school only, *e.g.*, the winners of open scholarships, the "top boy," the "victor ludorum," and the cricket and football teams. Photographs of sufficient merit might form the nucleus of a collection of photographs, the property of the school, which would gradually grow into a photographic history of the school. The responsible head of the club should have full power to accept or refuse on behalf of the school any work of the members, and the negative of any accepted photograph should become the property of the school, the photographer being allowed a limited number of prints from the negative.

The year's programme might be arranged so that the winter months, when but little out-door work is possible, are utilised in giving instruction in printing processes, lantern-slide making, and in acquiring further theoretical knowledge by means of demonstrations given by the master who has charge of the camera club.

MR. BALFOUR ON PUBLIC SCHOOL EDUCATION.

Mr. A. J. Balfour, M.P., presided, on Friday, June 16th, over the Speech Day celebrations at Leys School, Cambridge, and distributed the prizes. In the speech which he subsequently delivered, Mr. Balfour referred to several phases of a public school education. The following selections from the speech will interest many of our readers:—

Public School System.

I do not believe that anybody knows what the origin of the Public School system in England is. It is a very remarkable system. It flourishes, so far as I know, nowhere except on Anglo-Saxon soil, or except among those who speak the English tongue. It owes its birth to no great Minister of Education, nor to the carefully thought-out schemes of any great religious body, such as those religious bodies who have done so much for good or for evil in developing education on the Continent. It would be hard, I think, to say whether the English school system has been made by the Masters for the boys or by the boys for the Masters. In truth, it is as natural and, therefore, as inexplicable a growth of our English soil as the British Constitution itself. For my part, I am a hearty believer in that system. I hold that, while a Public School is the product of the English character, the English character has itself owed a great deal to the Public School, and the merits of the Public School are not to be adequately gauged either by the character of its curriculum or the success, however great, of the scholars whom it turns out. It has merits which nearly touch the character of the future of those never destined to excel in scholarship or in any other branch of study; but who, by the character which they have formed under the influence of a Public School, have gone forth to every clime and to every land, and have done honour to the country which gave them birth.

Classical Education.

I hold that there is no probability, and there is certainly no desire, and certainly if it were probable it would not be desirable, that the dead languages—that Greek and Latin—should be excluded from the place which they have occupied in the higher education of the whole of Europe for centuries past. But I think we have to recognise that we cannot quite look at education at the end of the Nineteenth Century with the same eyes that our forefathers looked at it at the period when science did not exist, and when no literature existed—no literature that had to be taken account of existed—except in the two languages neither of which was a living language. From the nature of things they were driven to base their education wholly on the study of the great classical authors. They were driven to it, not merely because those authors are, and must always be, an admirable instrument of education, but because there was in their time literally no other field of human knowledge or of human research to which they could turn for subjects in which the youth of their age might be adequately educated. We live, and we happily live, in a very different period. And if it be true, as I think it is, that the classical languages still form the most convenient instrument of education, let us be careful, let us who hold that view be careful, that we do not put it on excessive grounds, that we do not press our case too far, and that in the face of many who think that the whole ancient scheme of education should be revolutionised we do not give ourselves away by claiming for the classical system things which, after all, the classical system cannot give us.

Literary Education.

I hold, and I think almost everybody who has studied the question holds, that all education which is not in part, and in a considerable part, a literary education, is necessarily maimed and one-sided, an education, that is to say, which does not make the person educated at home in some great imaginative literature, and which does not put him in sympathy with the great literary artists and the great thinkers of the past, and perhaps of a very different epoch, is an education which must leave undeveloped some of the finer sympathies, some of the more valuable qualities, which education ought to develop. But let us be quite honest with ourselves. This literary education can only be really profited by, fully profited by, in those cases where the student is really at home in the language which embodies the literature which he is studying, and unless the Head Master and his colleagues are much more fortunate than those unhappy beings who had to educate me and my contemporaries, there must be, and I am sure there is, a very large portion of those who go through a classical training who do not gain that familiarity either with Greek or with Latin which surely is absolutely necessary if the real literary and imaginative qualities of those two great literatures is to be thoroughly assimilated and absorbed by the student. Do not let it be supposed that on that account I think those who perhaps never reach that degree

of knowledge in those most difficult tongues have therefore wasted their time. I do not hold that view. I believe, for various reasons which I need not enter into now, from this fact among others, that the body of knowledge to be acquired is a fixed body of knowledge, and not changing from year to year, and almost from day to day, like Natural Science, from the fact that it concentrates attention, that it requires the pupil to be perpetually applying general rules to new cases, for the reason that it does not lend itself to cram, for the reason that there is always an admirable body of persons competent to teach it—I believe that for even those not destined to be scholars in that full sense of the term which I have indicated classical education may be an admirable training for the mind. Shall I be going too far if I state that, for the majority of boys at our Public Schools who do not get from their knowledge of Greek or Latin any real living insight into Greek or Latin literature—for them, I say, it is really imperative, if we believe, as I believe, in a literary education, that we should, through the medium of some more easily-learnt language, either at school or after school, give them that knowledge of the past which it has been thought in many lands, by men of genius, they could not have if they are to be restricted simply to the rudiments of Greek or Latin which they have been able to acquire at school. I therefore think that all those who believe in literary training, and among those I may rank, I suppose, every advocate of scholarship, I am sure that all those ought to do their best to encourage—I do not say by dogmatic or scholastic processes—but to encourage such other knowledge of these more modern literatures as shall enable those not so fortunate as themselves, and those who never can have the acquirements which they have attained—to give them some chance of obtaining all those benefits from a literary training which a literary training, and a literary training alone, is competent to give.

Scientific Training.

As for the controversy which goes on between the advocates of science and the advocates of literature, I really have hardly patience to speak, because it seems to me, as I have sometimes heard the two sides stated, utterly absurd. I cannot really conceive that any man, however enamoured of scientific method, that he should for a moment undervalue that insight into human nature and the interests which have always stirred human nature, and the manner in which those interests have been transformed by men of genius, from time to time, in the imaginative crucible of literature—I cannot imagine that such a training should be undervalued even by the more rigid advocate of scientific method. On the other hand, is it credible that in these days there should be found any man who should undervalue that curiosity about the world in which we live which science cannot, indeed, satisfy, but towards the satisfaction of which, after all, science is the only minister. There is a method of studying science, and there is a method of studying classical literature or modern literature, which, no doubt, has educational value to no man—a method of study which may indeed benefit mankind in the sense that it increases knowledge, but which does nothing for the student, either to satisfy his imaginative curiosity or to strengthen his imaginative appreciation of his fellow man. You may study chemistry, and you may study Greek versification, in a spirit which will leave you as barren and poor after you have done it as it found you before you began it; but after all, if we are to make the best of that heritage of great works which the men of old have left us, if we are to make the best of that insight into the physical world which from day to day is extending under the magic touch of men of science, it is surely folly that any man should think that he has done the best for human knowledge until he has drunk as deeply as he may of both sources of inspiration.

THE BOARD OF EDUCATION BILL.

THE Board of Education Bill was read a second time in the House of Commons on June 26th. The following quotations from the speeches during the debate on that occasion will serve to briefly indicate the views taken by several politicians, keenly interested in education, on certain of the provisions of the Bill. We have been compelled from considerations of space to deal only with those questions raised in the discussion which are likely to be of more direct interest to our readers.

Registration of Teachers.

Sir J. Gorst.—I think that the regulations will be framed in a generous and liberal spirit. It will be a register to which everyone can find access who is qualified to teach the higher subjects of education. There is nothing to prevent any Irish or Scottish teacher who is qualified from being put on the register of England and Wales.

Sir W. Anson.—As to the question of the registration of teachers dealt with by the Bill, teachers may in the future consider it an honour and distinction to be upon the register; but there must be ultimately the test of examination of some kind. Outside expert opinion there is a general belief that anybody can teach anything so long as they have a University degree and distinguish themselves in the athletic field. In the past, and to a certain extent in the present, schools suffer from that belief. There is also a belief that teachers must be to the manner born. No doubt there are born teachers, just as there are born statesmen; but I believe that, as there are a considerable number of persons who, without being born statesmen, may in time become useful members of the House of Commons, so there are many persons who, if they are taught how to teach—if they are set to learn that they must be infinitely patient, must try to understand the intellectual difficulties of their pupils, their stupidity and perverse ingenuity, and to be content with small results—these things may very well be imparted to the teacher before he uses his independent authority upon a class. One part of that examination should be in the theory and history of education. If a man is going to be a teacher, it is as well that he should know what other teachers have thought upon the subject and its history. I welcome the proposal for the registration of teachers, not only because it will impress upon the teacher that he has something to learn before he begins to teach, but because it will create a sense of comradeship in the great profession of teachers—a profession which I believe to be the most honourable a man can follow.

Mr. J. Bryce.—We are told in the Bill that the committee is to frame regulations for the formation of a register of teachers but the Bill does not contain a provision for the creation of such a register. I should have thought that there ought to be an express provision in the Bill for the creation of a register if it is to have any effect. Does the Government intend that the holding of a place on the register shall have a legal effect similar, for instance, to that of being on the register of the Medical Council? It is very doubtful whether the Education Department is the right body to keep this register. It is a professional matter, and hardly a matter to put into the hands of a Government department. Ought not the profession itself to run the register in the same way that the Medical Council works the "Medical Register?"

Inspection.

Sir J. Gorst.—Provision is also made enabling County Councils to apply the local taxation money which by law is applicable to secondary instruction, to the payment of the expenses of inspectors under the Bill, but there is nothing in the Bill pledging the administration to the particular kind of inspection they will have. In the ordinary schools they will have no power to inspect unless with the consent of the

governing bodies and proprietors of the schools. . . . . No doubt any school may invite inspection, but there is no absolute compulsion on the Board of Education. It is not obliged to inspect any school, but it may inspect any school if inspection is asked for.

Professor Jebb.—Under the Bill power is taken to inspect all schools supplying secondary education which may desire to be inspected, while all schools subject to the Endowed Schools Act will be liable to compulsory inspection by the new boards as they are at present by the Charity Commission. It is not intended at present to undertake any complete or systematic inspection of secondary schools—for financial reasons alone that would not be possible; but the headmasters of many of the public schools have signified their willingness to accept inspection, under certain conditions, not so much in their own interest, but because they think it is desirable in the public interest that there should be a complete system of inspection of secondary schools, and that their example may influence the smaller schools in accepting inspection.

Sir W. Anson.—I hope that the inspection of secondary schools under the Bill will not be limited to the officials of the Department, but that the services of all the existing agencies for inspection may be availed of by the schools. The Universities of Oxford and Cambridge have established a board which inspects the higher schools; and with regard to the lower schools there is another board, confined to Oxford University, which conducts examinations that are almost of the nature of inspection. I hope that these agencies will continue to be used; and that it will not be made more expensive to the schools to be examined from the Universities than to be examined from the Department.

Mr. Bryce.—The inspection proposed by the Bill is not the inspection of the Charity Commission. It is really the complement of that carried on by the Charity Commission. The inspection is to be so optional that it is not to be compulsory even as regards health. That seems to me to be an unfortunate defect in the Bill. I do not quite understand how much the Government contemplate by this inspection, but I think they would probably have done better to have reserved the inspection of local schools for their measure dealing with local authorities rather than to have thrown this extremely large task upon their Education Department. There is a considerable advantage in giving the inspection to local authorities.

Sir A. Rollit.—I trust no attempt will be made to divert the work which the local authorities have been doing in regard to inspection, and to place it in other hands. When it is remembered that the City Guilds, the College of Preceptors, and the London and other Chambers of Commerce have been strenuously, and at considerable outlay of funds, promoting the extension of commercial education, I submit that to take all that away and place it in the hands of the Universities would be a very serious mistake.

Consultative Committee.

Sir J. Gorst.—A great deal has been said about a consultative committee to which the Minister for Education should have recourse on any technical question upon which the Department itself is scarcely qualified to determine. It is proposed under the Bill to sanction the formation by the Board of Education of a consultative committee. The constitution, the numbers, and the mode in which it is to be applied are not provided for in the Bill. It will be an experimental proceeding, and it is thought better to leave the appointment of the committee to the discretion of the President of the Board of Education, and the conditions under which it is to hold office. But a certain portion is to be representative of Universities and other bodies taking an interest in education. In the view of the Government it would be a mistake to make this committee into a Parliamentary Committee so as to tie the hands of the President.

Prof. Jebb.—The object of establishing the consultative committee is to place at the disposal of the new Education Board the advice of persons conversant with the details of secondary education. Not less than two-thirds of the members of that consultative committee are to be representatives of Universities and other bodies interested in education, and the functions of the committee are to form the register of teachers and to consult the board of education in the matter of the inspection of schools. The consultative committee is also to be taken into counsel on any matter referred to it by the board, but on such matters only. It is to have no statutory powers whatever. It is to be the creation of the Minister of Education, who could choose his own advisers subject only to the proviso of two-thirds. The Minister would not be obliged to take the advice of this committee more than he saw fit to do so. I do not think, therefore, that those who are apprehensive that the control of secondary education may pass too much into the hands of educational experts have any reason to be alarmed by anything in this Bill.

Sir W. Anson.—I do not share in the apprehensions which have been expressed that the consultative committee will be a collection of faddists, and that their crotchets will impair the secondary education system of the country. No doubt the consultative committee will consist of persons interested in education; and no doubt every one interested in education is a faddist, having his own views as to the way subjects should be taught. I have been engaged for twenty years in teaching, and have decided views in the matter; and I have no doubt that I shall be told by another person engaged in teaching the same subject that my views are, to a certain extent, fads. It is right that a subject like secondary education should be under the direction of persons of ample knowledge, that it should be treated with a light hand, and that the Board should have opportunities of conferring with persons outside itself.

Mr. Bryce.—The Bill is extremely uncertain and doubtful about the consultative committee. In the first place, we are told that it is to consist of "persons representing Universities and other bodies interested in education." There is considerable ambiguity about the expression, and I hope the Government will give the House some indication of their views as to what is meant by "persons representing Universities" and "bodies interested in education." I should also like to know whether the proceedings of this consultative committee are to be private. I rather understood from what passed in another place that the proceedings are to be private, like those of the India Council.

Colonel Lockwood.—I regard the consultative committee as an extremely important part of the Bill, and it is so viewed by all the teaching profession. It will be the means of discovering and focusing opinion on many educational matters with which the Minister himself will not be brought into contact; it will prevent stagnation, encourage experiments, record results, and will pave the way for dealing with the vexed question of local authorities.

The Bill has passed the House of Commons Standing Committee on Law, and has been ordered to be reported, in its amended form, to the House. Professor Jebb's amendment to provide that the inspection of schools might be undertaken by the Board's own officers, or, after taking the advice of the consultation committee, by any University "or other organisation," was agreed to by Committee. It was also agreed to insert in the Bill a new subsection providing that "the council of any county or county borough may, out of any money applicable for the purposes of technical education, pay or contribute to the expenses of inspecting under this section any school within the county or borough."

EXPERIMENTAL STUDY OF CHILDREN.[1]

By ARTHUR MACDONALD,
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THE original part of this work is chiefly a study of Washington school children; the rest is, in the main, an endeavour to present results of the principal investigations on school children up to the present time. As to the original part of this study, the reader will remember that all such work is in its infancy, and must therefore be necessarily incomplete. It is hoped that this, with the work of others, may aid in a more thorough study of children, on whom the future civilisation depends.

Anatomical measurement of children is one of the chief branches of anthropometry. Anthropometry is the measurement of the human body in general. It is a branch of anthropology, but independent in its purpose and methods. In early times measurements of the body were made in the service of art. It is in comparatively recent times that authropometry has taken a scientific direction. The artist was interested almost wholly in the form and proportion of the human body, and so measured those only who were well-formed. The empirical investigator is interested in the measurements of all persons. The founder of this latter branch of study is the Belgian statistician, Quetelet. His purpose was to find what is typical in man, at the same time making note of the variations due to sex, age, race, and social position.

Importance of Measurements of Children.

In the investigation of normal modern civilised man, the most important branch is probably the study of children. The importance of taking physical measurements of children in school lies in the fact that such measurements may be considered as a test for systems of physical culture. As pupils are examined periodically to test their mental growth and improvement, it is just as necessary for their welfare that their physical condition and development be ascertained, so that progress may be gained in body as well as in mind. But there must be some standard by which we can measure physical development and growth. This can only be ascertained by taking measurements of a large number of children of all school ages. Although the physical conditions upon which the activity of mind depends are so complex, and so much is still unknown, yet it can be said with almost a certainty that at those ages in which children grow rapidly there should be a corresponding reduction in the amount of study required, and this should be done even if the pupil is mentally capable of doing more, for no pupil should be developed in mind to the detriment of bodily conditions. The bright pupil, whom parents are too often inclined to push, needs it the least, especially if his physical condition is inferior to his mental. The saying that apples which ripen slowest last the longest is as true as it is homely. The systematic collection, then, of physical statistics in the public schools will furnish valuable facts for the hygienist and the educator.

Methods of Study.

To establish the measure of work according to the strength of the individual is fundamental to the economy of health. This is especially true of children, but the difficulties here are greater than in adults, owing to the changes caused by growth. Overtaxing of the powers here leaves its mark generally throughout the whole future life of the child. No question, then, can be more important for the school, according to Combe, than:

(*a*) What is the maximum work suitable to a child in the different periods of development in its school life?

(*b*) Can this maximum be injurious at certain times, when all the vital force may be required for growth?

We must first know the physiology of normal growth, whether it is regular and when it increases or decreases in rate, and what influences this increase and decrease. There are two methods of pursuing such an investigation—the collective method and the individual method.

The collective method consists in measuring large numbers of children of every age, and obtaining the average or mean for each age, the value of which is in proportion to the number measured. Quetelet, of Brussels, was one of the first to use this method, but he only measured ten of each sex, which is too small a number to give any certainty to the results. Of much more importance are, for instance, Dr. Bowditch's measurements of 24,000 Boston school children. This method was employed by Alex. Hertel in Denmark, who measured 28,384 children in the different public schools. Axel Key in Sweden measured 15,000, most of whom were in the high schools; Erismann gives results from 3,000 children in Moscow, Pagliani for 2,016 in Turin. Kotelmann in Hamburg made very careful and extensive measurements, but on a limited number. The individual method was employed by Liharzik in Vienna, who investigated 200 from 8 to 14 years of age, measuring them each year.

What is a Normally Developed Child?

This question might be answered, but only within certain limits, owing to the variation and complexity of the human species. A method of inquiry would be to seek out the positively abnormal children and find what characteristics are peculiar to them. The remaining children in a general way might be called normal.

At present the desire is to find the average, the type or types of the great mass of children. This can be done only by measurements on large numbers, these measurements being summarised according to the statistical method.

It is a common saying that "almost anything" can be proved by statistics. This may be true with their wrong interpretation. Yet without statistics there is little or no basis for opinion or conclusion. Every additional observation through counting, measuring or weighing, every repetition of an experiment, when applied to large numbers, lessens the amount of error, giving a closer approximation to truth, against which preconceived ideas or theories have little weight.

Some Conclusions as to Washington School Children.

(*a*) *Conclusions as to* 1,074 *Children Specially Studied.*

Long-headedness increases in children as ability decreases. A high percentage of long-headedness seems to be a concomitant of mental dulness.

Children are more sensitive to locality and heat on the skin before puberty than after.

Boys are less sensitive to locality and more sensitive to heat than girls.

Children of the non-labouring classes are more sensitive to locality and heat than children of the labouring classes.

(*b*) *Conclusions as to all the School Children.*

As circumference of head increases mental ability increases.[1]

Children of the non-labouring classes have a larger circumference of head than children of the labouring classes.

[1] The reader who desires fuller information is referred to "Experimental Study of Children." By A. Macdonald. Washington: Government Printing Office, 1899.

[1] It being understood that the race is the same.

The head circumference of boys is larger than that of girls, but in coloured children the girls slightly excel the boys in circumference of head.

Bright boys are in general taller and heavier than dull boys. This confirms the results of Porter.

Children of the non-labouring classes have, in general, greater height, sitting height, and weight than children of the labouring classes. This confirms the results of investigations by Roberts, Baxter, and Bowditch.

Girls are superior to boys in their studies.

Children of the non-labouring classes show greater ability in their studies than children of the labouring classes. This confirms the results of others.

Mixture of nationalities seems to be unfavourable to the development of mental ability.

Girls show higher percentages of average ability in their studies than boys, and therefore less variability. This is interpreted by some to be a defect from an evolutionary point of view.

As age increases brightness decreases in most studies, but dulness increases except in drawing, manual labour, and penmanship; that is, in the more mechanical studies.

(*c*) *Conclusions as to Children with Abnormalities.*

Boys of the non-labouring classes show a much higher percentage of sickliness than boys of the labouring classes.

Defects of speech are much more frequent in boys than in girls.

Boys show a much greater percentage of unruliness and laziness than girls.

The dull boys have the highest per cent. of unruliness.

Abnormalities in children are most frequent at dentition and puberty.

Children with abnormalities are inferior in height, sitting height, weight, and circumference of head to children in general.

HIGHER COMMERCIAL EDUCATION IN ITALY.[1]

Italy was amongst the last of the nations to take in hand the question of commercial education. It was not until 1868 that the "Royal Higher Commercial School" was established at Venice. This was the first institution of its kind in Italy, and was followed by the establishment of similar schools at Bari and Genoa respectively. These, together with eleven lower commercial schools, form all the provision that has as yet been made in regard to commercial education in this country, as distinguished from instruction in arts and crafts.

Higher Commercial School at Venice.

The Royal Higher Commercial School at Venice is empowered to confer on the pupils who successfully complete its course of studies a diploma which is considered for all legal purposes as equivalent to the higher academical degrees. It has for its object the preparation of young men for commercial pursuits, and also for the consular and teaching professions.

On the commercial side there are three courses, lasting in all three years. The pupils receive practical as well as theoretical instruction, being taught modern languages, geography, commercial law, book-keeping, accountancy, letter-writing, technology and the nature of commodities, and other elements of commercial business.

The consular course lasts five years, and comprises foreign languages; book-keeping; commercial, civil, maritime, international, constitutional and criminal law; commercial history; technology; political economy; the science of finance; and the art of statistics; and other studies preparatory to the Foreign Office examination for posts in the Consular service.

Candidates are only admitted to the school after having passed a preliminary examination, or on the production of a certificate showing that they have successfully accomplished the educational courses in technical or collegiate schools.

In the year 1897-8, 133 students were on the books, of whom 33 attended the common preliminary class, constituting the first course for all the sections, 23 the further commercial courses, 3 the consular courses, and the remainder the courses for those desiring diplomas as teachers; 111 presented themselves for examination, of whom 88 completely satisfied the board of examiners, and were promoted or granted diplomas.

The total income of the school from all sources was, in 1897, £3,873, including £600 from school fees and £57 fees on granting certificates; the expenses in the same year amounted to £3,759.

The school is governed by a Board of Administration composed of eight members, two of whom are appointed by the Ministry of Commerce, two by the Provincial Council of Venice, two by the Communal Council, and two by the Venice Chamber of Commerce. The director and professors of the school are appointed by the Government on the recommendation of the Board. The institution is said to be the most complete of its kind in Italy, and is generally considered to have proved a great success; most of the students who have passed the commercial curriculum have found places of profitable employment. The majority of the students come from Venice and the neighbourhood; in 1897 there were eight students from foreign countries.

Commercial School at Bari.

At Bari the local Chamber of Commerce instituted in 1873 a "Commercial School with a Model Office," which rendered important services to the commerce of the district. Ten years later the Government issued a scheme of statutes for the school and granted a subvention, and in 1886 the institution was transformed into the Royal Higher School of Commerce.

The objects of the Bari school are: (1) to afford a thorough theoretical and practical instruction to those who wish to engage in trade or industry, or to become clerks in commercial houses, with special attention to the practical application of commercial instruction; (2) to prepare young men who propose to follow the consular career. The course of studies extends in the lower classes on the commercial side to two years, in the higher classes to three years. The consular course is of five years' duration.

The control of the school is exercised by a Board of Administration, composed of nine members representing the different authorities contributing to the maintenance of the institution.

The director of the school has a deliberative voice at the meetings of the Board. The powers of the Board are limited by the bounds defined in the scheme of statutes and regulations issued for the school by Royal Decree, and are within the purview of the laws on public instruction. The Minister of Commerce exercises a general right of superintendence over the school, he approves the programme of instruction and the yearly balance-sheet, he nominates, suspends, or removes, the director

1 "Commercial Education in Italy." Diplomatic and Consular Reports. No. 503. (Miscellaneous Series). 1899.

or the professors, and can at any time depute his representative to inspect the school or even to intervene in the examinations.

The receipts shown on the provisional balance-sheet for the year 1898 include, besides £3,560, under the head of subventions, £100 from school fees, and £12 from fees for certificates. These sums, with other sundries, are set down to meet a total expenditure of £3,850. The principal expenses are salaries to teachers, £3,092, and house-rent, £320. The sum of £80 was expended on the technological museum and exhibition of samples, which the local Chamber of Commerce is using every effort to develop into a commercial emporium.

During the period of 1887-97 the average yearly number of pupils was 41 in the upper classes and 60 in the lower classes. About 25 per cent. of the pupils come from local commercial circles. It is said that the poor attendance at the school is due to the fact that young men who can afford to follow the courses of a higher commercial school prefer to devote themselves to a strictly professional career.

Genoa Higher Commercial School.

In Genoa there is a commercial school of considerable importance; it is called "The Royal Higher School of Instruction in Commercial Studies in Genoa," and was established by Royal Decree in May, 1884. It is governed by a committee representing: (1) The Ministry of Agriculture, Industry, and Commerce; (2) The Province; (3) The Municipality; and (4) The Chamber of Commerce of Genoa, each of which contributes 20,000 lire a year, or 80,000 lire (£3,200) together, to its support.

The complete course of instruction covers three years, and is divided into three classes of one year each, viz.:—(1) Commercial Technology; (2) Economical and Juridical Science; (3) Literary and Philological Culture.

Candidates over 16 years of age are admitted on proof, either by examination or by the production of certificates from Government, or other recognised educational establishments, that they have a good general education. Promotion from each annual class to a higher is by examination, and on the completion of the whole course a final examination has to be passed to entitle candidates to a diploma or commercial degree, qualifying them to hold the highest posts in banking and commercial establishments, or in expeditions and voyages on account of the Government, public companies, or others. A three years' scholarship of £100 a year is provided to enable the most promising student of each year's graduates to go abroad and gain practical experience in any of the principal commercial centres of the world.

One interesting feature in its instruction is the "banco modello," or model office. Students in this department represent different firms in various parts of the world, and go through all the most minute operations of trading with each other, including transit of goods by sea and by land. Connected with these commercial houses are: a deposit and discount bank, a bank of issue, and a clearing-house, all being furnished with a complete supply of ledgers, forms, &c., such as are actually used in each department of trade.

A good commercial library, machinery room, museum of commercial samples, and a laboratory are attached to the school. The professors are 12 in number, and are selected by competition according to the regulations governing the appointment of university professors; their stipends vary from £80 to £200 per annum; no provision is made for pensions.

The results have been excellent, and successful graduates find immediate employment at high salaries.

The following are the subjects taught, with the number of hours per week given to each:—

Subject.	1st Course.	2nd Course.	3rd Course.
French language	4	3	2
English ,, ...	6	3	3
German ,, ...	6	3	3
Spanish ,, ...	—	3	3
Commercial geography	2	3	2
Technology and nature of commodities	1	4	4
Political economy and statistics ...	3	2	2
Civil and commercial law ...	3	2	2
Mathematics	2	2	2
Accounts and book-keeping ...	9	4	4
Model office	—	8	8
Total hours per week ...	36	37	35

Text-books are not used, and pupils must attend the lectures of the professors. The school is officially a higher institution of university rank; its diploma is equal in value to the Academical Degree of Doctor, and certifies that the holder is qualified to fill the post of manager in great commercial, transport and banking undertakings.

In 1898 the receipts were £3,586, derived from subventions and from the proceeds of the school fees. The expenses amounted to £3,326. The number of pupils averages about 40.

Commercial men in Genoa appear to have a high opinion of the school, and in many instances their sons attend the classes. All the pupils holding certificates from the school at once obtain good situations either in Italy or abroad. A shipping company in Genoa whose book-keeping is of a very complicated nature, necessitating the employment of a highly trained clerk, has recently given the appointment to one of these students. The result appears to have been very satisfactory.

A NEW FORM OF SCHOOL DESK.

DR. ELIZA MOSHER, of the University of Michigan, describes in the June number of the New York *Educational Review* a form of hygienic desk which she has designed to obviate such evils as "near sight," "spinal curvature," "flat chest," &c., which too often result from the use of many of the old-fashioned patterns of school desks. The "Mosher reading and writing

Fig. 1.

Fig. 2.

desk" consists of *two parts*, a writing table and an adjustable reading desk, as will be seen from a glance at the illustrations. The desk is narrow, to prevent the pupil from resting his elbows upon its wide part. It is deep from front to back, to make room for books and papers, and it slopes but slightly. The reading attachment consists of a movable headpiece, attached to

the writing desk by means of a pair of brackets having a swivel joint. When needed for reading, the pupil noiselessly drops it into position (Fig. 1) and places his book upon it. The normal focal distance for reading ordinary type is from ten to fourteen inches; the book in place upon the reading desk is about this distance from the pupil when he is properly seated. The book stands, moreover, at such an angle as to make a forward inclination of the head in reading not only unnecessary, but uncomfortable. When the reading desk is not in use it forms, by virtue of its construction, a support for a reference book, such as a dictionary (Fig. 2). Since boys and girls differ in height, both desk and chair are adjustable. This is accomplished by means of a single supporting standard of iron fastened to the floor. To raise or lower the chair or desk, all that is needed is to loosen a single nut, place the chair or desk at the proper height, and tighten the nut. Finally, the back can be raised or lowered to fit pupils of different heights.

CURRENT GEOGRAPHICAL TOPICS.

By A. J. HERBERTSON, F.R.G.S.

I.—Puerto Rico.

PUERTO RICO, the most eastern of the Great Antilles, is in many ways the most interesting of the West India Islands. It is less than 100 miles long and about 35 miles wide, and has an area of about 3,700 square miles, which is about twice the area of Lancashire. It is thus somewhat smaller than Jamaica. It does not possess the variety of landscape that Jamaica does, but consists of a low range of hills which runs along the axis of the island, whose highest point is only 3,600 feet, not much more than that of Snowdon. The surface of the island is undulating. Rains are plentiful, especially on the northern slopes, and the island is extremely well watered. The temperature is equable, and the climatic conditions favour rich vegetation, which the fertile soil of the island renders luxuriant.

We have practically no scientific information about this island, although it is one of the most densely populated and well cultivated of tropical islands. The forest trees are numerous, and fruit trees of all kinds flourish. The fertile soil produces rich crops of sugar, the yield per acre being greater than any other West India island except Cuba. Coffee is grown on the higher lands, either on the shady side of the mountains or under the shade of trees. Tobacco is extensively cultivated, and small fruits and vegetables of all kinds are grown. Many cattle are reared. The land is mainly in the hands of small proprietors, who obtain rich crops with very little labour.

The population in 1887 was about 800,000, a density of 221 per square mile, equal to that of many agricultural counties of England, such as Norfolk and Suffolk. About half a million of these are white, a quarter of a million coloured, and less than 80,000 black. It is very notable that the black and coloured population are not treated as outcasts by the creoles in the Spanish possessions, while they are in British and United States possessions.

The country is covered with small villages and towns. The most important of the latter is San Juan, whose full name is San Juan Bautista, which was founded in 1511. It has an excellent harbour, the entrance to which, however, is very difficult in the winter months, when the north winds are blowing. Ponce, 90 miles from San Juan, is the other important city, with 15,000 people, about half the population of San Juan.

II.—General Structural Relations between Central America and the West Indies.

The general structure of Central America and the West Indies is not easy to understand, nor is much attention devoted to it in ordinary school text-books of geography. General notions of the structure of a region, however, are absolutely essential if geography is not to deserve the criticism, often made by its detractors, that it is a mere enumeration of details, selected on no scientific principle, and without any proper correlation.

The difficulty which always accompanies attempts to group a large number of details according to some general law is increased, in the case of the region under consideration, by our ignorance of much of it, and by the diversity of the forms to be considered. This has led the writers of some school text-books to postulate a simplicity of structure which does not exist, as, for example, to assume the existence of a continuous mountain range uniting the Cordilleran systems of North and South America. This, however, is not the case.

Most of the mountains of Central America run east and west, and there is no suggestion of a longitudinal range, except in the line of active volcanoes and young volcanic deposits which skirts the Pacific from 15° to 8° N. In the north the granitic Sierra Madre del Sur separates this volcanic range from the isthmus of Tehuantepec, above which the steep escarpments of the southern volcanic mountains of Mexico rise in the north, striking almost due east and west, and ending the Cordilleran system of North America. In the south the Veragua and San Blas ranges, respectively lying west and east of the depression at Panama, also strike nearly west-east, and have no connection with the northern ranges of the South American Cordilleras. Central America is neither North nor South American in its physical characteristics, but a region apart.

The West Indies have been even less satisfactorily dealt with, for they are rarely treated as a unity at all, unless the single statement that they may be considered as a bridge uniting Florida to Venezuela can be regarded as an attempt in this direction.

It is, however, quite incorrect to assume that the West Indies form part of North America. In the Great Antilles the mountains show no trace of relationship with those of North America. The Organos mountains of Cuba lie in the same line as the north of Yucatan. The trend of the Sierra Maestra of Cuba can be traced westwards, through the Little and Great Caymans and the Misteriosa Bank, to the Cockscomb Mountains of British Honduras, and eastwards, through the northern mountains of Hispaniola,[1] which join a southern range in the east, and form one range in Puerto Rico. Traced westwards, the southern Hispaniola mountains lie in the same line as those of Jamaica, the Pedro and Rosalind Banks, the mountains of northern Honduras, and thence through those of Central Guatemala, as the general direction of the rivers there would suggest. So far as the structure of these mountains is known, it corroborates the relationship of these West Indian and Central American regions. They are mountains of folded sedimentary strata, the recent deposits being of Pacific and not of Atlantic type. We can well imagine a relatively recent geological period, before the young volcanoes made a continuous barrier, and when the land was lower in the west, during which the three great depressions in Central America, Tehuantepec (390 feet), Nicaragua (150 feet), and Panama (286 feet), were straits. When the west of the region was a line of islands the east was a continuous land mass, the tops of whose mountains form the Antillean Islands of to-day.

The northern Small Antilles, facing the N.E. trades, were

[1] It is convenient to use the old name Hispaniola for the island which is divided between the two republics of Haiti and Santo Domingo.

classified as Leeward Islands in old books, those south of Dominica as Windward Islands, and these stupid terms are retained in our political nomenclature, although it is opposed by that of all other nations, who call the eastern Small Antilles the Windward Islands, and give the name Leeward to those lying in their lee off the north coast of South America. The Small Antilles, however, consist of a N. and S. line of volcanic islands, parallel to the young volcanic region of Central America. The chief volcanic islands are St. Kitt's, Montserrat, W. Guadeloupe, Dominica, Martinique, St. Lucia, St. Vincent, Grenada. The outer islands from Sombrero and Aguilla to Maria Galante are limestone and coralline islands, rising above a submarine bank. The South American islands, from Tobago and Trinidad to Curacao, Oruba, are submerged parts of the east and west running mountains of the north of South America, parallel to the mountains of the Great Antilles. From one point of view Central America and the West Indies form an area, bounded on east and west by great volcanic regions, trending north and south along ridges of risen ground in the west, and of sunken ground on the east, separating the deep basins of the Pacific, the Caribbean, and the Atlantic waters, and bounded on north and south by ranges of folded mountains, mainly of sedimentary rocks, striking west and east. This is the view of Mr. Hill, but Prof. Suess sees in Barbuda, Antigua, and Barbados, the connection between the northern Antillean mountains and those of northern Venezuela, which he regards as prolongations of the Andes. For Professor Suess the Antilles are structurally part of South America.

The plants and animals of Central America and the Antilles are distinctly South American in character; and all known fossils have this peculiarity. In the past as in the present this region has been South American and not North American, and it would be well to emphasise this in our geography lessons.

NOTE.—In last month's article, p. 223, line 6, "the remainder are whites, consisting of," should read "the remaining whites consist of."

ITEMS OF INTEREST.

THE August number of THE SCHOOL WORLD will contain a series of articles suitable for holiday reading. Many teachers are in the habit of making the summer vacation the occasion for observations of different aspects of Nature; and to interest them we are glad to be able to announce that the following illustrated articles, amongst others, have been arranged:—"The Stars of August," with maps, by Prof. R. A. Gregory; "On the Rearing of Caterpillars," by W. F. Kirby, F.L.S.; "Observations on Earth Sculpture," by Dr. A. J. Herbertson, F.R.G.S.; "Illustrated Experiments in Botany," by Ernest Evans; "Clouds and Cloud-Forms," by A. T. Simmons, B.Sc. Other contributions somewhat outside the ordinary school routine will be included in the number.

OWING to the retirement of Sir John F. D. Donnelly, K.C.B., from the secretaryship of the Science and Art Department, the Duke of Devonshire has appointed Sir George Kekewich, K.C.B., the present secretary of the Education Department, to be also secretary of the Science and Art Department. Captain W. de W. Abney, C.B., becomes Principal Assistant Secretary of the Science and Art Department, and Mr. W. Tucker, C.B., Principal Assistant Secretary of the Education Department.

AT the annual summer meeting of the Incorporated Association of Headmasters, held on June 30th and July 1st at Manchester Grammar School, resolutions were adopted welcoming the Board of Education Bill as a great step towards the organisation of secondary education, regretting that the Bill embodies no definite educational policy, and expressing the hope that the Bill would pass this session.

THE following resolution respecting the Board of Education Bill has been passed by the executive committee of the National Association for the Promotion of Technical and Secondary Education:—"That, having regard to the fact that it is not proposed to create for the present an adequate staff of Governmental inspectors of education and to the character of the education to be inspected, this committee are of opinion that the Board of Education should be empowered to recognise the inspection of such public bodies as may be approved for the purpose by that board."

THE General Medical Council has decided that the senior examination of the Central Welsh Board should be added to the list of preliminary examinations qualifying for entrance upon a course of medical studies.

THE recent inquiry into the expenditure of the London School Board on Science and Art instruction has resulted in the Local Government Board auditor (Mr. T. B. Cockerton) disallowing and surcharging certain items in the accounts of the Board for the year ended Michaelmas last. The London School Board will probably appeal against the auditor's decision, and it is not unlikely that School Boards throughout the country —for the decision, it is expected, will have a general application —will move in the matter.

THE explanation of the grant of £12,000 to the Leeds Girls' High School, to which we made reference in our last issue, is that the Governors have, with the consent of the Charity Commissioners, agreed to purchase the existing High School, with the intention of permanently establishing it as a grammar school for girls.

THE Town Council of Walsall has decided to spend £4,000 in enlarging the Science and Art Institute which was a short time ago handed over to the town. The money is to be expended in providing additional class rooms, a proper physical laboratory for the day school, and increased laboratory accommodation for advanced students.

WITH the object of assisting teachers of schools and classes to acquaint themselves with the methods and principles of natural science, especially as bearing upon aspects of school and class work, the Technical Instruction Committee of the Liverpool City Council have made arrangements with Professor W. A. Herdman, F.R.S., Professor of Zoology at University College, to give a short course of lectures and laboratory demonstrations on the study of natural history.

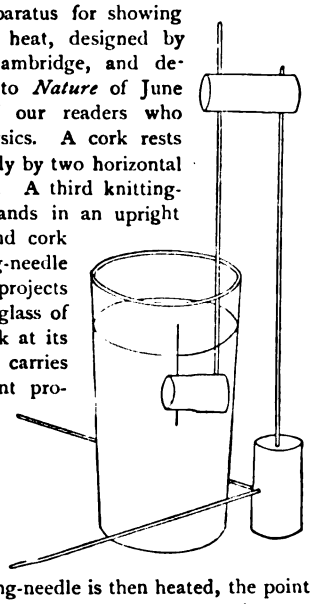
THE "Guide to the Museum of Eton College" prepared by Mr. M. D. Hill, and recently published, is evidence of the excellent provision made at Eton for the study of natural history. The museum was planned by Mr. A. Vaughan Jennings, the first curator, and since the appointment of the present keeper, Mr. Hill, very considerable developments have taken place.

IN connection with the Welsh Educational Exhibition being held at Cardiff during the Eisteddfod meetings which commenced on July 15th, an historical handbook of Welsh education is being prepared under the editorship of Dr. Isambard Owen. The work will contain chapters dealing with the early history of education in Wales; the history of Jesus College; the late Lord Aberdare's Departmental Committee, and the working of the Intermediate Education Act; besides chapters on some of the chief grammar schools and training colleges.

A meeting of teachers was held on June 17th, in Marshall Street Hall, Edinburgh, to consider what steps should be taken to further the interests of teachers of special subjects in elementary and secondary schools with a view to securing the recognition of the Education Department for the benefits of the Superannuation Act. Representatives were present from Edinburgh, Leith, Kirkcaldy, St. Andrews, Dundee and Broughty Ferry.

The County Councils of Berkshire, Dorset, Hampshire and Oxfordshire co-operate, through their Technical Instruction Committees, with Reading College in a very complete system of field experimental work. The landowners and farmers at the different centres have readily given facilities for carrying on the experimental work by placing land at the disposal of the College, and by giving every assistance in the cultivation of the plots. Meetings with local agriculturists, in most cases arranged by the Directors of Technical Instruction for the different counties, have been held on the plots at most centres. Mr. Douglas A. Gilchrist and the other members of the Agricultural Staff of Reading College are to be congratulated on the success of this development of agricultural instruction.

The following simple apparatus for showing the expansion of metals by heat, designed by Mr. Horace Darwin, of Cambridge, and described by him in a letter to *Nature* of June 15th, will interest those of our readers who are engaged in teaching physics. A cork rests on the table and is kept steady by two horizontal knitting-needles fixed into it. A third knitting-needle fixed in the cork stands in an upright position, and carries a second cork at its top. Another knitting-needle passes through this cork and projects vertically downwards into a glass of water, and carries a third cork at its lower end. This last cork carries a sewing-needle with its point projecting upwards just above the surface of the water. If the left vertical knitting-needle is heated with a match, the point of the sewing-needle will disappear below the surface of the water; if the right knitting-needle is then heated, the point will appear again. These small movements can be easily seen by watching the reflection of a bright object in the surface of the water.



Messrs. Allman & Son, Ltd., have made arrangements for the publication of the *Public School Writing Book* in eight numbers. Number 4 has been issued first; the remaining numbers will follow at intervals as quickly as possible. We heartily recommend the style of penmanship adopted; it is clear, elegant, simple, and has been approved by the managers of the chief banks. The paper has been specially made for these copy books, and has received the approval of a number of commercial authorities. The writing books are sure to command immediate success.

The Rev. Dr. H. de Gibbins makes a practical proposal in the June *Fortnightly* for the provision of commercial education throughout the country, and his suggestions deserve careful attention. He proposes the establishment of a Department of Commerce on the same lines as the Department of Science and Art at South Kensington. To begin with, the standard should be fairly low, though the system should be regular and well-organised. The qualifications of teachers should be clearly laid down and provision made to enable teachers to properly qualify themselves. One set of examinations by one body would with advantage take the place of the different sets of examinations by different examining bodies which have hitherto been provided. Work done in classes in connection with such a Department of Commerce would be paid for by giving grants freely yet judiciously. The schoolmaster must be consulted as to what it is possible to teach in schools, and inspectors would see that the teaching is properly done. Besides this, commercial museums and specimens of products must be common accessories to teaching. "Have, in fact," as Dr. de Gibbins says, "organisation and system instead of muddle and chaos."

Eight hundred and fifty-five candidates entered for the recent Cambridge Higher Local Examination, which was held at 24 centres. In 1898 the number of candidates was 879. The new regulations, which contain the announcement of set subjects in the various groups for December, 1900, and June, 1901, as well as for December, 1899, and June, 1900, can now be obtained from the local secretaries or from Dr. Keynes, Syndicate Buildings, Cambridge. Important changes have been introduced in the regulations for French, German, and Italian. In June, 1900, an oral examination in the first two of the languages will be held for the first time.

The Teachers' Training Syndicate have reported to the Senate of the University of Cambridge that the period of five years for which the grant of £100, placed at its disposal for providing lectures on the Theory, History and Practice of Education, was renewed on May 29th, 1894, and comes to an end at the end of the present academical year. The necessity of the grant is now more urgent than before. During the last five years headmasters of secondary schools have taken more decisive steps to insure the training of teachers, and a secondary department has been added to the Day Training College, originally instituted for the training of teachers in primary schools. At the present time members of both the secondary and primary departments of the Day Training College are subject to compulsory attendance at the lectures. The Syndicate have therefore recommended that a sum, not exceeding £100 a year, be placed at the disposal of the Teachers' Training Syndicate for the five years ending June, 1904, for the purpose of providing lectures in the Theory, History or Practice of Teaching, open to members of the University.

Dr. R. Ogilvie, one of Her Majesty's chief inspectors, in his general report for the year 1898, on the schools in the southern division of Scotland, remarks with reference to the provision of secondary education, that the several schemes formulated by the burgh and county committees for the distribution of the equivalent grant vary considerably in detail, being drawn up to suit the varying educational circumstances and conditions of the different districts; but amidst this apparent diversity there persists a substantial unity of aim and purpose. The common object of all the schemes is to extend the benefits of secondary instruction, as far as practicable, to all who are at once desirous of taking advantage of it and capable of profiting by it. Where efficient and well-equipped secondary schools already exist, the method generally adopted is to facilitate the transference of promising pupils from the elementary schools by subsidising the secondary schools with grants in proportion to the number of free places. In the more sparsely populated rural districts substantially the same object is effected by grants to conveniently situated central schools, on certain conditions regarding staffing and accommodation.

MR. G. BIRTWISTLE, who was bracketed Senior Wrangler this year, was as a boy a scholar of Fulledge Wesleyan School, Burnley. He entered Burnley Grammar School during the headmastership of Mr. J. L. Ward by means of a scholarship, and among the numerous successes he gained in school examinations the honour of being placed first in all England in the Cambridge Junior Local takes a prominent place. By the help of two exhibitions from Burnley Grammar School, Mr. Birtwistle proceeded to Owens College, Manchester. In 1896, he not only graduated as a Bachelor of Science, with first-class honours in chemistry, obtaining a Le Blanc medal, but also secured an entrance scholarship at Pembroke College, Cambridge. Shortly after beginning his reading at the University he was awarded a Beatson scholarship. Burnley is naturally very proud of Mr. Birtwistle.

MR. R. P. PARANJPYE, who was bracketed Senior Wrangler with Mr. Birtwistle, is a Maratha Brahmin, born twenty-three years ago in the village of Murdi, in the Ratnagiri district. First in the first division has been his invariable record since in 1891, at the age of fifteen, he headed the list at the matriculation examination for the whole of the Bombay Presidency. During his three years at Fergusson College he passed first in the first class at every examination. Fergusson College is an institution manned entirely by native professors, and Mr. Paranjpye, before going to England, pledged twenty years of his life to service in the college, where he will draw a salary not exceeding Rs. 70 a month.

MISS LAPTHORN, the highest Lady Wrangler, is only twenty-one years of age, having been born at Gosport in 1878. She was educated at the High School for Girls, Portsmouth, and Bedford College, London, before she proceeded to Cambridge.

In an unfriendly little paragraph in the July number of the *Journal of Education*—the first notice, we believe, our esteemed contemporary has taken of THE SCHOOL WORLD—the article is commented upon in which we gave the result, admittedly incomplete, of an inquiry as to the schools of men of letters. As a casual glance did not show the name of Mr. Swinburne to the writer of the note to which we refer, the question is pathetically asked, "Where, oh! where, is Swinburne?" If the writer had looked in the first column of p. 213, line 5, he would have found the answer to his query; for Mr. Swinburne is there named among men of letters educated abroad. Most of the writers mentioned as having been omitted from our list were educated at Harrow and Merchant Taylors', and the close association with these schools of the Editor of the *Journal of Education* (whose name, by the way, ought perhaps to have been included with the men of letters educated at the former) furnishes a sufficient reason for the criticism.

FOREIGN.

M. DE COUBERTIN contributes to a recent number of the *Revue des Deux Mondes* an interesting paper on education in Holland. For many reasons Holland furnishes an interesting field for educational experiments—from its geographical proximity to Germany, its historical relations with Great Britain, and its successful struggles for political freedom. It is not surprising to learn that M. de Coubertin recognises both solidity and common sense in Dutch educational methods—these are a natural outcome of the national character. The influence of the family life in Holland is of the first importance, and is maintained throughout the whole of the early part of the pupil's educational career. This paper deserves the attention of British educationists.

MR. R. P. PARANJPYE.

MISS LAPTHORN.

MR. G. BIRTWISTLE.

Portraits from "Black and White."

THE Committee on School Hygiene appointed last year has made its preliminary report to the Department of Superintendence of the National Educational Association of the United States. The subjects dealt with in the report are (1) seating, (2) ventilation, (3) light, (4) heating. We can only make a few selections from their conclusions. If children sit on benches too high to allow their feet to rest squarely on the floor, congestion of blood in some parts of the lower limbs will result, leading in some cases to aneurism or varicose veins.

UNDER the head of Ventilation it is reported that ninety-five per cent. of the school buildings of the United States depend upon windows and doors for ventilation, and instead of controlling currents of fresh air which enter the room by distributing them so that a thin sheet of air will come in only at the top of each window and get warmed before it reaches the floor, it generally happens that the room is carelessly ventilated in all weathers by opening windows at the bottom, and by making a large opening at the bottom of one window instead of small openings at the tops of all the windows.

WITH reference to the correct principles to be adopted for lighting a schoolroom, the Report states that the light should

come from the left side, from the back of the room and from two and one-half to three feet above the floor. The aggregate surface of the windows must bear a certain proportion to the depth of the room and the surface of the floor. The windows must be placed along the wall at stated distances in such a manner as to distribute the light properly to all parts of the room.

CURRENT HISTORY.

Russia has been attracting the attention of newspaper writers and readers more than usual during this year. The Czar is evidently a much more important person to this generation of Western Europeans than ever before. To our forefathers of the sixteenth century, Muscovy was much as Africa is to us to-day. In Mary's reign, Chancellor and Willoughby founded a trade with Archangel, and Shakespeare, wanting a barbaric guise for his mummers in "Henry VIII.," introduces "Muscovites." It was not till the seventeenth century that, under the leading, or rather driving, of Peter the Great, "Muscovy" began to take part in European politics, and to develop as a civilised power. To this day the proverb survives, "Scratch a Russian, and you find a Tartar." The renovated Russia of the eighteenth century was, and still is, a branch of the Christian Church. Deriving its theology from the Eastern Roman Empire, it is still the Greek, or "Orthodox" Church, as distinct from the "Catholic" Church or the Protestant Churches of Western Europe. Thence we may view two or three current topics of interest.

Russia believes most thoroughly in itself and in its ideals. Everyone under the sway of the Czar must conform to the standards approved of by the majority of the peasantry of that enormous country. Because we in Great Britain misunderstand this ideal, we are apt to wonder at, or even to cry shame upon, Russian dealings with Dukobhortsy or with Finns. We forget that our own "toleration" is only a hundred years old, and that we have in Ireland a similar problem to that of Finland. Russia is expelling the Protestant sectaries and reducing the autonomy of Finland because the "national" feeling is strong, and because that feeling is "religious" as well as secular. It is not up to our more enlightened standpoint, it is true, but "let him that is without 'patriotism' throw the first stone."

"Russia," *i.e.*, modern Muscovy, is an escape from Tartardom, and, now that it is strong, it is carrying the war into the enemies' territory. This year it has realised that much of the work is done, that "Siberia" (that great length and breadth of Asia from which its former conquerors came), by means of convict settlements and other developments, has become quite Russian, and is an integral part of the Czar's dominions. "Greater Russia," therefore, is to be assimilated to the European part of the Empire, and will become a basis for further conquest, commercial or otherwise, of the Tartar power of the East, viz., China. Here again, as Englishmen, *i.e.*, as non-"Orthodox," we have no sympathy, rather an antipathy. And this is strengthened by commercial rivalry.

The Conference at the Hague, to which we referred last month, is now sitting, and already some results are apparent. Not much, perhaps, but no one was ever very sanguine, and unless the aim had been high the achievement might have been lower still. And it is to Russia that we owe this conference. Take a map of Europe and Asia, compare the territory of the Czar with that of all Western Europe. Make what modifications you will because of difficulty of communication, present sparseness of population, uninhabitable areas, and pause before we dismiss from our thoughts as "foreign," or lightly undertake to declare war on such a country, with such a past, such an incalculable future.

THE SCHOOL PULPIT.

Notable Passages from Sermons Preached in Public Schools.

Leaving School.[1]

What a fine coin our British sovereign is, and how much one can do with it? Not only does it pass current in this country, but there are many places on the Continent—some of them quite small out-of-the-way places too—where the coin is received at once and without question. The people there may know very little about England and Englishmen, but they know this, at least, that the sovereign is a good honest coin which they may safely receive. It is plain that this would not be so if our coinage were not well looked after. The greatest care must be taken that the sovereign contains the right amount of gold, and that anyone who even *tries* to pass bad coins should be severely punished. Those who *make* bad coins deserve still heavier penalties. The wickedness of passing a bad coin lies not merely in the fact that the person who receives it is cheated out of so much money, which is, in reality, stolen from him; but that thereby all other coins immediately fall under suspicion, and are most rigorously tested. Every sum of money paid thus becomes a source of anxiety to the receiver lest it should be found to include some of the bad money which he believes to be in circulation. In short, if our coinage were not kept pure by the greatest efforts, our trade would languish and the loss induced would in the end fall upon those who could least afford it—*i.e.*, the poor. A bad coin, then, is bad not only because of its own inherent badness, but because it damages the reputation of the good ones, placing them under grave suspicions which they do not at all deserve. And so it is with men. A bad Englishman damages the reputation of all Englishmen. A bad boy's misdeeds do not end with himself, but help to give his fellows in the eyes of others a reputation they do not deserve. This is but another side of the great truth that no man liveth unto himself, and it is a truth which is of peculiar significance to many of us. In our common life here together at school the reputation of each one of us, in so far as we are members of the school, is, in a certain measure, at the mercy of his fellows. People must judge of any community by the specimens they meet. Though at all times we need to dwell upon this truth, yet there is to-night, I think, a special reason for bringing it before you. Some of you are appearing in this place for the last time as schoolboys—it may be for the last time altogether. Is it not well, therefore, to remind you that you have a duty to those whom you leave behind, and that, by *your* actions, *your* conduct, *your* character, *they* will, in some measure at least, be judged? Thus, *our* reputation is, to some extent, at *your* mercy. If you realised this always, would it not be a very powerful incentive to right-doing, and would you not refrain from wrong-doing whenever the temptation presented itself?

In the old days, a newly-created knight inscribed upon his shield some device and motto which were supposed to be the key-note, as it were, of his life. So you, who are shortly to go forth into the world as good soldiers of Jesus Christ, engrave upon your shields the Cross of Christ, and around it this motto: "Watch ye, stand fast in the faith, quit you like men, be strong!"

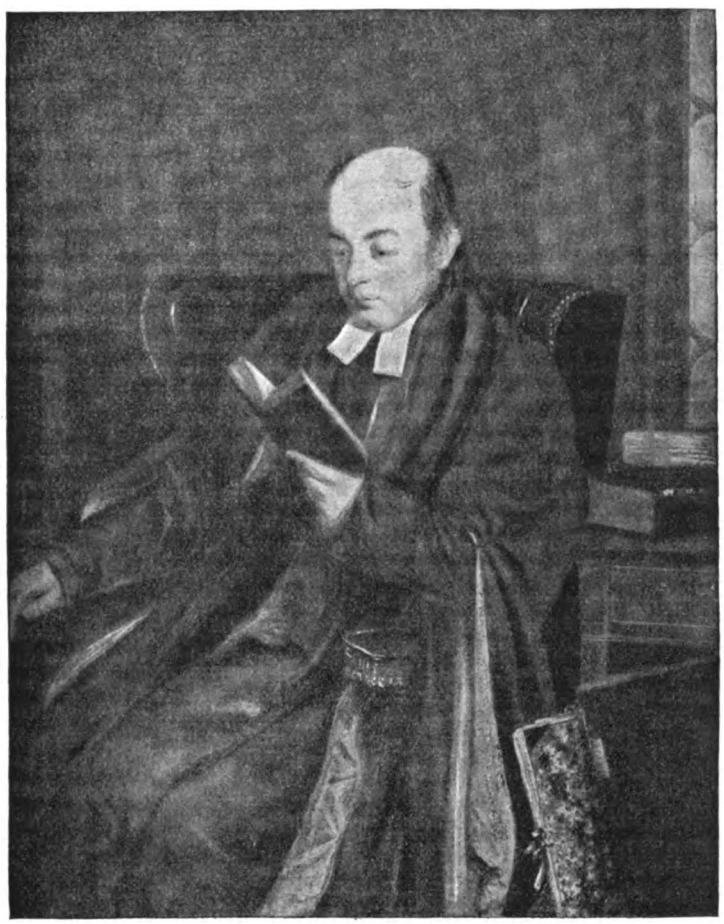
There is something in the very thought of strength that commands respect and admiration, and especially, perhaps, is this true of us when we are young. Then we are prone to worship even mere physical strength. Out of this very feeling arises one of the greatest temptations with which you will be confronted.

[1] From a sermon preached in Mill Hill School Chapel by the Headmaster, Dr. J. D. McClure, M.A.

You leave school; you are no longer boys (at least, you fancy so); you would fain pass as men—brave, strong, manly—and yet you are conscious that you are not men. Hence you are tempted to do many forced and unnatural things to demonstrate that you are what you are not. And the first thing perhaps that strikes you is, that now you are a man (or trying to be) you ought to show yourself above all the restraints, the rules, the discipline to which you are at present subjected; in fact, that you ought to be free from all hindrances to the enjoyment of your own devices. This is one of the foolishest, perhaps also one of the harmfullest, notions you could possibly have. You could show no greater sign of real, inherent weakness. Let these words sink into your hearts.

. . . .

Think of that Civil War in the seventeenth century, when the parliamentary forces won. To what, or rather, to whom did they owe this victory? To one man who saw clearly why it was that at first his troops were no match for the well-trained cavaliers; who chose God-fearing men, submitted them not only to spiritual discipline, but to vigorous drill, exercise, and evolutions, with the result that he made the finest body of troops the world has ever seen out of men taken from the farm, the office, and the counter. Before their terrible charge the best troops of the Continental armies were scattered as withered leaves before the wind of winter. Indeed, all strength and all true success come from self-denial and discipline and their attendant virtues. Self-reverence, self-knowledge, self-control. These three alone lead life to sovereign power. If you would show yourselves men, then, let it be by self-control, self-denial, self-reverence, rather than by self-indulgence and absence of restraint. Remember, things are not manly merely because men do them.



DR. BUTLER (see p. 272).

Again, to gain bodily strength the two great needs are proper food and exercise. I need not tell you what "training" means. So, too, if you would be mentally strong your mind must be properly fed and exercised. It may be more pleasant *now* to loll in an armchair and read a trashy novel than to be working hard to get at the innermost thought of some grand old writer of bygone days, or to enter into the glorious temple of science so as to understand in some measure the labours of a Newton, a Laplace, a Sedgwick, or a Faraday; just as it may be more pleasant to loaf in a hammock and eat sweets than to eat wholesome food and train alike the eye and the limbs in some healthy recreation. But then the *future*, what of that? You know what a future such conduct will bring. So, too, if you would be morally, spiritually strong, you must feed your highest nature with all that is best and holiest in the thoughts and lives of God's saints, whether living or dead, and, above all, with the Spirit of our Lord Jesus. God will give you countless opportunities for exercising your spiritual powers; of practising those Christlike virtues which alone can render you strong and manly. To be physically or mentally strong involves constant watchful care.

. . . . . .

One of the many temptations you will meet will be the temptation to do wrong, or at least to refrain from doing right, in order that you may not be laughed at. To feel oneself turned into ridicule, and become a laughing stock, is always hard to bear. It is additionally so when this ridicule comes, as it so often does, from those who are older than ourselves, who ought to help us in our life's journey. It is especially hard if it comes from people we wish to think well of us, into whose society we long to enter.

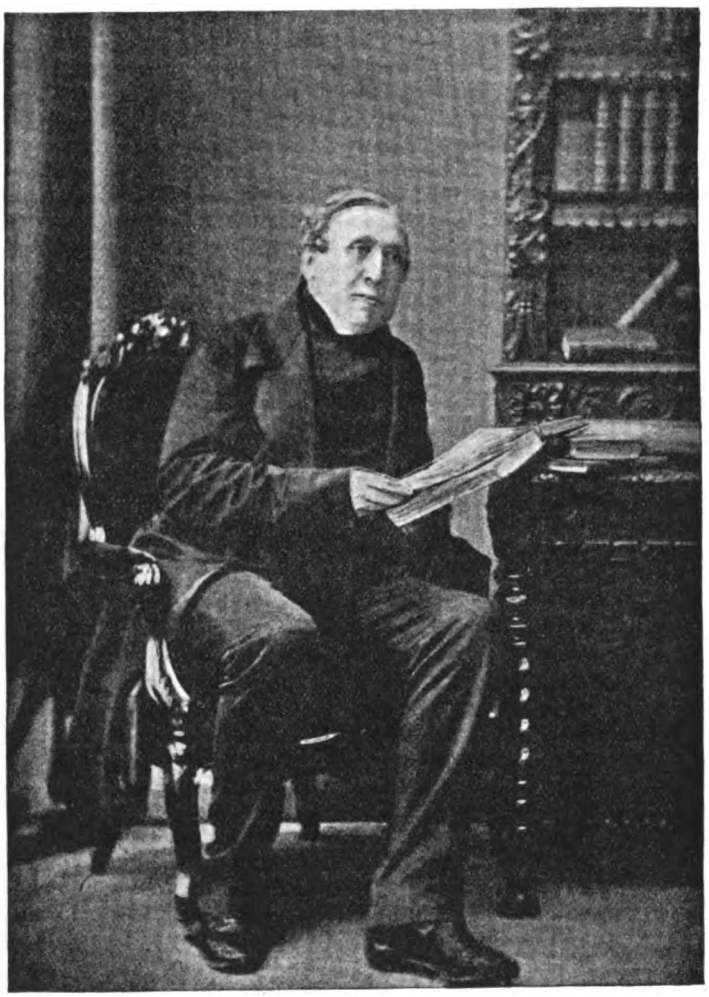
More men hath laughter driven from the right
Than terror armed with fire.

Yet, believe me, all of you will have to face this trial, and to pass this ordeal; and what will be the result? Shall laughter (perchance the laughter of fools) drive you from right-doing, or will you be able to endure even that for Christ's sake? I know not; it is for you to answer. I can only pray that you may, indeed, quit you like men and be strong.

Again, we all like to stand well with our fellows. Now, sooner or later you will be called upon to make your choice between the approval of some of your friends and the approval of your Heavenly Father. It is hard, very hard, to be unpopular, and to know yourself to be so, especially if we yearn for the love of those around us, as I hope many of us do. Yet even for popularity you may pay too great a price. There are some men whose disapproval is infinitely to be preferred to their approval. Perhaps you do not quite believe that. Yet it is true, and some day you will find it out, even if you do not already know it. When the time of trial comes will you be ready to meet it? Will you be ready to brave for the Lord's sake the cold looks, the disdain, the bitter recriminations, perhaps, even of those you love? Quit you like men, be strong!

THE MAKERS OF SHREWSBURY.[1]

Very little is known of the working of Shrewsbury School during the ten years which followed its foundation in 1550. Though in reality he was preceded by others, Thomas Ashton is usually reckoned as its first Headmaster, and he might almost be called its founder; for, by his exertions, the greater part of its existing endowments was obtained, and to him are due, in the main, the statutes and ordinances by which the school was governed for more than two hundred years. Under Ashton's supervision Shrewsbury prospered greatly, and in the course of the first six years of his headmastership nearly 800 boys were admitted. In fact, the school at this time took its place as the great public school for the north-west of England. Foremost among all the boys educated by Ashton stand Philip Sidney—poet, scholar, soldier, and the model of a Christian gentleman—and Fulke Greville, Sidney's bosom friend. Ashton's partiality for, and skill in arranging, dramatic plays sufficiently explains his standing regulation, that, on every Thursday, the highest form should, before recreation, "declaim and play one Act of a Comedy."



DR. KENNEDY.

Much as we should like to follow the late Mr. Fisher's example, and give our readers an account of the rule of Lawrence, Meighen, Chaloner, Pigott, Taylor, Lloyd, Owen, Phillips, Hotchkis, Newling, Atcherley and the other headmasters, considerations of space make it impossible, but we can with confidence refer the interested reader to this delightfully-written history, where an appreciative account can be found by one who was himself an assistant master in this school by the Severn.

At the same time we must deal at greater length with the careers of those princes among schoolmasters, Butler and Kennedy, Mr. Fisher's account of whom is a charming piece of reading. One fact impresses us each time we examine a new volume dealing with the history of a school. How is it that even the greatest schoolmasters find such difficulty in "getting on" with their second masters? Quoting the author of the present history, we read of Dr. Butler and his second master: "The constrained and unfriendly relations which for nearly twenty years existed between the head and second masters, and which, after some years' cessation, were again renewed during the last few years in which they were colleagues, must also have been a serious impediment to the prosperity of Shrewsbury School" (p. 266). Doubtless in all such disagreements there are faults on both sides. A headmaster runs a great risk of treating his second master merely as an assistant. Whereas, of course, the second master may be a man of experience equal to his chief's, though the vagaries of fortune and governing bodies have placed him in a subordinate position. On the other hand, the second master, often a somewhat disappointed person, is very prone to forget that there must be a final court of appeal, some person whose word must eventually settle the disputes which are continually arising "in the best regulated" school. Added to this a more than average susceptibility causes the second master to construe all sorts of harmless school orders into affronts offered to his dignity. Whatever the explanation, one thing is certain, that in many schools, even in this year of grace, there is the same friction and consequent unfortunate dissipation of energy. Samuel Butler (p. 271) guided the affairs of Shrewsbury from 1798-1836. For twenty years he laboured before the prosperity of the school rewarded his efforts. It is consequently not surprising to read that in 1806 he was a candidate for the headmastership of Rugby, his own *alma mater*. Fortunately for Shrewsbury he was unsuccessful. This very year marked the commencement of the wonderful series of university distinctions which made Shrewsbury boys remarkable throughout the country, and caused many a headmaster to write to Butler for the secret of his success.

Nor has Shrewsbury been without its rebellion. The year 1818 is notable for an "epidemic of turbulence" throughout English public schools. But Butler was more than equal to the occasion. His summary treatment of offenders caused the Master of St. John's College, Cambridge, to write to Shrews-

[1] "Annals of Shrewsbury School." By G. W. Fisher, M.A. Revised by J. S. Hill, B.A. xvi.+508 pp. (London: Methuen & Co.) 10s. 6d.

bury, expressing the thankfulness felt by "every member of the university interested in the support of discipline" for Butler's firmness in resisting "the turbulence and self-will of presumptuous boys." Of the stories about Butler we can only repeat one. "Going into school one day the Doctor stopped to read some words scribbled on the wall, which had caught his eye. The words were, 'Butler is an old fool.' But his only remark on reading them was, 'The melancholy truth stares me in the face.'"

Butler denounced football as "only fit for butcher boys." Against boating, too, he waged continual warfare. Cricket was not forbidden, but does not seem to have met with any special encouragement. In a letter to a parent Butler wrote (1820): "When two boys quarrel, though battles ought not to be encouraged, perhaps the most desirable thing is that they should settle it between themselves by a trial of mastery, which generally puts a stop to all future squabbles."

Benjamin Hall Kennedy reigned from 1836 to 1866. He was an old boy of Butler's, and was top of the sixth form before he was sixteen years of age. While at Cambridge Kennedy formed intimate friendships with John Sterling and Frederic Maurice, besides becoming acquainted with many other celebrities. In 1827 he was appointed an assistant master at Shrewsbury, but remained only a few months, returning to Cambridge to take up a fellowship at St. John's. In June, 1830, he became an assistant master at Harrow, where he stayed six years, leaving to preside over Shrewsbury.

Of the "reforms" instituted by Kennedy the introduction of mathematics and modern languages into the regular work of the school must be mentioned, as well as the institution of "preparation" under a master's supervision, and the compulsory use of a college cap by all boys below the upper sixth. A further happy alteration was the introduction of "organised games." Cricket, football and boating were for the future recognised as school institutions.

The high standard of work attained by Butler was not allowed to deteriorate. "Between 1841 and 1870 thirty-seven Shrewsbury men obtained a first class in the Classical Tripos at Cambridge, of whom nine were Senior Classics, twelve were university scholars, and eight Chancellor's medallists. During the same thirty years eighteen Browne medals, nineteen Porson prizes, three Camden medals, and eight Members' prizes were also adjudged to Salopians. At Oxford, although only fourteen Shrewsbury men gained first classes, either in moderations or in the final classical schools, thirty were placed in the second class, and five obtained university scholarships." But for the other mighty works which Kennedy did we must refer the reader to Mr. Fisher's entertaining *résumé*. In 1886, after the resignation of Dr. Kennedy, the Rev. W. H. Moss, the present headmaster, was appointed, of whose work, which is so well known to our readers, it is necessary to say nothing. We are sure this history of Shrewsbury will be largely circulated among Salopians, past and present, and hope it will be widely read by all teachers, and be added to every school library.

University of London.—At a meeting on July 5th the Senate of the University of London passed, by twenty-one votes to six, the following resolution proposed by Sir Edward Fry and seconded by Mr. Bryce:—"That the Senate accepts the proposal of Her Majesty's Government as far as it provides in the buildings of the Imperial Institute accommodation for the work hitherto done by the University; and authorises the committee, consisting of the Chancellor, the Vice-Chancellor, and Sir J. G. Fitch, to settle the formal terms of agreement with the Government; and the Senate reserves the right of the University to hereafter request the Government to make further provision for such further needs as may arise in the future."

THE AUTHOR OF "EDUCATIONAL REFORMERS."[1]

To select and arrange from "forty note-books of various dimensions," which if printed in full would make some five or six thousand quarto pages, those parts most suitable adequately to present the views of a keen educationist like Quick, and, at the same time, to give a proportionate view of his career, was by no means an easy task. We are, consequently, glad to congratulate Mr. Storr upon the success of his editing. Though there are some parts included in the "Remains" which might with advantage have been passed over, yet the choice of material is generally happy and the editorial remarks just what were required to complete a harmonious whole.

Quick entered Trinity College, Cambridge, in 1850, and passed out as Senior Optime in the Mathematical Tripos of 1854. After leaving Cambridge he went in 1855 as an additional unpaid curate to the Rev. J. Llewelyn Davies at St. Mark's, Whitechapel. He gave up his curacy in January, 1858, because it did not afford sufficient scope to his energies, and in June of the same year began work as a schoolmaster at Lancaster. The following table of dates (p. 10) gives the leading details of the first part of his career:—

Lancaster Grammar School, June, 1858—Jan., 1859.
Guildford Grammar School, Midsummer, 1889—Midsummer, 1860.
Hurstpierpoint, Jan.-Aug., 1865.
Cranleigh, 1865-1867.
Hurstpierpoint, Oct.-Dec., 1867.
"Educational Reformers" published, 1868.

In the autumn of 1869 he became a master at Harrow and remained there until the end of the Midsummer term of 1874. After two years of comparative leisure he purchased (in the summer of 1876) the goodwill of a small preparatory school in Orme Square, Bayswater, of which he was in charge, with varying success, until 1881. In 1879 the Cambridge Teachers' Training Syndicate was appointed, and started a course of lectures on the History of Education, electing Quick to the chair. This post was retained until 1883. But in 1881 Quick had given up the Bayswater day-school and moved to Guildford, where he opened a preparatory school for boarders. Nor was the Guildford school retained long, for in 1883 Quick left Surrey to become the vicar of Sedbergh, where he stayed until his resignation in 1887. Quick's last move was to Redhill, which provided him with a home until his death in 1891.

It is thus seen that Quick was, off and on, a schoolmaster for twenty-five years, and he had experience in every kind of secondary school. He does not appear to have been uniformly successful, and from some of his entries in his diaries it would seem that his health and temperament were by no means those which the ideal teacher should possess.

"I don't know how it is, but whereas it used to be my greatest pleasure to go into school, I would now rather have an hour's stone-breaking" (p. 43).

"The daily scramble with one's work prevents my ever doing anything for amusement. I occasionally take exercise for health, and the exercise is pleasant enough, but I never take it except for health, and rarely take enough even for health" (p. 45).

"One is hardly the same being at the beginning and at the end of a day. At first school one has no difficulty in preventing whispering; at last school I cannot at present stop it. I am quite conscious that many (probably most) of my lessons are

[1] "Life and Remains of the Rev. R. H. Quick." Edited by F. Storr. viii.+544 pp. (Cambridge: at the University Press.) 7s. 6d

very poor, but I don't quite see how to improve, and the fact is that one's energy is so taxed to get through one's work that one has none to spare for any attempt after an ideal standard" (p. 42).

Quick had by no means an exalted opinion of the schoolmaster's desire to improve. This comes out again and again in his journals. While at Harrow he wrote:—

"If a book were published showing how teachers could add 5 per cent. to their incomes, the whole profession would read it as one man, but if a book only shows the teacher how he may work with more interest and pleasure to himself and more profit to his pupils, nobody cares to look at it" (p. 58).

In 1875 Quick puts on record—

"Although our public schoolmasters are men of the highest education and of marked success in intellectual studies, they hardly any of them know or care anything about the intellectual side of their profession. All their energy goes into petty details, and they care for nothing else. Some few of them have outside intellectual pursuits, but most are too hard worked to do more than simply amuse themselves when school-work is over. . . ." (p. 352).

Mr. Storr has, by his choice of excerpts, accentuated the many-sidedness af Quick's sympathies. Every part of the teacher's work seems to have been commented upon and discussed in the forty note-books. We especially commend these "Remains" to the notice of those who have not lost the enthusiasm which, though it marks the beginning of a teacher's career, too often becomes killed by "the heat and burden of the day." Quick experienced the difficulties which present themselves to every nine out of ten schoolmasters, and he has something helpful to say on nearly every one of them. A teacher can, at all events, privately consult a book without any loss of dignity—and what is dearer to the teacher than dignity?

THE CASE FOR SECONDARY EDUCATION.[1]

The Incorporated Association of Headmasters has been endeavouring since February "to inform public opinion with a view to raising the standard of secondary education." Short articles have been inserted, week by week, in seventy or eighty journals throughout the country. Many of the essays collected in this volume represent the lessons which have been given to the public by writers approved by a committee of ten appointed by the Association.

It is not surprising, in the circumstances, that there should be a considerable amount of repetition noticeable throughout the essays; but, perhaps, since they are designed to form "a handbook for public men and parents," it is a good thing to have important opinions insisted upon in this manner. While fully recognising the lack of knowledge and interest in educational problems on the part of the public, we are a little doubtful whether newspaper articles by schoolmasters will receive the attention which the subject dealt with deserves.

Educationists, it is true, know well enough that the experienced schoolmaster has more right than any man to speak on the question of secondary education, but the man in the street, however much it may be wished to educate him, is suspicious—he thinks the schoolmaster has his own ends to serve. Be this as it may, there can be no question that the essays will prove useful for the purpose of enlightening the rank and file of secondary teachers themselves. Assistant masters, and to a smaller extent assistant schoolmistresses, are neither enthusiastic about, nor conversant with the political aspects of secondary education. To them as a body we commend these earnest and, on the whole, carefully thought-out papers.

Nearly every phase of a complicated question is dealt with between the covers of this useful volume. The relations of secondary education to citizenship, self-development, British trade, elementary education, technical education, commercial education, higher education, are each given a separate essay. Indeed, we surmise that by the time the ordinary public man, or parent, has got half way through the collection of opinions, the conclusion he will have come to is that the question which forms the title of the volume is an insoluble one.

The editor's preface informs us that the essays "form a series with a common aim," and in another place refers to a "substantial agreement of view" among the essayists, and this is certainly a noteworthy circumstance. But it is a matter for regret that certain other shades of opinion are not represented. We should have liked an essay by one of the many able Higher Grade School Headmasters on the place of the Higher Grade School in a system of national education, and an essay on the advantages of a private school education by a representative believer in this method of instruction would have added a new interest to the collection.

[1] "What is Secondary Education? and other Short Essays." Edited by R. P. Scott, LL.D., M.A. xvi.+339 pp. (London: Rivingtons.) 2s.

RECENT SCHOOL BOOKS.

Modern Languages.

Dumas, Le Trésor de Monte Cristo. Edited by B. Proper. 116 pp. (Blackie.) 1s. 6d.—Probably every schoolboy who takes this book in hand has read the story in English. To make it the basis of a great deal of talk about grammar, &c., would be an obvious mistake. This Mr. Proper has not failed to see; his notes cover only four pages. The vocabulary has been compiled with care, but is not quite complete. There are several full-page illustrations.

German Prose Composition. By A. L. Meissner. 191 pp. (Hachette.)—We have no hesitation in recommending this book, every page of which is the result of long and varied experience. Professor Meissner gives a number of most useful hints, all the more valuable on account of the copious examples. The passages for translation are taken from a large number of authors, and represent every kind of style. The footnotes are not too full, and the English-German vocabulary is quite trustworthy, as far as we have tested it.

Goethe, Hermann und Dorothea. Edited by J. T. Hatfield. liv.+187 pp. (Macmillan.) 3s. 6d.—This volume, like several others recently issued by the Macmillan Company of New York, affords evidence of the scholarly enthusiasm with which the German classics are studied in America. In the introduction, Professor Hatfield discusses the beautiful poem at length, and from many points of view, sometimes with an exuberance of epithet which is almost overpowering. He has given commendable care to the text, which the printers seem to have "improved" rather freely, Goethe himself not having been a careful proof reader. The notes are full, and satisfactory on the whole; the style, however, is a little shaky occasionally, and the renderings are not always happy.

Hints on French Syntax. By F. Storr. 56 pp. (Rice.) 1s.—This little book, which was first issued in 1885, has now reached its 7th edition, a sign of its well-deserved popularity.

Mr. Storr has added an appendix, containing over a hundred easier examples. They are carefully selected, and many teachers will be very glad to have them.

Schiller, Die Jungfrau von Orleans. Edited by W. Humphreys. xlvi.+259 pp. (Macmillan.) 3*s.* 6*d.*—A very creditable piece of work indeed. The play is edited with a full apparatus, so that it is suitable for University students as well as for a high form in a school. A number of well-chosen pictures help to make this the most attractive and valuable edition that we have yet seen. By producing such books, author and publisher alike deserve the gratitude, not only of the teacher, but of every lover of literature.

Classics.

Euripides. Hecuba. By T. J. Jeffery, M.A. 104 pp. (Clive.) 3*s.* 6*d.*—We are inclined to think that this is one of the best volumes of the "University Tutorial Series" which have yet appeared. In the Introduction, after dealing with various matters of interest and importance, such as metres and the Greek theatre, the editor devotes some eight pages to some good character sketching and criticism of the poet and his critics, maintaining the position that "his appeal to the common feelings of humanity makes him akin to the later world." The notes are clear and helpful, but we should like to see more parallel passages given to illustrate the language.

Cicero. Pro Cluentio. By W. Peterson, M.A. lv.+271 pp. (Macmillan.) 3*s.* 6*d.* Mr. Peterson has made this speech peculiarly his own. His translation of it has been known and used for some years, and last year he sent notes on various portions of it to the *Classical Review*. We therefore expect to find in his annotated edition the hand of a master, and our expectation is not disappointed. There will now be no room for another edition, as Mr. Peterson has gathered up the work of Professor Ramsay and Mr. Faussett, to whom he expresses his obligations, and has added a good deal which is new. The Introduction contains a *résumé* of all the circumstances of the trial, and in the notes we find some proposed emendations which seem very sound and convincing.

The Odes of Horace. Book II. By Stephen Gwynn. 111 pp. (Blackie.) 1*s.* 6*d.*—We have already noticed Mr. Gwynn's edition of the First Book in these columns. The present volume is of the same excellence as the former, and indeed, in accordance with the principle of the general preface that "each book" (of "Elementary Latin Classics") "will be complete in itself," contains the same matter by way of introduction. We miss a note on *regnata* (vi. 11), and that on *nec dedecuit* (xii. 17) should have been given on *non bene* (vii. 10). In xviii. 34 the iambus (not *iambic*) is probably not resolved, but is there by synizesis. Mr. Gwynn still refuses an index.

Cicero's Catiline Orations. By C. H. Keene, M.A. xlvi.+204 pp. (Blackie.) 2*s.* 6*d.*—This is another member of the same series as the last. The speeches are all published together, the later ones being as carefully and fully edited as the first, which we recently reviewed. The exercises based on each speech should be very profitable.

Satura Grammatica, or Latin Critical Notes. By E. G. A. Beckwith, B.A. 111 pp. (Bell.) The author of this little book, having had experience in Army coaching, has here drawn up a collection of notes for the Army student. It will prove useful not only in the sphere of its original purpose, but also to all who wish to prepare for an advanced grammar paper. A good feature is the provision of blank pages here and there for the student's own notes. There are, unfortunately, inconsistencies of spelling; thus *coelum* appears on page 29, though it is declared to be "a barbarism" on p. 77, and although *quum* is stated to be a wrong spelling on p. 15, we find t on p. 43.

Grammar.

Parsing and Analysis Scheme. A New Grammar. By Sidney C. Tickell. (Newman & Co.) 2*s.*—This book consists of 16 large sheets, and the author claims for it many distinctive features. He takes *limitation* as the basis of language; accordingly a sentence "consists of a verb and its limitations." In "the boy had said it," "boy" *limits* "had said" *through* difference in position *as* subject; "it" *limits* "had said" *through* difference in position *as* object. In "he learns because he works," "works" is a verb *limiting* "learns" *through* conjunction "because" *as* cause. This *limiting* . . . . *through* . . . . *as*, is the author's formula, and forms the basis of analysis, first of words, then of sentences and clauses. As will be seen, the system is decidedly novel; it is questionable, however, whether it is practical; personally, we are inclined to consider it rather bizarre.

Edited Books.

The Works of Shakespeare, Vol. V. (Eversley Edition.) Edited by Professor C. H. Herford. 541 pp. (Macmillan.) 5*s.*—This edition has now arrived at the historical plays, and as a first instalment Professor Herford (with whom Professor Harold Littledale is now associated in this task) gives us the three "Henry VI." plays and "Richard III." The dreary arid waste of theories, probable or improbable, possible or impossible, over which critics have been led in solving the questions of the former, is very completely though briefly reviewed by the editor in his introduction, the result being that he favours Greene as the primary author of what Shakespeare has (probably with others) amended and improved. The case of "Richard III." is much the same, Professor Herford inclining to the view that Marlowe had a very considerable influence over Shakespeare at the time of its composition, even if he had no actual hand in it. The literary interest of this volume is of course less than its predecessors; but it contains a clear statement of many points in dispute, and the promise of better things to come.

King Henry the Eighth. (The Warwick Shakespeare.) By D. Nichol Smith, M.A. 167 pp. (Blackie.) 1*s.* 6*d.*—This is a most handy and comprehensive edition of a really important though unsatisfactory play, and it differs from many school editions in paying great attention to the purely literary and dramatic aspect of Shakespeare's art. The introductory matter deals fully with all the questions of date and literary history; but in the notes, while adequate explanations of words and phrases are given, the chief interest is concentrated on the æsthetic value of each scene, and the part it contributes towards the whole. The disputed question of authorship is very fully discussed. Mr. Spedding and Mr. Swinburne set the main battle in array, and other theories are recapitulated. The historical authorities, Holinshed and Foxe, are given at length in an appendix, and an elaborate note on the metre will delight many advanced students of English rhythms.

Scott's *Marmion, Canto VI.* Edited by M. Macmillan. 75 pp. (Macmillan.) 1*s.*—A very capital, handy, condensed edition, in which all that can be reasonably expected from a learner in a junior form is put quite clearly. The introduction is exceedingly well done, considering (as the editor remarks) that "no very subtle powers of criticism are required to arrive at

a correct estimate of Scott's poetical works." That is certainly true, but what is here written will be of considerable interest and value to young students.

History.

Cosimo de' Medici. By K. Dorothea Ewart. 240 pp. (Macmillan.) 2*s.* 6*d.*—In reading for the Modern History School at Oxford Miss Ewart has probably attended the delightful lectures of Mr. A. L. Smith, of Balliol, and Mr. E. Armstrong, of Queen's, on Italian History in the Fifteenth Century. Here and there we seem to have come across traces of their influence in her book; but there is certainly no large-handed "conveying." She has made an independent use of her materials, and has spun from them a very clear and readable account of the man who took the first long stride towards converting the Medici from bankers to Grand Dukes of Tuscany. Beginning with a brief sketch of the elaborate constitution of the City-State of Florence, she proceeds to tell the story of the struggle which issued in the expulsion of the Albizzi faction and the rise of the Medici to the hidden helm of state. Two chapters are devoted to the foreign policy of Florence during the "principate" of Cosimo (1434-1464); one to his domestic policy; one to his private life; and the last to his patronage of literature and art. Miss Ewart's narrative is lucid, and is happily interspersed with the comments, both of the actors in the story and of their contemporary historians, from Machiavelli and Guicciardini downward; and her own reflections on the political significance of the story are characterised by both insight and humour. But why does Miss Ewart transfer the name of Frankenstein from the monster-maker to the monster-made (p. 129)? Miss Ewart has done well what she set out to do; but, like the previous contributors to the "Foreign Statesmen Series," she does not seem to be quite clear as to what class of readers she is catering for. She explains much that a special student of modern history hardly requires to have explained; and, on the other hand, she does not explain much which, without explanation, would be caviare to the general reader. Is not an account of the political divisions of Italy at least as necessary as an exposition of the intricacies of the Florentine constitution? Is the average purchaser of this book likely to be quite familiar with the soldi, florins and crowns of which Miss Ewart speaks as glibly as though they were centimes and francs? And is not the practical working value of this book and its fellows reduced by at least fifty per cent. by the omission of an index? It seems to us that a uniform kind of index—not one left entirely to the caprice of the individual contributor—is essential to the utility of the "Foreign Statesmen Series." In other respects also the series would be none the worse for a little "sub-editing."

Geography.

The Unrivalled Atlas for Schools and Families. 40 Maps (14 × 11 inches). (W. and A. K. Johnston.) 3*s.* 6*d.*—This is the 26th edition of an atlas that is as trustworthy as most at the same price. It contains an index to 22,000 places. We suppose the fact of its being an atlas for families, as well as for schools, justifies the inclusion of a certain firm's Unsweetened Gin and Lemon Squash amongst its advertisements.

Mathematics.

The Elements of Euclid, with notes, &c., by I. Todhunter, D.Sc., F.R.S. New Edition. Revised and enlarged by S. L. Loney, M.A. viii. + 332 + cxxxii. pp. (Macmillan.) 4*s.* 6*d.* — In this edition the number of exercises has been doubled. The appendix has been enlarged by the addition of sections on poles and polars, inversion, harmonic ranges, coaxial circles, &c. Hints are given for the solution of the more difficult or important exercises, and various other minor improvements have been made. It is hardly necessary to add that the new editor has made these alterations in a judicious and sympathetic way.

The Essentials of Geometry. W. Wells, S.B. vi. + 392 pp. (Isbister & Co.; and Heath & Co., Boston.) 6*s.*—A decidedly fresh and entertaining book by one of the progressive school. In discussing parallels the author uses Playfair's axiom, and the treatment of proportion is frankly analytical. The idea of giving figures for many of the exercises, as well as hints for their solution, is a very good one, and deserves imitation. It would have been well to say a few words about the use of hypothetical constructions. The section (p. 88) on Measurement is not very satisfactory, and the argument of Art. 683 and others which follow are unsound. Nevertheless, Mr. Wells's book contains a well-arranged outline of plane and solid geometry, likely to interest the student, besides giving him a practical knowledge of the subject.

Woolwich Mathematical Papers for Admission into the Royal Military Academy for the Years 1889-98. Edited by E. J. Brooksmith, B.A., LL.M. (Macmillan.) 6*s*—The papers contained in this volume are of a very reasonable and satisfactory type; the subjects included are arithmetic, algebra, trigonometry, elementary geometrical and analytical conics, and elementary statics and dynamics. As a good collection of test papers, requiring some thought, but not too difficult, the book deserves recommendation. It will be useful not only to Army candidates, but to secondary students and teachers in general.

Science and Technology.

The Steam Engine, and Gas and Oil Engines. A book for the use of students who have time to make experiments and calculations. viii. + 630 pp. (Macmillan.) 7*s.* 6*d.* net.—All who are interested in the intelligent study of heat engines will welcome Professor Perry's new book, however they may view some of his methods, for in the work of all doctors we recognise that which will last and that which is transitory. We are but machines for the improvement of the race, and even the available is only partly made useful. Blessed is he who hath a high efficiency! Engineers, however, will always value Professor Perry most highly as the apostle of experimental study, for before all things he has constantly pointed out, both by precept and example, the great need of teaching the scientific principles of engineering by means of experimental deduction; and in the position which he now holds at South Kensington, we are all glad that he is able to insist on these methods being followed in a large number of schools of the country. In the book before us the student is first, so to speak, given the steam engine to handle, and, being introduced to the principles of expansion, is allowed to take an indicator diagram. He passes next to the kinematics of the engine; and the various types of boilers complete the practical side. Energy and efficiency are next measured, and the theoretical diagram follows, with estimate of missing steam. Heat and work, entropy, fuel, gas and oil engines conclude the principal portion of the book—four chapters remaining for the more exact mathematics of valve motions, inertia, kinetics of gases, momentum of fluids, and cylinder condensation. Consisting of 630 pages, it is a long work to read, for it must be well studied, but it will certainly make the student think and try for himself, which is Professor Perry's main object, and which is the best praise we can give. The publishers are also to be congratulated on style, finish and low price; and the draughtsman for a number of beautiful drawings.

Miscellaneous.

Social Phases of Education in the School and the Home. By Samuel T. Dutton, Superintendent of Schools, Brooklane, Mass. x. + 259 pp. (Macmillan.) 5*s.*—It is only necessary to compare the dicta of recent pedagogic books with the belief and practices of schoolmasters five and twenty years ago to see how far we have advanced in matters educational. Education means something more than the mere training of the intellect. It is to the fuller recognition of the claims of the moral, physical, and æsthetic sides of children to intelligent attention, and the desire to ensure a proper all-round development, that much of the improvement in recent years in the schools of this country and America is due. The chapters of Mr. Dutton's volume are selected from lectures given by him during the past two years at Harvard, Chicago, and Boston Universities, and from papers read before the American Social Science and the National Educational Associations. Though there is little specific instruction which can be immediately applied in the class-room, to be found in the book, it is certain to indirectly benefit teachers who study its contents. It provides a new atmosphere, as it were, for the British schoolmaster and schoolmistress; familiar problems are presented in new ways, and the American experiences described will go a long way towards expanding the all too prevalent narrowness among the teachers of our schools. Mr. Dutton is evidently a student of Herbart, Comenius, Rousseau, Pestalozzi, and Froebel, for scattered up and down his pages we find abundant evidence of the influence of these authorities upon his way of dealing with the questions he tackles. The only fault we have to find is one which the author shares with many American writers. There is too great a disposition to enlarge and explain, and this causes the reader much weariness, and results in a great loss of directness and force.

The Book of The Judges. By Rev. F. H. Stewart, M.A. 107 pp. (Rivingtons.) 1*s.* 6*d.*—This edition is suitable for junior forms. What is to be found in it is not so much scholarship as a moderate amount of teaching material clearly put. The introductory section, for instance, which deals with the moral difficulties raised by the Old Testament narrative is admirably adapted to serve this purpose, and to clear young minds without alarming them. The notes are brief but to the point, and the Song of Deborah is given in poetic form according to the Revised, as well as in the prose form adopted by the Authorised Version, and the two run concurrently over five pages of the book.

Brushwork Copy Book. By Elizabeth C. Yeats. 72 pp. of designs. (George Philip.) 1*s.* 6*d.*—Miss Yeats has earned the right to be called the "Children's Friend." In her "Brushwork Copy Book" she has shown how to create in children the artistic sense, and to educate them to appreciate colour, form, and nature. It is a rare gift for a clever artist to be able to bring herself down to the level and comprehension of a child. This has been done in these "artistic blots." There are few things which excite more wonder in the mind of a child than the power to create in some tangible way, with a little colour and a brush, the fancies that come and go. Miss Yeats's book contains just such ideas of birds, fishes, insects, animals, and landscapes as delight children. Parents and teachers are advised to give this book a trial. As an introduction to the "Wonderland of Art" it is calculated to impart much pleasure and profit to children.

Geometrical Drawing: for Army and Navy Candidates. By Edmund C. Plant, C.B. Vol. I. Practical Plane Geometry. (Macmillan.) 7*s.* 6*d.*—The educational value of a systematised course of instruction in Geometrical Drawing is now fully recognised. Such a course introduced into the early training of a student inculcates habits of neatness and exactness, in addition to the facilities which it offers for acquiring a practical knowledge of geometrical constructions. The students who carefully work through the various problems given in this book cannot fail to derive great benefit from it. Instead of the usual arrangement into chapters the problems are arranged in groups, and at the end of each group exercises are given. The diagrams are drawn to a fairly large scale, and these, together with typical questions set at the Woolwich and Sandhurst Examinations (the solutions to which are given) are clear and explicit. Students who are desirous of obtaining a great amount of information in a few words will find that the terse instructions given in this volume exactly meet their requirements. The style adopted may be characterised as abrupt or telegraphic, and a little more and fuller information as to the "why" and "wherefore" of some of the constructions would surely be welcomed by an earnest student. The printing and illustrations are alike excellent.

In Shakespeare's Days. By M. C. Gillington and E. Ouseley Gilbert. 95 pp. (Curwen.)—This operetta, "for Colleges and Schools," is intended to give boys and girls of to-day some idea of life in Shakespeare's time. Had the authors reserved their work for "schools" only, they would have shown a modesty more becoming. We prefer the libretto to the music. It is at least modelled on something better, and may acquaint children a little with the customs of three centuries ago. But the music we cannot regard seriously. Throughout, discords are frequently treated in the most extraordinary manner, being at times left unresolved. Consecutive fifths occur, as do other glaring errors over which 'twere best to draw a veil.

Economics. By E. T. Devine, Ph.D. vi. + 404 pp. (Macmillan.) 4*s.* 6d.—Let not the ordinary English reader take up this book "with a light heart." It is a good book, clearly written, full of thought, and interesting from cover to cover; but it is not for the beginner. It is written from a stand-point diametrically opposite to that which is adopted in this country. The author himself says (p. 91), "The true starting point in the construction of any complete theory of economics lies in consumption rather than in production . . . . wants precede satisfactions;" and he contrasts his method with that which regards "new activities as giving rise to new wants." The book comes from America, and shows its origin in every page. The inhabitants of the western hemisphere, happy in new lands and in the scientific discoveries of the last century, have not yet realised to any appreciable extent the "preventive checks" on population or the difficulties of earning a living. Accordingly, they believe, or at least Dr. Devine does, that "the standard of living directly determines all forms of personal income," except certain fixed ones (p. 142); that "if we crave an object as the hungry man craves food, we are equally sure to get it" (p. 145); that "every new capacity for enjoyment finds existing the necessary physical conditions to provide for it" (p. 84). These propositions may be true of the "economic man" as defined in the first chapter, and though not impossible, it would be difficult in short compass to state our objections to them. But we are told further that the "productivity of land depends on the variety of human wants" (p. 300); that "each generation, under good methods of cultivation, makes the land more productive than it found it" (p. 139); and that "the total yield may be increased indefinitely" (p. 388). What a happy world this must be where all these good things are true! There are many good things to be found in these pages, and abundance of illustrative matter: many "familiar principles" are "re-set" in

a fresh and interesting way, and the best use the English reader can make of the work is to read it next after a thorough course of Mill or Marshall. The two combined will give a breadth of view which is generally desirable, but not often attained in the study of economics.

CORRESPONDENCE.

The Editors do not hold themselves responsible for the opinions expressed in letters which appear in these columns. As a rule, a letter criticising any article or review printed in The School World *will be submitted to the contributor before publication, so that the criticism and reply may appear together.*

The Grantham Grammar School Case.

As the action of the Assistant Masters' Association in connection with the recent dismissal of assistants at Grantham has resulted in an inquiry, which we believe to be the first of its kind, it may be of interest to your readers to have before them the chief facts of the case, and our position with regard to them.

The case is, in brief, as follows:—

In August, 1898, the late headmaster of Grantham Grammar School sent in his resignation, to take effect at Easter, 1899, and communicated the fact to the assistants.

The new headmaster was appointed in December, and the late headmaster asked to be allowed to retire immediately.

The Clerk informed the outgoing headmaster that the appointments of the assistants would terminate with his retirement, and this intimation was passed on to the assistants. They wrote to the governors protesting against such treatment, and, acting on our advice, presented themselves at the school at the beginning of the Lent Term. The new headmaster refused to allow them to resume their duties.

The Charity Commissioners, in reply to a letter I was instructed to send them, stated (1) that they had decided to hold an inquiry into the facts of the case, and (2) that they had informed the governors that there was apparently no ground for the contention that the appointments of the assistant masters were automatically terminated on a vacancy occurring in the headmastership.

The governors assumed that the assistant masters were the servants of the headmaster, and that he was in consequence solely responsible for their appointment and dismissal. The Assistant Masters' Association contended, as it has always done, (1) that the assistants are *not* the servants of the headmaster but of the governors, whose agent he is; and (2) that the assumption that the assistants are automatically dismissed at the end of the headmaster's term of office is as bad in law and equity as it is opposed to common sense. If the contention of the governors is correct, then the death of a headmaster during term time would necessarily cause the whole staff, through no fault of their own, to be summarily thrown out of employment, whilst the staffless school must, equally of necessity, be closed until a new staff has been appointed. What could be worse than such a state of affairs? The Commissioners, however, seem to favour our view of the case, and we confidently hope that they will give a decision in harmony with this view.

At the best the conditions of service of assistant masters are very bad. Not only is the work extremely onerous, but as the pay is about equal to that of an artisan, they have very little chance of providing for the future. Besides, there is little or no demand for assistants over 35 years of age, and, in consequence, a man who is dismissed at the age of 40—when he is naturally at his best as a teacher, and is totally unfitted in the majority of cases to begin life anew—has either to leave the profession entirely and seek for other work, or to accept a post altogether inferior in point of school and stipend to that which he formerly held.

Headmasters of endowed schools under schemes of the Charity Commissioners cannot generally be dismissed except by a two-thirds majority at two consecutive meetings of the governors. By analogy, the claim of this Association, that assistants should have at least a term's notice expiring at the end of a term, and that this notice, in the case of a change of headmaster, should be given by the incoming headmaster, is surely a reasonable one. That this *is* the custom of the profession was emphasised at the enquiry by two prominent headmasters, and we claim that it should be authoritatively recognised as such.

There is the further question of the right of appeal for assistant masters. In the scheme for the Grantham Grammar School an appeal to the governors is provided for in the event of the dismissal of the assistants. But in this case the governors refused to acknowledge their responsibility, and showed such want of consideration for the assistants as to strengthen the contention of this Association, that not only should assistant masters have the right of appeal, but that that appeal should be to the central authority, which we hope will soon control the destinies of secondary education.

Paul. E. Swinstead,
Hon. Sec. A.M.A.

104, Mount View Road,
Stroud Green,
London, N.

The Teaching of Geometry.

We must all feel grateful to Professor Minchin for his courage in attacking the traditional teaching of Euclid, both in the columns of *Nature* and in The School World; and from the absence of any criticism of his articles in either paper, at least at present, I presume we may conclude that there is not much to be said against his arguments.

There are some of us, though, I fancy, who, though we agree with much that Professor Minchin says, and though we might desire, with him, for Euclid to be abolished in favour of some other scheme of geometry, yet would have preferred that he had given us more help in the teaching of Euclid rather than practically have abandoned Euclid altogether. We must teach *Euclid*, and shall probably have to do so for many years, as Britons are very conservative, especially in matters educational. We can gather many hints from his papers, which are full of interest to every teacher, but I must own to feeling a trifle disappointed on reading them, as I had hoped to have had much light thrown on this very difficult problem—How to teach Euclid. I suppose, though, we could hardly expect so ardent a reformer to do so. For him there is no alternative, and Euclid must go.

Nevertheless, there are reasons why, I think, we might be sorry to lose it. To me Euclid seems valuable, not so much for the geometry learnt thereby, as for the fact that, if properly taught, it ensures exactness and thoroughness. Till lately too, before algebra had begun to be taught on scientific lines so that children are led to see the principle before putting it into practice, it was practically the only instrument we had for teaching children to think and to think to the point. Prof. Minchin seems to believe that children have no difficulty in understanding things—I rather believe that they rarely properly understand principles. This is no doubt due to our method of *instruction* instead of *education*; but, give a child a *rule* and show him how to apply it and he asks for nothing more, until, by a course of

Practical Science, or Elementary Euclid, you have lifted him a little above being a machine.

Prof. Minchin, to my mind, seems rather hard on us teachers when he says that "Euclid is taught in all our schools without the aid of rule, compass, protractor or scale." I have wondered rather that letters of indignation have not been written to answer this accusation. Practical work seems to me the very foundation of Euclid. A child cannot really understand unless he does. It is for this reason that in teaching a theorem, *e.g.*, I.4, I always show first how the antecedent problem is to be done. Someone must be able to make two triangles with two sides of the one, &c.; why not the pupil? If he has just made his two triangles you have little difficulty in showing him the difference between his data and what he has to prove. Again, in proving I.5, by the method of superposition, if you assume the isosceles triangle and ask the pupil what he knows about it, as likely as not he will say, "The angles at the base are the same size," and he is right, for he does know that. But if he has made his isosceles triangle and he gives you that answer, your reply is, "How do you know that?" and the reason for the proof comes.

Taught in a common-sense manner, stripped of all pedantic phraseology and attired in schoolboy language, I believe Euclid is most valuable, and, as far as my experience goes, it can be both appreciated and liked.

Definitions should be given as required and never learnt by heart in a lump; for myself I believe that a boy has a quite good enough idea of a point, line and straight line, for practical purposes, and so these definitions can wait till the examination looms in sight.

The postulates must be insisted on—otherwise Euclid is chaos, and it must be driven into the pupil that *Euclid's* rule was a straight edge and *he* only drew circles when he knew just where the compass point must be and pencil point as well. This grasped, the pupil can measure as much as he likes.

Axioms can wait till they are wanted—many of them need never be referred to. Props. 2 and 3 can wait till the class demand them, as they will probably in doing I. 9, for they will not believe Euclid can cut a piece off one line equal to another, without measuring. When Props. 4 and 8 are understood (the truth of them), I go to 9, 10, 11, 12. On a second reading we take 5 and 8 (Philo's method) and later still 6. Of course, exercises must drive the new ideas home—these are the real test of understanding the subject.

Can anyone give me a reason which will appeal to the schoolboy as to *why* Euclid never measured? and also a working definition of "angle"? In Finn's book, the Junior Euclid, just published, he practically gives no definition, but says when two lines meet they include an angle, and this is practically what most teachers do. We may set a formula to be learnt, but no real definition is given.

H. HAROLD ROBJOHNS.

County School, Pwllheli,
June 28th, 1899.

THE above letter from Mr. Robjohns shows that he is very largely in agreement with the view that geometry can be better taught to beginners than by the ordinary use and teaching of Euclid's book. Of course, when I said that Euclid is taught without the aid of instruments, I did not mean to assert that there are *no* teachers who make their pupils use rule and compass. I am aware that there are some.

As to the problem of improving Euclid so as to make the book quite suitable to the teaching of young boys, I must say that I believe the thing to be essentially impossible. You may strip Euclid of all its tedious phraseology—its misplaced and truly ridiculous "shalls," and so on—but the fact remains that its *order of thought* is not good. What is the use of telling a boy that "a right line is that which lies *evenly* between its extreme points," and keeping him for many months in ignorance of the fact that the base of a triangle is shorter than the sum of the two sides? The definition savours of fraud, and it teaches a boy to deceive himself with a vague word. If Euclid's *order* were good, we could easily settle the matter of phraseology and the manner of teaching.

Mr. Robjohns hits the nail on the head when he refers to the conservatism of teachers. He might have especially mentioned the conservatism of the classical schools. It seems to me to be deplorable that leading men of science interest themselves so little in matters of school education. The result is that the education of England is still mainly mediæval. It is possible that we may suffer severely for this in the near future.

G. M. MINCHIN.

PRIZE COMPETITION.

Result of No. 6.

THE June competition was not popular. Comparatively few lists of books suitable for holiday reading were sent in, and the six volumes receiving most votes have not a substantial majority. Upwards of fifty books are named on the replies, and yet many new publications which might with advantage receive a teacher's attention during the vacation are completely ignored. The result of the voting is as follows, in the order of the times each book is mentioned:—

= { No. 5, John Street ... ... R. Whiteing.
  { The Double Thread ... ... Ellen T. Fowler.
The Day's Work ... ... Kipling.
Reminiscences ... ... Justin McCarthy.
Letters of Robert Browning and Elizabeth Barrett Browning
= { With Kitchener to Khartoum ... G. W. Steevens.
  { Aylwin ... ... Theodore Watts-Dunton.

The first prize is awarded to Miss Waldron, 22, Village Road, Oxton, Cheshire, whose list contains four of the above-named books. The second prize goes to Mrs. Humphries, Pope's Hill House, Cork, who names three books correctly.

OUR CHESS COLUMN.

No. 7.

THE prize winner in the last competition is:—

N. J. Chignell,
Merchant Taylors' School,
Charterhouse Square,
London.

Correct solutions also received from:—

N. B. Dick; E. E. Middleton; A. V. Poyser; A. D. Punchard; C. A. Wood; N. P. Wood.

The mate is effected thus:—

WHITE.	BLACK.
	1. Q x P (ch.).
2. K—Rsq.	2. Q—Kt8 (ch.)
3. R x Q.	3. Kt—B7 (ch.).
4. K—Kt2.	4. B—R6 mate.

The leaders in the monthly competitions are:—

N. P. Wood, 5; N. B. Dick, 4; A. V. Poyser, 4; A. D. Punchard, 4; F. G. M. Beck, 3.

Three of the games in the Inter-School Tournament have been finished, and the scores at the time of going to press are :—

School.	Wins.	Losses.	Draws.	Points.
Nonconformist Grammar School, Bishop's Stortford	0	2	0	0
The College, Cheltenham	0	0	0	0
New College, Harrogate	0	0	0	0
Merchant Taylors' School, London	2	0	0	2
Grammar School, Manchester ...	0	0	0	0
High School, Trowbridge	1	1	0	1

The following is a game between Merchant Taylors' School, London, and Nonconformist Grammar School, Bishop's Stortford.

Muzio Gambit.

White (M.T.S.).	Black (N.G.S.).
1. P—K4.	1. P—K4.
2. P—KB4.	2. P x P.
3. Kt—KB3.	3. P—KKt4.
4. B—QB4.	4. P—KKt5.
5. Castles.	5. P x Kt.
6. Q x P.	6. Q—KB3.
7. P—K5.	7. Q x P.
8. P—Q3.	8. B—KR3.
9. Kt—QB3.	9. Kt—K2.
10. B—Q2.	10. Kt—QB3.
11. QR—Ksq.	11. Q—QB4 (ch.) (*a*).
12. K—Rsq.	12. Kt—Q5.
13. Q—KR3.	13. QKt—KB4.
14. Kt—Q5.	14. P—Q3 (*b*).
15. Q—KR5.	15. Kt—K6 (*c*).
16. B x Kt.	16. Q—QR4.
17. Kt—KB6 (ch.).	17. Resigns.

Notes.

(*a*) The game has been played correctly up to this point, but Black should now have played Q—KB4, with a safe game.

(*b*) Evidently plotting Kt—Kt6 (ch.), leaving White's queen *en prise*.

(*c*) Wasted move. Black might have tried 15 P—QKt4. There is no immediate fear of Kt x Kt or R x Kt. In the former case Kt—Kt6 (ch.) wins the queen ; if R x Kt, Kt x R without loss. Or, possibly, 15 Castles might have resulted in a good game. After the text move the game was lost in any case.

I hope to give another of the finished games next month.

The game for competition this month is subjoined :—

White.	Black.
1. P—K4.	1. P—K4.
2. Kt—KB3.	2. Kt—QB3.
3. B—B4.	3. B—B4.
4. Castles.	4. Kt—B3.
5. P—Q3.	5. P—Q3.
6. B—K8Kt5.	6. B—KKt5.
7. P—KR3.	7. P—KR4.
8. P x B.	8. P x P.
9. Kt—R2.	9. P—Kt6.
10. Kt—KB3.	10. Kt—KKt5.
11. B x Q.	11. B x P (ch.).
12. R x B.	12. P x R (ch.).
13. K—Bsq.	13. R—R8 (ch.).
14. K—K2.	14. R x Q.
15. KKt—Q2.	15. Mate in three.

And a very pretty one it is !

The prize winner (or winners) will receive one of Messrs. De La Rue's pocket chessboards and men, or a book of equivalent value. Send in before the 29th inst.

Rules.

I.—Write on postcards only.

II.—Give name, date, and school address.

III.—Address all communications to

The Chess Editor,
The School World,
St. Martin's Street,
London, W.C.

CALENDAR.

[*Items for the August Calendar should be sent in by August 1st.*]

July, 1899.

Monday, 17th.—Oxford Local Examinations commence.

Tuesday, 18th.—Scholarship Examinations begin at Dover College and Derby School.

Wednesday, 19th.—The Bishop of Winchester presents Miss Charlotte Yonge with an address on behalf of the subscribers of the Charlotte Yonge scholarship, Winchester High School.
Scholarship Examinations begin at Radley and Merchant Taylors' Schools.

Thursday, 20th.—Sir W. H. White unveils a window at Devonport Technical School.
Scholarship Examinations begin at Sandwich Grammar School.

Saturday, 22nd.—Mr. Long, M.P., presents the prizes at South Eastern Agricultural College, Wye.

Monday, 31st.—Marlborough College, Prize Day.

August.

Wednesday, 2nd.—Scholarship Examination begins at Bradford Grammar School.

The School World.

A Monthly Magazine of Educational Work and Progress.

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All contributions must be accompanied by the name and address of the author, though not necessarily for publication.

The School World

A Monthly Magazine of Educational Work and Progress.

No. 8. AUGUST, 1899. SIXPENCE.

CHAPTERS IN SCHOOL HYGIENE.

By C. E. SHELLY, M.A., M.D., &c.

Consulting Medical Officer, Haileybury College.
Joint Hon. Sec. of Medical Officers of Schools Association.

III.—Class Rooms, Lecture Rooms, and Studies.

THE class-room and the dormitory must have certain fundamental qualities in common; for they are intended for occupation by the same individuals who possess under all conditions certain constant bodily requirements and are the subjects of constant vital processes. The essential difference between them is practically this:—the place devoted to sleep demands perfect ventilation, darkness and silence; that intended for work calls for perfect ventilation, good light, and suitable acoustic properties.

GENERAL CONSTRUCTION.

With regard to general construction: hollow walls with a smooth internal surface pervious to air, and so coloured in a flat tint as to absorb as little light as possible without producing glare; an impermeable boarded floor; and the avoidance of sharp angles, ledges, quirks and beadings as far as may be—so as to discourage the harbouring of dirt—are all points of real hygienic importance.

No class-room—no living room of any kind—should have its floor below the level of the ground. Stone floors are objectionable, being noisy as well as cold, and quickly becoming damp and "sloppy" in wet weather. Wood blocks, set in pitch on concrete, make a better floor, but this, too, is noisy; and the blocks are apt to become loose in places, and wear unevenly. On the whole, a good boarded floor, with all joints treated with marine glue, as described in connection with the dormitory, answers best; it can be kept in good condition for a long time by the occasional use of the plane, provided this operation be not deferred too long. If a class room is on the ground floor, with cellars beneath it, care must be taken that these latter are dry and well ventilated, and that they be not used for storing vegetables, or other substances liable to decay, or coal (which gives off an appreciable amount of deleterious gases). If there be no cellar underneath, the space below should be effectively ventilated by means of properly disposed air-bricks or the like; and this space should itself be floored by some six inches of good and well-laid concrete.

LIGHT.

Light, during the hours of daylight, will be furnished by windows. These should reach to the top of the room, while their sills should be at least four feet to four feet six inches above the floor; thus full light may be secured, entering above the heads of the pupils, whose attention is not distracted by the sight of objects outside. This latter aim is only partially attained by obscuring the glass in the lower sashes of windows arranged in the ordinary fashion, while much of the needed light is at the same time lost. The total window-area should not be less than one-tenth of the floor space of the room; and 15 square feet of window-space may be provided for each 1,000 cubic feet in the room without the risk of producing an undue cooling effect. Whenever possible, the windows should all be placed on one side of the room only, and so that the light falls on the left of the pupils as they sit at work, and on the right of the master who sits facing them. Although the light enters from one side only, reflection from the light-hued wall opposite and from the ceiling ensures its practically equable diffusion throughout the room.

ARTIFICIAL ILLUMINANTS.

The choice of artificial illuminants is practically limited to three: gas, paraffin, and the electric light. In the use of the two former, the lamps or gas brackets should be fixed along one wall—preferably in the lines of the spaces between the rows of desks—so as to throw their light from a point somewhat above the level of the pupils' heads and on to their left hands. The Welsbach is at present the best form of gas light; and the same principle (the incandescence of a "mantle" of refractory earths) is applied to paraffin oil lamps, but it needs special care and attention to attain the best results. On the wall behind each light (gas or oil) should be placed a polished metal reflector, but this should be broadly convex—not, as is usual, concave—in shape, because

the object in view is to diffuse and soften rather than to converge the light rays towards a focus. By far the best light for the purpose is that furnished by the incandescent electric lamp. It neither robs the air of oxygen nor fouls it with the waste products of combustion, while its heating effects are relatively negligible (see Table, below); it contains far less of the irritating red rays of the spectrum than does either paraffin or gas; it is under immediate and independent control; the risk of accident by fire is reduced to a minimum; and if a sufficient number of lamps of small candle-power be disposed not far below the ceiling of the room, a soft diffused illumination is produced resembling that of diffused daylight. When reflecting shades are used with this light they should be convex, for reasons already given.

If properly placed and arranged, there is no reason for enclosing any sort of artificial light in globes or chimneys of ground glass or porcelain—such shades block out from 25 to over 70 per cent. of the light which reaches them.

The following Table, compiled by Dr. Meymott Tidy and (for electric light) by Mr. Hammond, affords a useful comparison of the hygienic qualities of the different artificial illuminants judged by the same standard or "candle-power."

Burnt to give light of 12 standard candles at 120 grains per hour.	Cubic feet of oxygen consumed.	Cubic feet of air consumed.	Cubic feet of carbonic acid produced.	Cubic feet of air vitiated.	Heat produced in pounds of water raised to 10° Fahr.
Cannel Gas	3·30	16·50	2·01	217·50	195·0
Common Gas*	3·45	17·25	3·21	348·25	278·6
Sperm Oil	4·75	23·75	3·33	356·75	233·5
Benzole...	4·46	22·30	3·54	376·30	232·6
Paraffin..	6·81	34·05	4·50	484·05	361·9
Camphine	6·65	32·25	4·77	510·25	325·1
Sperm Candles... ...	7·57	37·85	5·77	614·85	351·7
Wax Candles	8·41	42·05	5·90	632·25	383·1
Stearin Candles ...	8·82	44·10	6·25	669·10	374·7
Tallow Candles ...	12·00	60·00	8·73	933·00	505·4
Incandescent Electric Light	None	None	None	None	13·8

* One ordinary gas burner is equal in vitiating effects to four adults.

Importance of Proper Lighting.

This matter of the proper lighting of the class-room is of serious practical importance. Imperfect vision is becoming increasingly frequent with each succeeding generation of all highly civilised peoples. All its forms are aggravated, and one at least is directly induced by the muscular efforts entailed upon the eyes in reading, writing, and other "near" work; the evil effect of such efforts is intensified if the work be pursued in a bad light, in unsuitable postures, or under unhealthy and vitally depressing conditions; and the not infrequent result is more or less of a life failure—a profession barred, an opportunity destroyed, a career of usefulness hampered, a source of legitimate enjoyment curtailed. Appropriate and nourishing food has been already dealt with; the importance of a pure atmosphere is not less cogent, and not more difficult to secure. The maintenance of a suitable posture when reading or writing is not so easy to ensure. It is impossible to have a desk and seat suitably proportioned to the dimensions of each member of the school, and automatically adaptable to his progressive stature; and the use of the several ingenious forms of adjustable desks is severely handicapped by practical difficulties. But the provision of abundant light of the right kind and in the right way is not an impossibility; and it must be regarded as one of the prime essentials in connection with every room in which the "work" of the school is supposed to be carried on.

Ventilation.

Proper and effective ventilation is, of course, as necessary in the case of the class-room as elsewhere. It may be secured by a combination of inlet Tobin's tubes and extracting cowl outlets, as described in connection with the dormitory. The windows may serve as useful auxiliaries at times, especially if their upper sashes be made to open inwards: or if they be fitted with Bird's inlets, the lower sash being raised for some three inches by a hinged block the length of the sill, so that the incoming air may enter through the space between the two sashes; but ventilation by the windows must not be regarded as the routine method. Indeed, in planning the hygiene of the school the old English term "eye-door" should be mentally applied to these openings, rather than our modern equivalent of the ancient "wind-door."

Artificial Warmth.

Except in the case of rooms of the smallest size, artificial warmth can be satisfactorily maintained only by properly arranged coils of hot-water or hot-air pipes. These must be kept free from dust and dirt, and the supply of heat should be under ready control. A good thermometer, with easily legible index, placed as nearly as possible in the centre of the room, is a valuable piece of furniture. As a generally applicable rule, the temperature as shown by such an instrument should not be allowed to fall below 50° F., or to rise above 60° F. When the room feels too warm the thermometer should be consulted, and if it does not indicate too high a temperature it may safely be concluded that the uncomfortable sensation of heat or closeness is really due to imperfect ventilation, and means should be at once taken to rectify this rather than to reduce the source of heat. But the master must not be a slave to his thermometer, and he must not forget that comfort and protection from risks of chill depend on maintaining a room temperature duly proportioned to that of the air outside; one, consequently, which must often be lower in wintry weather than that of the same room on a warm summer's day. Hence, too, artificial heating must be resorted to in cold weather, at whatever season

of the year this be experienced, and without any rigid dependence upon the calendar. With regard to other sources of artificial heat, it may be pointed out that the "close-stove" is not only bad in principle, but directly noxious, owing to the freedom with which the very poisonous carbon monoxide transfuses through cast-iron at a high temperature into the air of the room. Gas-stoves are liable to similar objections, besides being expensive; and stoves designed for the introduction of "warmed fresh air" are, in its true sense, insanitary, for the reasons already specified when dealing with the ventilation of the dormitory.

SIZE OF CLASS-ROOMS.

The details already mentioned apply to class-rooms of all sizes, and the size of any particular class-room is dependent on the maximum number of pupils which it is intended to accommodate. A master cannot properly teach and control a class exceeding thirty in number; and while this is the practical maximum, a smaller number will give better educational results, and the hygienic needs of a room suited to the smaller number can be more easily attained.

The size of the room can be calculated by allowing at least 800 cubic feet for each inmate, reckoning not more than 12 feet of wall height in doing so, and thus allowing 70 square feet of floor space to each pupil. This allowance appears extravagant as judged by some standards. And it is occasionally asserted that in the class-room—which the pupil occupies, or should occupy, for no more than an hour at a time—less cubic space is needed per head than in the dormitory, which is occupied for nine hours or more continuously. But if a certain minimum cubic space is required in the dormitory, in order to ensure adequate ventilation without draught for a succession of individual hours, no less should be provided in the class-room for any single hour, remembering, too, that in the class-room both muscle and brain are active, and that effete products of vital activity are being produced and need removal in increased proportion. Moreover, while those who argue in favour of a smaller allowance of space in the class-room make no allowance for the deteriorating effects produced on the air by the ordinary artificial illuminants, they make two damaging admissions:—(*a*) That it is practically impossible to change the air of such a room with the necessary frequency without creating chilling draughts; while if, to avoid this sensation of cold, the incoming air be warmed, the occupants are exposed to relaxing conditions, robbed of a respiratory stimulus necessary to robust health, and made unnecessarily susceptible to the influence of the outer air, whenever they leave the class-room in relatively cold or damp weather; (*b*) That, directly a class leaves the room, all windows should be thrown open, in order that the atmosphere may be sweetened for its successors: which appears to merit the retort that no pupil should be compelled to breathe—even for part of an hour's lesson—air which is admittedly too foul to be tolerated by the next comers. The question ultimately resolves itself, obviously, into one of expense, in connection with which three things may be pointed out:—That nothing is so costly as ill-health; that nothing is more insidious than the way in which the foundations of subsequent ill-health may be laid, and in which the powers of resistance to illness may be sapped during early life; and also that, inasmuch as the wall height of rooms is of little value from this point of view, above 10 or 12 feet, a saving may be effected in this direction when designing and erecting buildings of this class.

A lobby, with hooks and racks, for depositing wet coats, caps, umbrellas, &c., is a most useful adjunct to the class-room. With very little trouble it can be so provided with heating pipes and exit ventilating openings as to serve as a drying room for such articles of clothing, and will then be especially valuable in wet weather.

STUDIES AND LECTURE ROOMS.

Studies should be as large as possible, and well lighted. They should never be used as bedrooms; the furniture should be plain and solid; curtains and flimsy draperies should be discouraged; and where gas or oil is used for lighting, the burner or lamp should occupy a fixed position, and a special flue or exit shaft should be provided to carry off the products of combustion.

The general principles indicated above apply equally to larger buildings, such as lecture halls and the like, in respect of which the faults most commonly manifest comprise imperfect arrangements for ventilation, warming, and lighting; doors and doorways (and where there are galleries, staircases) badly arranged for easy and rapid exit; and indifferent acoustic properties.

ON THE TEACHING OF ENGLISH COMPOSITION.

By J. C. NESFIELD, M.A., Merton College, Oxford.

Author of "English Grammar Past and Present," "English Grammar and Composition," &c.

VII.—ORIGINAL COMPOSITION: ESSAY-WRITING.

WE come lastly to the subject of original composition. In all the exercises that have been recommended hitherto—the correcting of common errors of expression, the conversion of sentences from one form to another, the synthesis or combining of short sentences into one larger sentence, the correction of wrong order, the observance of the rule of unity in the formation of sentences and paragraghs, and the condensation of a page or two of print into about half the original space—in all these processes the student has the material placed fully before him, so that nothing but the form of expression is left for him to think of. In original composition,

however, the case is entirely different. In this he has to supply the matter as well as the form—the ideas to be expressed as well as the mode of expressing them. Here, then, the student enters upon a new kind of difficulty: he is thrown much more upon himself than he has ever been before; and I find it more difficult in consequence to suggest a definite mode of procedure either for the student or his teacher.

There is one point, however, on which emphasis can be laid at once without any doubt or hesitation, viz., that the student, of whatever standing he may be, the most advanced quite as much as the novice, must be thorough master of his facts before he begins to write about them. He must sit down to write, not because he has to say something, but because he has something to say. He may be certain that the words will not come unless the facts have been mastered and their mutual relations arranged in his mind in something like an orderly sequence.

Verbaque provisam rem non invita sequentur.—Horace.

Composition is the art of using language correctly and effectively; and the use of language is to express thought. The thought, therefore, is the first thing needed. If the student has to hunt for his facts at the same time that he is engaged in writing about them, he is attempting the impossible task of doing two things at once. Knowledge of the facts and of their inter-relations with one another conduces more to readiness of composition than a knowledge of all the arts of rhetoric, valuable though the latter may be. Among writers of recent times it would be impossible to mention any two men who have expressed themselves more clearly or more powerfully in everything that they spoke or wrote than Cobden and the late Professor Huxley. Yet neither of these men, so far as I know, had made any study of the arts of language or composition. The reason why they wrote so well was that they knew all their facts before they began to write, and held the views that they wished to express with an intensity of conviction amounting to a passion.

If now we are to apply this maxim to humbler mortals—the young men and young women of training schools and colleges, whose aims and capacities, at least at this period of their lives, are of a much lower order—how is the student to master and arrange his facts before he begins to write about them? and where is he to get them from? I think he should get them chiefly from the text-books of the year; or, to speak more correctly, the teacher should set him to write upon some subject, whether narrative, descriptive, or reflective, that he has been taught in class by the teacher himself. A student has a great variety of subjects to get up and digest for his examination, and the time that he can find for so doing is none too long. He should therefore be spared, if possible, the additional labour of getting up new subjects for the sake of writing essays on them. If the study of History, Literature, or Object-lessons can be made subsidiary to the practice of original composition, not only is a great saving of labour and thought effected, but the text-books themselves are likely to be studied more thoroughly when this ulterior object is kept in view. The teacher, in giving out the subject on which an essay is to be written, might, if he finds it necessary at first, draw up a very brief outline of the points about which the student is to write. In time, however, the student should be able to dispense with such help, and make out the headings for himself.

Essays may be roughly divided into three kinds—Narrative, Descriptive, and Reflective; according as they consist of a narration of some important event or the life of some eminent person—a description of some place or object of interest—reflections or opinions upon something of a more general or abstract nature. I am, of course, aware that the three styles, those of description, narration, and reflection, are often combined in the same composition, and that it is scarcely possible to write an essay of the reflective class without borrowing something from narrative or descriptive sources in support of the opinions and sentiments to be expressed. Nevertheless it is more appropriate, I think, that an essay should have one main characteristic, and that the subject selected by the teacher should be so worded that the writer who has to handle it may be able to preserve this characteristic without difficulty. The year's course in History, Literature, or Object-lessons is likely to furnish ample material from which subjects suitable for an essay can be selected. The drift of a poem by Sir Walter Scott, or of some special event or description selected from the poem by the teacher, will very easily bear being told in ordinary prose; and if a student is asked to reproduce the main facts or reflections in his own words, without having the book before him, this will give him a much better notion of original composition than he could get from the questionable habit of paraphrasing. A play of Shakespeare's can be dealt with in the same kind of way. Lamb's "Tales" (a copy of which is likely to exist in every school library) show very clearly how a story represented by the dramatist in the form of dialogue, and in the directions given to actors, can be reproduced by the reader in the form of a continuous narrative, and in a style of easy idiomatic prose. In the history of our country, if (as is probable) the history of England should form part of the year's course, there are many events of national importance and many careers of individual men, which could be detached from the general course of the narrative and made the subject of a separate essay. If, for example, the student were asked to write a life of Alfred the Great, he would keep steadily in view one leading trait in his character—a trait in which some of the greatest men in history have proved themselves to be wanting, viz., that he had the foresight, the modesty, and the patriotism to consider carefully what he could and what he could not accomplish, and that

hence, after defeating the Danes in a decisive battle and recovering his throne and capital, he made no attempt to re-conquer the whole of England, but was content to divide it between himself and the Danes, and devote the remainder of his life to making his own share of the island secure against future attacks either by sea or land. The writer would dwell upon the great work that Alfred, though he died rather young, lived to accomplish, viz., that he saved England from a relapse into barbarism by conciliating the ferocious Danes whom he had just defeated, and inducing their heathen king to declare himself a Christian, and thus help him to repel future incursions of Danish hordes from the northern seas—that he built the first English fleet and was the founder of our naval greatness—that he laid the foundations of Anglo-Saxon literature, and was the first to set on foot the compiling of the "Old English Chronicle," the best authority that we possess for the early history of our country. The writer would further show that by the vigorous measures of Alfred the Northmen were deterred at last from making further incursions into his dominions, and their attention turned to France, to a part of which they gave the name of Normandy. In such a narrative little or no space would be given to the story of the burnt cakes, which, though it amuses children, is of questionable credibility and contributes nothing at all to the main thread of the history or the lessons to be learnt from it.

If the text-books prescribed for the year in prose or verse do not furnish suitable or sufficient material for the purposes of original composition, the teacher will know better than myself the sources from which such material can be got, and what kind of subject is best suited to the capacities of his pupils. Assuming that the student is furnished with such facts as he may require, I will now offer a few remarks and suggestions on the manner in which he may be taught to put them into words—the only point with which I can be expected to deal in this paper.

(*a*) In what spirit or mental attitude should a student begin to write? He should be encouraged to write in a spirit of ease and confidence, as if he were stating or explaining the case to a friend, and not as if he were saying something that he expected to be criticised or corrected. If a person sits down to write with a sense of assurance and freedom, determined to say what he has to say, and to say it intelligibly, his thoughts are likely to flow easily, and to find a ready expression in words. But if he begins sticking at words before he has finished his first sentence, he is not likely to get much further. He might write his first draft in pencil. When he has put down all that he intended to say, and has filled in the outline with which he started, he should read over his composition carefully two or three times, so that he may be able to judge of its general effect, and become his own critic and corrector, cancelling any statement that may seem superfluous or irrelevant, cutting out any unnecessary verbiage, supplying any fresh facts or illustrations that seem to be wanted to fill up a gap in his argument or to add to its force, altering any words or phrases that seem obscure, ambiguous, pointless, or unrhythmical. When he has done his best at revision, he can write out his fair copy, paying careful attention to punctuation and to the right subdivisions into paragraphs.

(*b*) How is the teacher to bring his corrections to bear? I think that a student should be required always to leave a rather wide margin in the fair copy that he sends up to the teacher. The teacher will then have space on which he can write his own remarks. Every teacher, no doubt, has his own method of correcting or of pointing out in what respect some correction is needed. It is not for me to advise him. I think, however, every one would agree with me that the student, after receiving back his composition with the teacher's notes in the margin, should be thrown upon his own resources as much as possible in making the corrections or additions called for, and should send up the revised edition to the teacher for final review or correction before he is allowed to commence a fresh composition. The compositions, as finally revised, should be preserved for future reference or comparison.

(*c*) How often should a student be required to write a fresh essay? My answer is, quality before quantity. If a student, after one or more revisions have been made under the teacher's direction, has been able to prepare *one* good piece of composition, the sight of that will give him faith in himself, and encourage him to write another equally good or better. A habit of good writing being thus established, his progress is almost certain. A number of bad essays, written one after another, not thoroughly corrected by the teacher, not revised and rewritten by the student himself, can be of no use. What careless practising is to one learning the piano, careless composition is to one learning to write. The frequent repetition of such writing is not practice, but the dissipation of practice. One neatly worded and neatly argued essay, which a student can call his own, and which he can feel some pride in preserving and in reading over again, will be a greater stimulus to future progress than twenty that are ill-worded, ill-arranged, ill-argued, and, in fact, not worth preserving or reading again. An artist who has produced one good picture will certainly feel his ambition roused to produce another. The same motive will be roused in one who is learning to write; for composition is as much a fine art as painting, and requires no less care, patience, and perseverance, before proficiency can be reached. It will stir up a healthy spirit of emulation in the class if, when all the revised essays on a given subject have been received, the teacher reads out to the class one or two of them that he considers best.

(*d*) Which is the best form of composition—an essay or a letter? Opinions may differ; but I give my own preference decidedly in favour of the former. A letter is expected to be informal,

familiar, abrupt, discursive, running lightly over a variety of topics, and not limiting itself to one—in fact, a free and easy exchange of ideas and feelings between one friend and another. To ask a candidate to write a letter to a friend, describing some town that he has visited, or discussing the use and abuse of athletics as part of a school training, is asking him to use the epistolary form for a purpose for which this form was never intended, and is, in fact, never used, except in compiling an official proposal or report. Those qualities of style that are admissible and even attractive in a letter are out of place, and in fact positive defects, in an essay or formal composition.

VIII.—Vocabulary.

It remains to make a few remarks on the choice of words. Words need a special study of their own as much as the composition of a sentence or a paragraph. In examining the essay sent up to him the teacher would of course draw a line under any word that he does not consider suitable to the context, or that has been used in a sense which does not properly belong to it. It is needless to add that the text-books on History, Literature, and other subjects prescribed from year to year are the main sources from which the students' vocabulary can be enriched and regulated, especially if the subjects selected for composition are taken chiefly from these text-books. Some separate study of words might be useful, however, if time and opportunity can be found for it. There is a class of words in the use of which a great deal of laxity is springing up. I give a few examples :—

(1) I *doubt* the impertinence of writing about Walpole may not be forgiven.—*Fortnightly Review*, p. 124, January, 1899.

(2) He claimed nothing for himself, he merely *inferred*. All the claiming was done by people who believed him to be clever enough for anything. When he had been charged with the authorship of some anonymous book, he merely shrugged his shoulders, *inferring* by his manner that people might think whatever they chose.—"The Fowler," by Beatrice Harradin, quoted in *Literature*, p. 453, April 29th, 1899.

In (1) "doubt" is wrongly used in the sense of "fear"; and in (2) "inferring" is misused in the sense of "implying." Many more examples could be given. If these were collected and placed before the student for correction, it would help to put him on his guard against errors into which for want of such caution he might be liable to fall.

It would be of great use to a student if he could get some practice in the use of synonyms, that is, words that have some resemblance of meaning, but do not suit all contexts alike. Take the three words—*meaning*, *sense*, *import*. "An author may declare his *meaning* to be so and so; his words may bear that *sense*; but such may not be their obvious *import*. Hence *import* is the actual signification of words as they are ordinarily used. *Sense* is the possible signification that they might bear in a particular sentence. *Meaning* is the signification intended by the writer." Many similar examples might be given.

It is scarcely possible to express oneself effectively without the occasional use of metaphors. The student should therefore be put on his guard against the mixing of metaphors, that is, combining in the same phrase or clause ideas borrowed from more than one source. This confusing of metaphors is not at all uncommon.

We have arrived at a point which *lands* us in a *sea* of difficulties.—Quoted in *Church Gazette*, p. 719, April 15th, 1899.

Traders should once and for all abandon the hope that the province of Yunnan is a rich *mine* only waiting to be *tapped*.—*Cont. Review*, February, 1898.

Finally, it is very important that a student should have a thorough knowledge of the force of prefixes in modifying the meanings of words, as for example in words like *aclivity*, *declivity*; *emigration*, *immigration*; and many more. I will conclude with giving an instance of a recent misuse of the word *emigration* for *immigration* by a gentleman writing from America :—

The original and traditional character of the American commonwealth has long been giving way to the action of a variety of forces, some native and some foreign. A vast and heterogeneous *emigration*, which even the digestive powers of the Republic, armed with its school-system, has failed entirely to assimilate, is one of the factors in the change which has been long going on in the national character.—Goldwin Smith, *Cont. Review*, p. 620, May, 1899.

When a writer of such eminence as Mr. Goldwin Smith can make such an oversight as that just quoted, there can be no question of the necessity of putting a school-student on his guard.

VIII.—Text-books.

Before closing I shall be expected perhaps to give a list of the text-books recommended for use; but I must beg to be excused. There are many text-books on composition in the market, and the teacher is well able to decide for himself what suits his purpose best. Moreover, it is possible that some of the methods suggested in this paper do not commend themselves to teachers and school-managers, who have other and better methods of their own to work upon. Until there is something like unanimity in the mode of teaching, it is premature to talk about text-books. The kinds of lessons in composition that have been discussed in this series of papers may be reduced to two classes, (1) the writing of an original essay, which completes the course, and (2) the various kinds of exercise that are subsidary and preparatory thereto, viz., those discussed under headings I—V inclusive. I make no mention of the kind of exercise described under heading VI, paraphrasing from verse to prose; for this has been rejected as unsuitable and inexpedient.

There is no text-book, so far as I am aware, that contains a complete treatment of *all* the subsidiary operations that lead step by step up the slow and difficult path to original composition, though there are many that deal with them in parts. As aids to original composition the reader in no doubt aware that he can avail himself, if he

desires, of handbooks containing short essays in outline, which the student can be asked to fill up with fresh matter from his own knowledge or reflections. This may be a convenient way of practising a student in original composition, if the teacher prefers it to what I have recommended under heading VII, viz., the selection of subjects from the course of History, or of Literature, or of Object-lessons prescribed for the year.

EXPERIMENTAL BOTANY.

By ERNEST EVANS.

Natural Science Master, Mechanics' Institute and Technical Schools, Burnley.

THE following simple experiments for the illustration of some of the essential points in plant life are intended to be in no way exhaustive, but are rather meant to suggest others of a similar kind to the teacher of botany. Botany as a school subject is too often a matter of elaborate nomenclature learnt, in many cases, quite apart from flowers themselves. In these circumstances it is not surprising that it offers little attractiveness to the enquiring minds and inquisitive dispositions of boys or girls. Yet when experimentally taught there is no subject which, by its innate interest, so quickly gains a position of esteem in the child's mind. It is hoped that teachers may be able to find time during the present vacation to perform the typical experiments in plant physiology which are here brought together. If they do, there is no doubt that the object lessons in botany during the coming school year will gain greatly both in charm and educational value.

WATER CULTURE.

Germinate a few peas in damp sawdust. Obtain five wide-mouthed bottles with corks, and split the corks so that the plants can be suitably fixed.

FIG. 1.—No. 1, Pea plant grown in normal solution. No. 2, Pea plant grown without potassium. No. 3, Pea plant grown without nitrates or ammonium salts. No. 4, Pea plant grown with soda instead of potash. No. 5, Pea plant grown without calcium.

When the pea seedlings have their radicles about two inches in length, wash them in pure water, and fix five of the best developed in slits in the corks. Mix five solutions for water culture, and number the bottles containing them from one to five.

(1) Let the first be the normal solution containing:—

Distilled water	1 litre.
Potassium nitrate	1 gramme.
Sodium chloride	$\frac{1}{2}$,,
Calcium sulphate	$\frac{1}{3}$,,
Magnesium sulphate	$\frac{1}{2}$,,
Calcium phosphate	$\frac{1}{2}$,,

A few drops of a dilute solution of iron chloride.

(2) Leave out the potassium nitrate from the second solution.

(3) Mix the third solution without the iron chloride.

(4) From the fourth leave out magnesium sulphate.

(5) In the fifth substitute sodium nitrate for the potassium nitrate.

Measure the plants from time to time. Note—

(i.) How the plant grows in the first solution; the growth will be normal.

(ii.) The plant which is grown without the potassium nitrate is stunted in growth.

(iii.) The plant grown without iron is not green. Wash a leaf with a weak solution of iron chloride; it will turn green.

(iv.) The plant grown without magnesium sulphate is also very dwarfed.

(v.) The plant grown without potassium nitrate, but for which sodium nitrate is substituted, is also abnormal. This shows that sodium cannot take the place of potassium in the food of a plant.

ASSIMILATION AND RESPIRATION.

I. Place a little lime water in a saucer, and leave it on a table for an hour or two.

(i.) The surface of the lime water will turn milky.

(ii.) This shows that carbon dioxide exists in the air.

II. Prepare some carbon dioxide by acting on marble with hydrochloric acid. Fit up the apparatus shown in Fig. 2. Place a few pieces of marble or limestone in the flask, and cover with water; pour strong hydrochloric acid down the funnel till the action is brisk. Collect a bottle of the gas. This can be done by placing a delivery tube into the bottle. When the contents put out a light held just below the outside of the mouth of the bottle, it is full of carbon dioxide. Turn the bottle wrong side up, and place it over a branch with leaves which is placed in a glass of water. Expose to light for a few hours, and then test with a light. The light will continue to burn. This

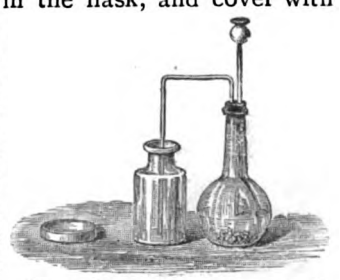


FIG. 2.—Diagram of apparatus for the preparation of carbon dioxide.

shows that the leaf has taken in carbon dioxide and given out oxygen.

III. Steep a few peas in water for twenty-four hours, and place them on damp cotton-wool at the bottom of a bottle. Close the bottle with a tight-fitting cork, and keep them warm for two days. Note—

(i.) That when the cork is removed, and a lighted taper is put in, its flame is extinguished.

(ii.) If a little lime water is shaken in the bottle it turns milky.

(iii.) This shows that some or all of the oxygen has been used up by the germinating seeds, and that carbon dioxide has been given out.

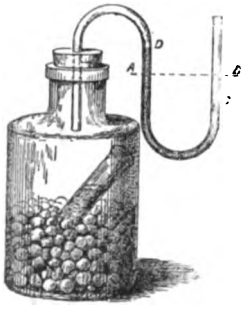


Fig. 3.—Diagram illustrating how germinating peas use up oxygen and give out carbon dioxide. *A*, *B*, level of coloured liquid; *C*, *D*, the change in level due to oxygen being used. The carbon dioxide is absorbed by the caustic potash in the test tube.

IV. Place a few peas on damp cotton-wool at the bottom of a bottle, and also place in the bottle a test-tube which contains a solution of caustic potash. Through the cork pass a glass tube bent in the shape of a **U**, as is shown in the accompanying illustration, and in the glass tube pour a little coloured fluid. Note—

(i.) The liquid stands at the same level in both arms of the tube.

(ii.) As the experiment goes on, the liquid rises in the arm of the tube which is in direct contact with the air in the bottle.

(iii.) The rise of the liquid is due to the oxygen being used up in the bottle by the germinating peas, and the carbon dioxide which they give out being absorbed by the caustic potash. The pressure in the bottle being less than the pressure of the external air, the liquid is forced towards the bottle.

(iv.) At the close of the experiment the caustic potash tube can be weighed, and it will be found to have increased in weight.

Rise of Temperature during Respiration.

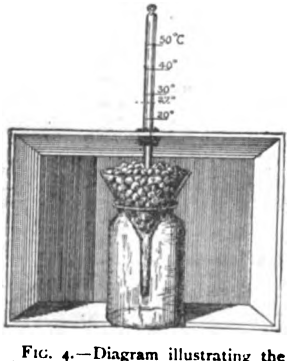


Fig. 4.—Diagram illustrating the rise of temperature due to respiration.

Place some germinating peas in a funnel, as shown in Fig. 4, so that they surround the bulb of a thermometer. Cover the apparatus over with a cardboard box, and pass the thermometer through a hole in the box. Note—

There will be a rise of temperature, due to the respiration which goes on.

Transpiration.

I. Take up three well-developed mustard plants by their roots, and put one in a dry place, such as on a table in a warm room. Place another with its roots in water, and the third in a dark cupboard. Examine at the end of a few hours. Note—

(i.) The plant placed on the table is withered.

(ii.) The one in the dark cupboard is in a far better state than the first.

(iii.) The plant in water is unaltered; the roots have taken water in as fast as it has been transpired.

(iv.) Plants give out water more actively in a light than in a dark place.

II. Obtain a potted plant, and cover the soil either with tinfoil or cardboard to prevent evaporation from it. Now place the pot and its contents on the pan of a scale and weigh it. Note—

(i.) That the pot and its contents lose weight.

(ii.) This must be due to the leaves and stem giving out moisture.

(iii.) The longer it stays on the scale the lighter it becomes.

(iv.) This experiment can be performed before a class even in winter, using either the electric light or gas.

III. Cover the soil of a potted plant with tinfoil or cardboard as before, and cover the plant with a bell jar, and place the whole arrangement in sunlight. Note—

(i.) The inside of the jar is soon covered with moisture.

(ii.) The moisture disappears at night.

(iii.) There is only one source for the moisture, viz., the leaves and stems of the plant.

(iv.) The moisture disappears at night because the plant no longer transpires; the moisture is condensed, and runs down the jar.

IV. Place some white blotting paper in a weak solution of *cobalt chloride*. Dry the paper either by holding it before a fire or in direct sunlight; it turns blue.

Hold a piece of this paper near a leaf which is still on the tree. Note—

(i.) That the paper slowly becomes red; the quicker the colour changes the more moisture the leaf is giving out.

(ii.) A similar piece of paper should be exposed to the air at the same time as a test of the atmospheric condition with regard to moisture.

V. There is, as a rule, more moisture given off by the under side of a leaf than by the upper. This can be proved by fixing the leaf of the oak or beech with a piece of cobalt paper on each face between slips of glass. Note—

The one fixed to the lower side assumes the red colour far quicker than the one on the upper side.

Root Pressure.

Cut off the stem of a dahlia or sunflower just above the soil, and fix to the cut end a hollow glass tube which contains a little coloured water.

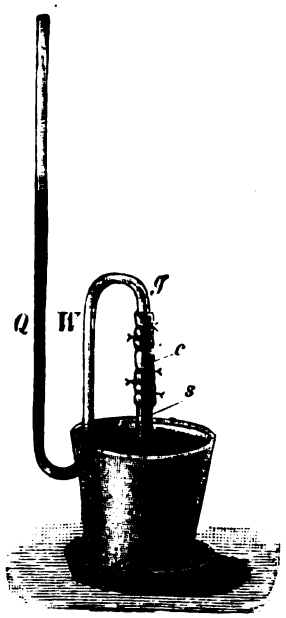


FIG. 5.—Apparatus for measuring root-pressure. The glass tube g is joined to the cut stem s by means of the rubber tubing c. The mercury Q is forced up the tube by the water W, which is given out by the cut stem

The fixing can be done by sliding the glass tube over the end of the stump and using rubber bands to hold it in place and to pack the base of the tube. Note—

The water is pushed higher and higher up the tube against the pressure of the atmosphere. The weight of the water lifted will give the amount of the root pressure.

How Sap Travels in Woody Plants.

I. Obtain a woody plant, such as an oak, which is growing in a pot. (*a*) From one branch remove a ring of tissue down as far as the new wood, *i.e.*, cut away the bark, cortex, and phloem, and pack the wound with cotton wool to prevent the entrance of fungi. (*b*) From another branch remove a ring of the new wood, and replace the bark and cortex. Note—

(i.) The leaves on the branch which has only a ring of tissue removed, down to the new wood, are still green and fresh.

(ii.) The leaves on the branch which has had the new wood removed have flagged; they ultimately die.

(iii.) The water which makes good that lost by transpiration travels in the new wood, but neither in the cortex nor in the bark.

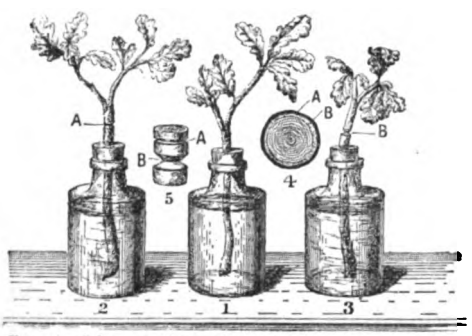


FIG. 6.—Diagram illustrating how the water moves up a stem. 1, A normal branch from the oak in water, the leaves of which are fresh. 2, A branch of the oak with the tissues removed down to the new wood. 3, A similar branch with the new wood taken out; the leaves are dried up. 4, 5, Sections of the same.

II. In many parts of the country old trees may be seen which have lost their heart wood, as well as the outer tissues of the plant. When such a tree is encountered, the following observations should be made. Note—

(i.) That leaves are still produced on the upper part of the old stem.

(ii.) That the leaves are green and fresh.

(iii.) These leaves must be supplied with water. This can only take place through the new wood, because the heart wood and the outer part of the tree have decayed. The water travels only through the new wood.

Light is Necessary for Growth.

Fill two plant pots with soil, and sow a few mustard seeds in each. Keep the soil moist. Place one pot in a window and the other in a dark cupboard. Measure the length of the plants in each pot from time to time. Note—

(i.) The plants kept in the dark cupboard are yellow in colour; those exposed to light are green.

(ii.) Those grown in the dark increase in length nearly three times as fast as those grown in the light.

(iii.) The leaves of the plant grown in the dark are very small, but those produced in the light are far larger.

(iv.) The plants kept in the dark begin to droop and soon die; those grown in the light are healthy and strong.

(v.) The plants in the dark are often attacked by fungi.

(vi.) Light is necessary for the healthy growth of plants, but they grow faster in the dark.

Effect of Light on Growth.

I. Place a pot containing a castor-oil plant on a window sill, and observe it from day to day. Note—

(i.) The stem and leaf-stalks bend towards the sun; the divided leaves arrange themselves at right angles to the window.

(ii.) If the pot is turned, the leaf-stalks and leaf-blades move round until they occupy their old position.

II. Examine a piece of ivy which is clinging to the wall or to the trunk of a tree. Note—

(i.) Most of the clinging roots are developed on the shady side of the stem.

(ii.) The roots developed in the light are turned away from it.

III. Obtain a box which will just cover a pot of musk. Cover the pot with the box, and so arrange matters that the light from a window can shine on the plant. Examine in twenty-four hours. Note—

(i.) The plants turn towards the light.

Turn the box so that the light can only shine into one corner.

(ii.) On the following day the plants will have turned again to seek the light.

Turn the box so that the plant can only receive light from the room.

(iii.) At the end of another day the plants turn once more to catch the diffused light.

(iv.) Plants like musk are light-seekers. They always arrange themselves so as to receive the maximum amount of light.

Gravitation and Growth.

I. Germinate a few peas in damp sawdust. Place one on damp soil. Place another with the

radicle and plumule in a horizontal position on a piece of glass which is covered with damp blotting paper. Note—

(i.) The radicle of the pea in the damp soil bends downwards and the plumule upwards.

(ii.) The plumule of the pea on the piece of glass grows straight upwards, but the root grows along the piece of glass until it reaches the edge, when it turns so as to make nearly a right angle with the rest of the root, and then grow downwards.

(iii.) This shows that the root is positively geotropic and the stem negatively geotropic.

II. Make a hole in the bottom of a glass tumbler for drainage. This can be done by striking a blow at the centre with a sharp pick. The tumbler

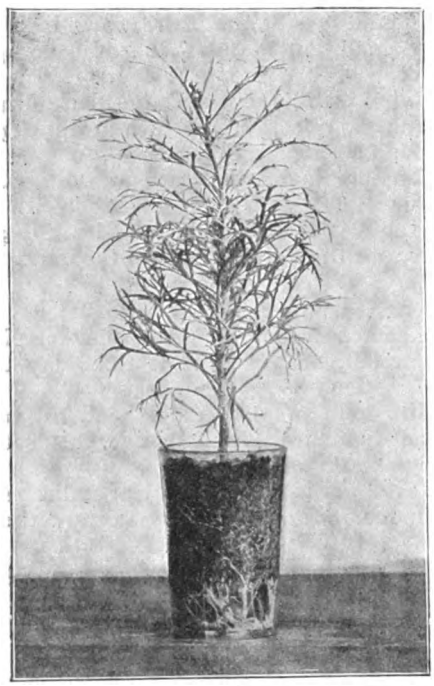


Fig. 7.—Photograph of a plant grown in a tumbler to show the distribution of the roots. The white roots are close to the side of the tumbler. During the growth of the plant the tumbler was covered with brown paper. The plant produced both flowers and fruits.

may crack, but if it holds together anyhow it will do. Fill with soil, and put a quick-growing plant in it. Expose to light. Note—

(i.) No roots will be seen near the glass, or, if they should appear there, they will soon bend away from the light.

Cover the tumbler with brown paper to prevent the light from affecting the roots. Examine in a few days.

(ii.) The soil near the glass is packed full of roots.

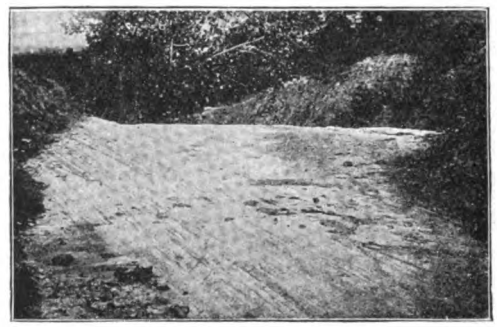
(iii.) If the plant and soil are turned out, and a sharp knife is used to cut a slice of soil away near the centre, it will be found full of roots with the tap-root growing downwards.

(iv.) This shows that the ordinary roots are negatively *heliotropic* and the tap-root is positively *geotropic*.

HOLIDAY OBSERVATIONS FOR TEACHERS OF GEOGRAPHY.

By A. J. Herbertson, Ph.D., F.R.S.E., F.R.G.S.

THE teacher of geography is to be congratulated when holiday time comes, for he can find excellent professional reasons for any tour he may select, and is always able to combine business with pleasure. He may elect to go to Switzerland to study glaciers and moraines, beautiful lakes and the famous falls of the Rhine; to Vesuvius for volcanic phenomena; to Scandinavia for a fiord coast and the midnight sun; to the summer hotel in Spitsbergen for a mild Arctic experience; to Holland to study a great delta; or to France for fine rivers and estuaries, or the volcanic puys of Auvergne. Nor need he go so far afield. The home land is rich in materials for profitable study. It is true that Arctic and Alpine conditions are wanting, but there are innumerable illustrations of glacial action in the past, and if the



Striations due to glacial action in the past.

midnight sun is not actually to be seen, it is yet possible by going to the north of Scotland to enjoy a day of considerably more than twenty hours. A typical fiord coast may be found on the west of Scotland, and a rias coast in south-west Ireland, while lakes, deltas and magnificent estuaries are all to be found without quitting the United Kingdom. The only difficulty lies in selecting among so many attractive alternatives.

To make the fullest use of the holidays we must first decide what we really want to do. While it is true that much can be learned by observing whatever "turns up," there is an obvious gain in going to places where something we particularly want to see is likely to turn up. A systematic holiday need not be a dull one.

The implements required by the teacher of geography are few in number. A good compass, a pocket aneroid and good maps are indispensable, and to these he may add at will a camera, a bicycle, thermometer, sundry lines for lake or sea work, and such simple surveying apparatus as he is competent to use.

Of the importance of the camera too much cannot be said. Most of the illustrations of scenery now on the market are selected from the artistic

rather than the scientific point of view. Good photographs of objects of geographical interest are hardly to be obtained. With the assistance of a camera it would be possible in many districts to obtain an excellent series of typical photographs of the work of wind, water and ice. At the seaside, for example, the beach might be photographed from the same spot at high and low tide, at spring and neap tide, and after a storm. The effect of winds on the height of the tides, as well as the ripples, swell, waves and breakers, could be similarly recorded. With these might be combined observations of the sea-water temperature at different times and under different conditions, as, for example, the rise of temperature with on-shore, and the fall with off-shore winds.

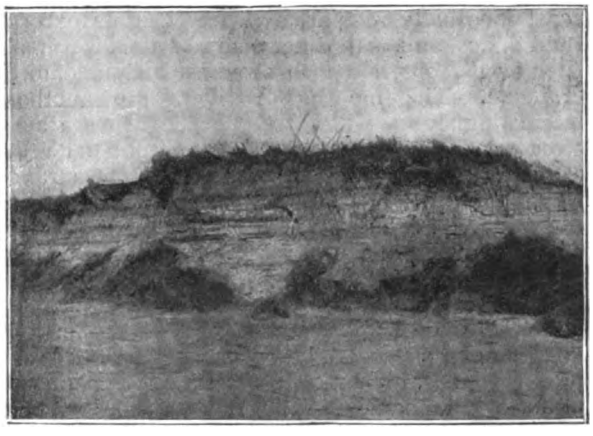
The camera, however, is after all optional, but the map is indispensable. Maps are the best of all text books. For a district in which he means to spend any considerable time, the teacher will of course supply himself with detailed ordnance maps, while for a region to be rapidly traversed general ones are more suitable. Both should be of two kinds—contour or properly hill-shaded maps showing the present surface features, and geological ones exhibiting their structure. Sir Archibald Geikie has recently issued geological maps of England and Wales and Scotland which will be found of the greatest assistance to teachers, while contour maps on the same scale have been published by Bartholomew, of Edinburgh, by whom the geological maps are also published. If the ordnance survey maps are too large for any district, the contoured maps, published by the same firm, on a scale of two miles to the inch, will be found suitable. They can be obtained at any railway bookstall, but are not yet published for some parts of central England and Wales.[1]

With his maps in hand the teacher of geography will find not merely his leisurely wanderings, but even his hurried railway journeys, full of geographical interest. Though railway travelling is from many points of view not an ideal method, yet it has one obvious advantage in presenting many types of landscape in quick succession. A glance at the geological map shows that such changes are definitely related to changes in geological formation, and as experience widens the observer can tell with fair accuracy when any important geological transition has occurred.

The engineering of any great line is generally in itself an interesting practical commentary on the broad geographical features of a country. As a rule, the railways follow the valleys, and in tracing them on a contour map there is generally seen to be a certain inevitableness about their direction, the further explanation of which may be sought in the geological map. Ridges are crossed either in water or wind gap. Failing these a tunnel may be necessary. In South Lancashire we find some lines traversing the higher land, while the rivers flow in narrower valleys below. Here we have an example of a region where stream erosion has not yet progressed far. In the north of England and Scotland all the main lines follow great valleys.

Even the less prominent surface features may be well observed from the carriage windows, though not of course studied in detail. Here a stream has cut a deep gorge, there it has formed a fine alluvial fan. Here the stream bed is rocky, there pebbly or sandy. All these are indications of the strength of the flow in different parts of its course. Elsewhere, perhaps, sand is quite absent and pebbles are replaced by large stones. The explanation is probably a harder rock, and the conjecture is confirmed by a glance at the geological map.

Again, a railway journey affords peculiar facilities for studying the distribution of vegetation and cultivation. Arable land in the narrow plains of mountain streams—haughs, as they are called in



SAND-DUNE AT LEASOWE, CHESHIRE, SHOWING LAYERS OF BLOWN SAND.
(*From a photograph by Mr. C. A. Defieux.*)

Scotland—the lower hill-slopes partly under cultivation and partly in grass, the higher slopes covered with grass, mixed with bracken and heather, form a typical succession of plant zones in hilly country. The contrast between the vegetation of a southern and northern slope or of sheltered or exposed regions is often very striking. Many of these contrasts can be photographed, making excellent illustrations for class teaching.

Other noteworthy points illustrate the mode of life and occupations in a district. Among these may be suggested the building materials in use—stone, wood or brick; slates, tiles or thatch—the distance between farm steadings and the relative size of each; the distances between the villages and towns; the nature of the goods on the trucks in the sidings; the people who travel from station to station, more especially in the slow train. Indeed, as a rule the geographer who has not too long a distance to travel prefers the slow train for the greater facilities it affords for seeing both

[1] The Geological Map of Scotland costs 7s. 6d.; that of England and Wales 12s. 6d., mounted on cloth. The contour maps are 1s. each for Scotland, Northern England and Wales, and Southern England and Wales. The two miles to the inch maps are also 1s. each sheet, or 2s. mounted on cloth.

the physical features and the actual life of a region.

The train, therefore, and its little brother, the cycle, have one special advantage. They carry the traveller more or less rapidly over a considerable tract of country, presenting many different types in succession, facilitating comparison, and assisting the formation of general ideas as a whole. For the detailed study of a limited area a different mode of procedure is necessary.

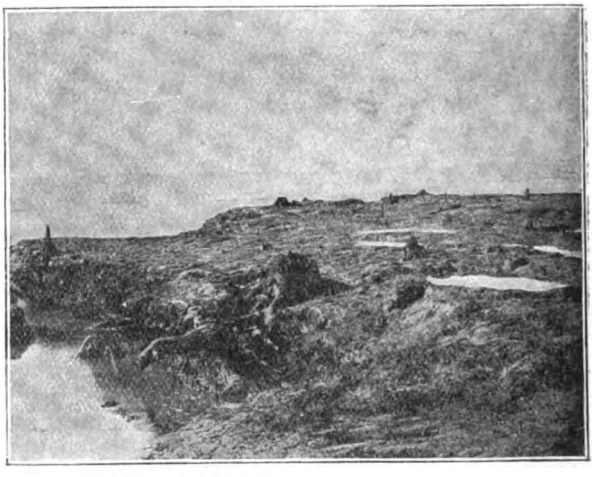
At the sea shore the rippled sand, the varying pebble beach, the changing sand dunes, are all worthy of close study. Valuable hints for observers will be found in papers like those of Mr. Cornish in the *Geographical Journal*. The general condition of the coast, whether sunken or raised, sinking or rising, can usually be determined, and several stages in its past history may frequently be made out by careful examination. Raised beaches are so common round Britain that they should always be carefully looked for. A sunken coast can generally be identified from its irregularities, and a climb to some height shows the water-covered valleys stretching inland. A raised coast is usually regular, with few heights except sand dunes, and with other characteristic features, such as lagoons, sluggish streams, and indefinite drainage. The mouths of rivers are another interesting study. The struggle between sea and river water leads to many forms, from delta to estuary. Some rivers flow parallel to the strand for considerable distances before debouching, and the spit of land between river and sea frequently bears evidence of many modifications of existing conditions.

At an inland centre there is just as much to observe if the spot be well chosen. Geographically, a region of many different rocks and great crustal movements is more interesting than a plain of uniform composition. The relief is varied, the streams are alternately rapids and still pools, their history is eventful. Such papers as that by Professor Davis on "Certain English Rivers," in the *Geographical Journal*, or by Professor Marr on those of the Lake district, suggest studies for holidays.

The first thing to be done on reaching the chosen centre is to climb the most commanding height, and study the outlook with the aid of all the available maps. The observer will thus discover the lie of the land and the trend of the rivers, the main lines of which should be correlated with the geological conditions. Such study and interpretation of earth forms is one which the teacher of geography should constantly practice, making use of all the available materials, written or charted. If he prefer, he may take a plane table, a prismatic compass, and an aneroid, and set to work to survey the country as if it were unknown. In that case he will distinguish the leading earth forms, and map them, determine the nature of the rocks, note the vegetation and the characteristic plants of each plant association, and observe the distribution of economic plants with their influence on the occupations and mode of life.

In our own country the topography and geology are already mapped, but in the matter of the geographical distribution of plants there is much to be done. One does indeed find on the ordnance map forests and some other vegetation features marked, but the typical plant associations have scarcely yet been studied, and offer a field in which a teacher of geography, who is also a botanist, may do really valuable original work under conditions which ensure a healthful and enjoyable holiday. Further hints will be found in Mr. Smith's paper on "Plant Associations," in *Natural Science*, or in one on the same subject, by the present writer, in the *Scottish Geographical Magazine*.

The physicist will find abundant work in studying the speed and volume of rivers; in trying to estimate rainfall and run-off from a river basin, no matter how small; in studying the temperature of rivers and lakes; and in sounding lakes with a well-seasoned rope weighted with sufficient lead. All these observations, if honestly and accurately made, will be of great general value, for little has yet been done in this country in the systematic study of such subjects.



SUBMERGED FOREST AT LEASOWE, CHESHIRE.
(*From a photograph by Mr. C. A. Deficux.*)

Again, the teacher of geography who is mainly interested in the influence of physical conditions on human life will find abundance of material in almost any neighbourhood. He will classify occupations, noting their cause—local conditions of climate, vegetation, mineral wealth, presence or absence of markets, &c.—and their effect on the general mode of life. To such, "Man and his Work," a little book by the present writer, to be published in the course of a few days, may offer hints for the collection and interpretation of material.

As literature, the teacher cannot do better than take such a book as Professor James Geikie's "Earth Sculpture" in his bag, and try to identify in his holiday surroundings as many of the phenomena therein described as possible. For Scotland, Sir Archibald Geikie's "Scenery of

Scotland" is indispensable, and Professor Ramsay's "Physical Geography of Great Britain," and Professor Hull's "Physical Geography of Ireland" are both highly to be recommended. No teacher of geography should visit Switzerland without Sir John Lubbock's "Scenery of Switzerland." Professor Davis's recently published "Physical Geography" is full of descriptions of land forms, illustrated by admirable diagrams, which will introduce those who do not know his writings to the fascinating, if somewhat difficult, study of geomorphology.

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CLOUDS AND WEATHER.

By A. T. SIMMONS, B.Sc.(Lond.)

Associate of the Royal College of Science, London.

A KNOWLEDGE of the shapes of clouds and their connection with weather can so easily be obtained that a student of Nature only needs to have his attention directed to the efforts which have been made to place the study of clouds upon a scientific basis in order to become a critical observer of their variety and significance. It is only necessary to watch the ever-changing shapes assumed by clouds during a short period of a breezy summer day to become charmed by their beauty and impressed by their grandeur. An almost infinite number of shapes may be observed at different times, but a continuous study of the sky will show that clouds frequently recur under similar forms, and so admit of being arranged into classes. There is naturally no very definite line of demarcation between one form of cloud and another, and several forms may be seen at the same time. Notwithstanding this, a number of clearly marked shapes can be recognised, and have been classified by meteorologists.

CLASSIFICATION OF CLOUDS.

The system of cloud classification most widely known was published by Luke Howard at the beginning of this century. Three different types were recognised, to which the names cirrus, cumulus and stratus were given; they were defined as follows:—

Cirrus.—Parallel, flexuous, or diverging fibres, extensible in any or in all directions.

Cumulus.—Convex or conical heaps, increasing upward from a horizontal base.

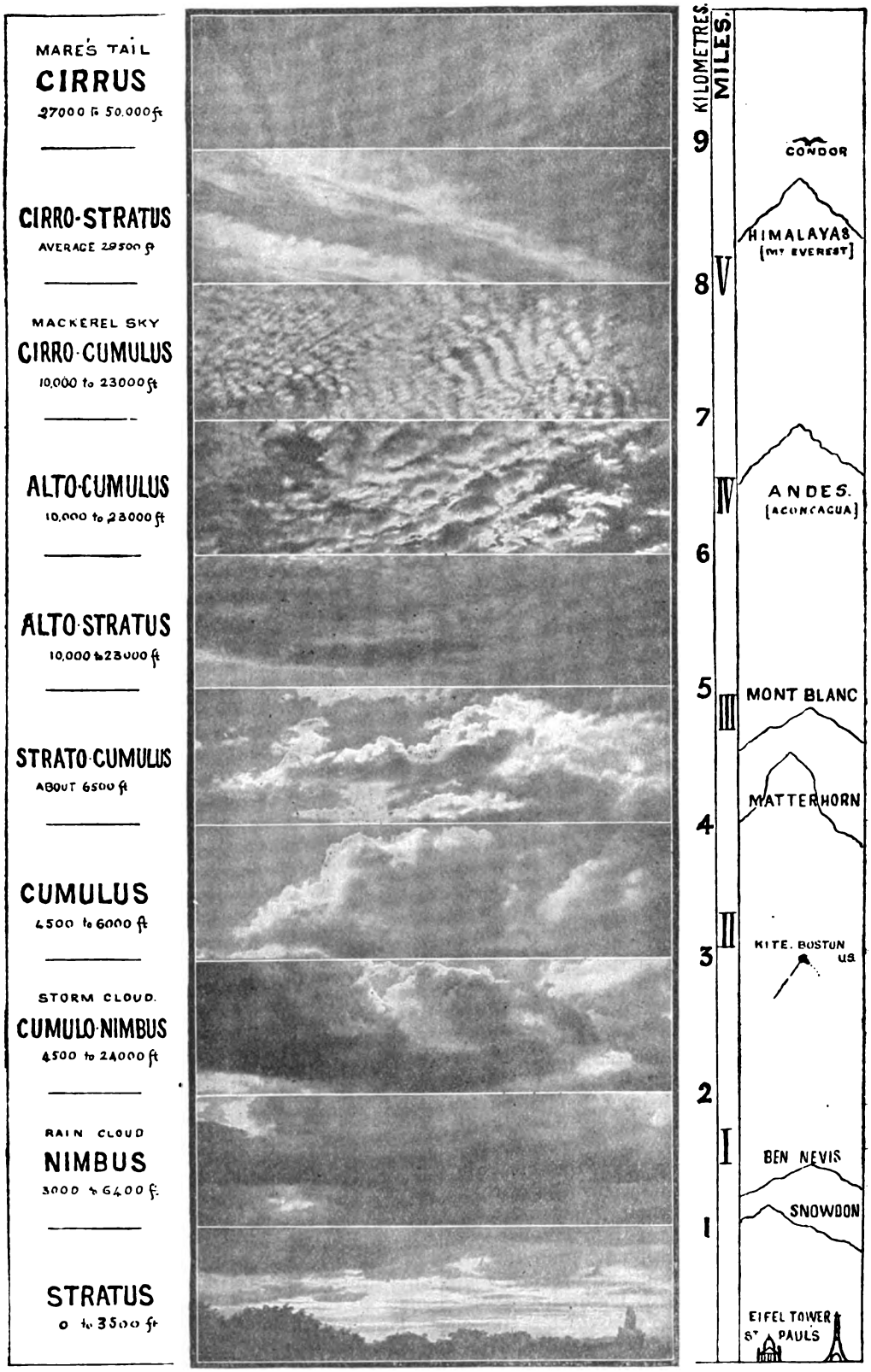
Stratus.—A widely-extended, continuous, horizontal sheet increasing from below.

From these three primary forms Howard devised four intermediate forms, which he named cirro-cumulus, cirro-stratus, cumulo-stratus, and cumulo-cirro-stratus or nimbus.

This nomenclature of clouds is still used by many meteorologists, but it is gradually giving place to another classification adopted at an international meteorological congress, and therefore termed the international system. Ten different types of clouds are recognised in this system, and are numbered 1 to 10 from the highest form (cirrus) to the lowest (stratus). The characteristics of the different types can be seen in the accompanying beautiful plate, which forms the frontispiece of a work by Mr. Richard Inwards entitled "Weather Lore," containing a collection of proverbs, sayings and rules concerning the weather. The names of the clouds and the heights at which the various forms most commonly occur are shown on the left of the picture. On the right-hand side heights in kilometres and miles are indicated, and a few well-known mountain summits are drawn at their relative altitudes to convey a clear idea of the heights of the clouds represented.

RELATION OF CLOUDS TO WEATHER.

As different clouds usually occur at different altitudes, it is easy to understand that they may give indications of forthcoming weather. An old proverb says, "The higher the cloud, the finer the weather," and this is probably true in many cases. A rule which applies to one part of the world may not, however, be accurate for another; nevertheless, when used in connection with observations of temperature and pressure, or with a weather map, cloud forms are of real service in weather forecasting. In the volume to which reference has been made, Mr. Inwards gives a number of proverbs and conclusions bearing upon the relation between various forms of clouds and weather, and the following extracts will serve to indicate the nature of the connection. The conclusions represent the result of years of observation, and they should be put to the test by readers of the SCHOOL WORLD interested in the moving panorama of the sky. Some will be found generally trustworthy, and others may be found inaccurate. Better than accepting any of the conclusions is it for the student of meteorology



FORMS, HEIGHTS AND NAMES OF CLOUDS PHOTOGRAPHED BY COL. H. M. SAUNDERS.

From "Weather Lore," by Mr. Richard Inwards.

to determine for himself the forms of cloud associated with particular kinds of weather in the district in which he spends most of his time.

"WEATHER LORE."

Stratus.—A stratus cloud at night, with a generally diffused fog the next morning, is usually followed by a fine day, if the barometer be high and steady.

Nimbus.—When scattered patches or streaks of nimbus come driving up from the south-west, they are called by the sailors "prophet clouds" and indicate wind.

If a little cloud suddenly appears in a clear sky, especially if it come from the west, or somewhere in the south, there is a storm brewing.

Cumulo-nimbus.—When a heavy cloud comes up in the south-west, and seems to settle back again, look out for a storm.

Cumulus.—When the cumulus clouds are smaller at sunset than they were at noon, expect fair weather; if, instead of diminishing in the evening, they keep increasing, they are indicative of wet.

Large irregular masses of cloud, like rocks and towers, are indicative of showery weather. If the barometer be low, rain is all the more probable.

Strato-cumulus.—If long strips of cloud drive at a slow rate high in the air, and gradually become larger, the sky having been previously clear, expect rain.

Cirro-cumulus.—A sky dappled with light clouds of the cirro-cumulus form in the early morning generally leads to a fine and warm day.

> "Mackerel sky, mackerel sky,
> Never long wet and never long dry."

Cirro-stratus.—Continuous cirro-strati gathering into unbroken gloom, and also the cloud called "goat's-hair" or the "grey mare's tail," presage wind.

The cirro-stratus precedes winds and rains, and the approach of foul weather may sometimes be inferred from its greater or less abundance and the permanent character it puts on.

Cirrus.—After a long run of clear weather, the appearance of light streaks of cirrus cloud at a great elevation is often the first sign of change.

Feathery cirrus in thick patches at equal distances apart is a sign of storm; so is any appearance of definite waves of alternate sky and cloud, in fact, so is any regular repetition of the same form.

But, as in all departments of science, little satisfactory progress will be made unless the observer's work is systematic and orderly. It is not enough to admire the ceaseless succession of sky patterns which have been very briefly enumerated. Each observation should be at the time recorded with the notes and sketches necessary to make it intelligible when referred to at some future time. If this is conscientiously done for a few weeks, the teacher or pupil who makes such a cloud record will be surprised to find order presenting itself out of diversity and regularity where only confusion seemed at first to prevail.

HINTS ON THE REARING OF COMMON CATERPILLARS.

By W. F. KIRBY, F.L.S., F.E.S., &c.

EVER since there were boys and butterflies, boys have run after butterflies; but it is more interesting to rear them from the caterpillars, though it does require a little more time and attention. One advantage is that there is no expensive apparatus required, and that many common caterpillars may be obtained almost everywhere. A rough wooden box, say about a foot each way, with a layer of loose soil or sand at the bottom, about two inches deep, and covered with a layer of moss; the box being closed with muslin or wire gauze to admit light and air, while preventing the entrance of enemies, or the escape of the inmates, will be enough for a commencement. The sand or soil should, however, be baked, and the moss dipped into boiling water before being used, to destroy any traces of animal life. The box should not, of course, have held any soap, chemicals, &c., before being used for caterpillars, but should be quite clean. It will be better for the beginner not to trouble about rearing his specimens from the egg, in the first instance. Caterpillars are easier obtained than eggs, and those which are already partly grown are more likely to be successfully reared than those which have just emerged from the egg. Later on, when the investigator has eggs laid by the insects he has reared, he will find it interesting to watch their development through the whole course of their lives.

Many caterpillars will eat a variety of plants, but most of them are more or less particular about their food; and if possible, every caterpillar should be fed on the plant on which it has been found feeding in the field or garden.

Having a box ready, how can we obtain caterpillars to put into it? As far as many common species are concerned, we have only to look for them on a fine summer day, and we can hardly fail to obtain as many as we want.

Let us go into the kitchen garden, and look at a bed of cabbages or cauliflowers. White butterflies of two or three different kinds will probably be seen flying over them, and the green or yellowish caterpillars which often strip the leaves, leaving only portions of the stalks and the tougher framework of ribs, are the produce of their eggs. If we transfer these caterpillars to our breeding-cage, and keep them well supplied with fresh cabbage-leaves, we shall, if they are not full-grown, see them increase in size from day to day, for they eat an enormous quantity of food as compared with their own bulk, and grow proportionately fast. The leaves offered to the caterpillars should not be wet or decayed, and should never be allowed to get stale; in fact, the food should always be renewed every day, and all the refuse carefully removed. The caterpillars should never be handled or disturbed, but should be encou-

raged to crawl on to the fresh food when it is changed.

Occasionally a caterpillar will be observed to mope, and refuse his food. His colours turn dull, and after a time he will moult not only his own skin, but even the covering of his head, his jaws, and the lining of his stomach. This accomplished, after a short rest to allow of the hardening of his new clothes, he will set to work to eat as fast as before, often beginning by eating up his own old skin.

But when a caterpillar has reached his full growth, he will eat no more cabbage during his present life. The caterpillar of a cabbage butterfly will probably climb up the wooden side of his dwelling, discard his old skin and other belongings as before, and fix himself as a yellow, black-dotted chrysalis straight up against the wall by a strong belt round the body, and another silken attachment at the lower end. There he will remain for two or three weeks, or perhaps all winter, if it is tolerably late in the season; but some fine day the chrysalis will crack, and a limp white butterfly with very small apologies for wings will struggle forth to the day. Presently the wings expand visibly to their proper size, as a fluid is pumped into their nervures by the contraction of the body of the insect; the moisture adhering to the insect evaporates, and it is ready to fly away into the open air.

But not all caterpillars arrive at this happy consummation of their existence. If an attempt is made to rear a number, several will die at one stage or other of their existence, and the caterpillars are very likely to be attacked by parasitic insects, which are generally called ichneumon flies. There is a great variety of these; they are transparent-winged insects, with four wings, and often with three long filaments at the extremity of the body. The commonest of those which attack the caterpillars of the white butterflies belong to the *Braconidæ*. They are the offspring of a little black four-winged fly, which lays her eggs on the caterpillar, and the maggots hatch and feed inside the body of this host, avoiding the vital parts, and grow along with it, arriving at maturity at about the same time. Then the parasites eat their way out of the body of the caterpillar, and form a cluster of little yellow cocoons round its dead body, as is very often to be observed when the cabbage caterpillars are plentiful. There are also some two-winged flies, like very bristly house-flies or bluebottles, the grubs of which attack caterpillars in a similar manner.

The cabbage butterflies do not by any means exhaust the attractions of cabbages for entomologists. Numbers of other insects of different orders feed on cabbages, among them being the caterpillars of many different kinds of moths, some of which are just as destructive as those of the cabbage butterflies.

Chief among these is the cabbage moth *par excellence*, a dark-coloured moth nearly two inches in expanse, with some whitish scaling in the middle of the forewings. The caterpillar is grey or greenish, with a row of white dots on the sides, and rolls itself up into a ring when disturbed. It is a great pest in gardens, feeding on all sorts of plants, and is particularly destructive to cabbages, burrowing into the heart of the cabbage, and often getting boiled. Like most other moths, it forms its chrysalis in the ground.

Besides this, there are many other brown moths, the caterpillars of which are called "Cut-worms" in America, because they generally feed at or just under the surface of the ground, and destroy plants by eating through the roots.

Another ubiquitous garden insect is the woolly bear, a black caterpillar clothed with long, shaggy grey or reddish hairs, which spins itself a loose web, or cocoon, in which it changes into a black chrysalis. From this emerges one of the most beautiful of our garden insects, the tiger moth, which often measures nearly three inches in expanse, and has reddish brown forewings, with ramifying white markings; the hind wings are red, with large, round, blue-black spots. The front of the body is black, and the abdomen is red, with transverse black bands.

The caterpillars of all these butterflies and moths, and of many more, may easily be found in almost every garden, even in the heart of London, and reared in the manner directed without much difficulty.

On beds of nettles we may expect to find the grey spiny caterpillars of the tortoiseshell butterfly, or the black ones of the peacock butterfly, which will change in due time into gilded angulated chrysalides, hanging by the tail only, and then into handsome butterflies with angulated wings.

On hedges we often find great masses of web, and large and small moths and their caterpillars in various stages at the same time. These are the white, gold-tailed and brown-tailed moths, with large tufts of wool at the extremity of their bodies, with which the females cover their egg-clusters, from whence emerge black caterpillars, with red lines and dots. The moths themselves, however, conceal themselves during the day, and will not be found on the hedges till dusk. Besides these, we may notice the much smaller grey, black-spotted caterpillars of the small ermine moths, different species of which are found on hawthorn, box, apple, &c. They are often sufficiently numerous to strip the trees of their leaves and to spin their webs all over them. The moths which they produce have long, narrow white forewings, marked with several rows of black spots; and grey hind wings.

The ermine moths, which are white or yellowish, with a few black spots on the forewings, are also very common in gardens, and are found sitting on walls, &c., in the evening. Their caterpillars, which are white, with an orange stripe on the back, or whitish, with brown hair and grey stripes, feed on a great variety of low plants.

But if we want to rear the caterpillars of the largest British moths, the stout-bodied, long-winged hawk-moths, we must look for large green

or yellow caterpillars, with a long horn on the back towards the extremity of the body, feeding on bed-straw, willow-herb, apple, poplar, lime, privet, and the largest of all on potatoes. They form their chrysalides in the ground, like so many of the smaller moths.

It will thus be seen that anybody who likes to take up the interesting study of rearing caterpillars need never fail of subjects for study and amusement. We have upwards of 2,000 different kinds of butterflies and moths in England, and many of them may be found by everyone who cares to look for them. Others are scarce, and will need much looking for; so that there is always plenty of novelty and excitement. Our instructions are merely intended to point out the simplest way of commencing such experiments; but there is a little book, Knaggs' "Lepidopterist's Guide for the Use of the Young Collector," costing only a shilling, which will be found to contain an epitome of the best methods of collecting and rearing all kinds of caterpillars.

Causes of Chinese Decadence. — The greatly increased interest in China at home will, I hope, give a stimulus to the study of the history of the social evolution of the Chinese, which is calculated to bring out many important lessons for ourselves. There have been, as it were, two parallel developments of the human race, one on the west of Europe-Asia, the other on the east side, very little dependent on each other. . . . The decay of manly spirit, brought about by the idea that war is immoral, the low position of woman, the absence of an hereditary aristocracy holding up ideas of honour and probity and constantly acting as a check on philistinism, the government by officials selected by competitive examination in ancient classics and trivialities akin to Latin verse, all these causes must have been acting disastrously to have brought an intelligent race into such a low position.—Dr. Augustus Henry in the *Bulletin* of the Royal Gardens, Kew.

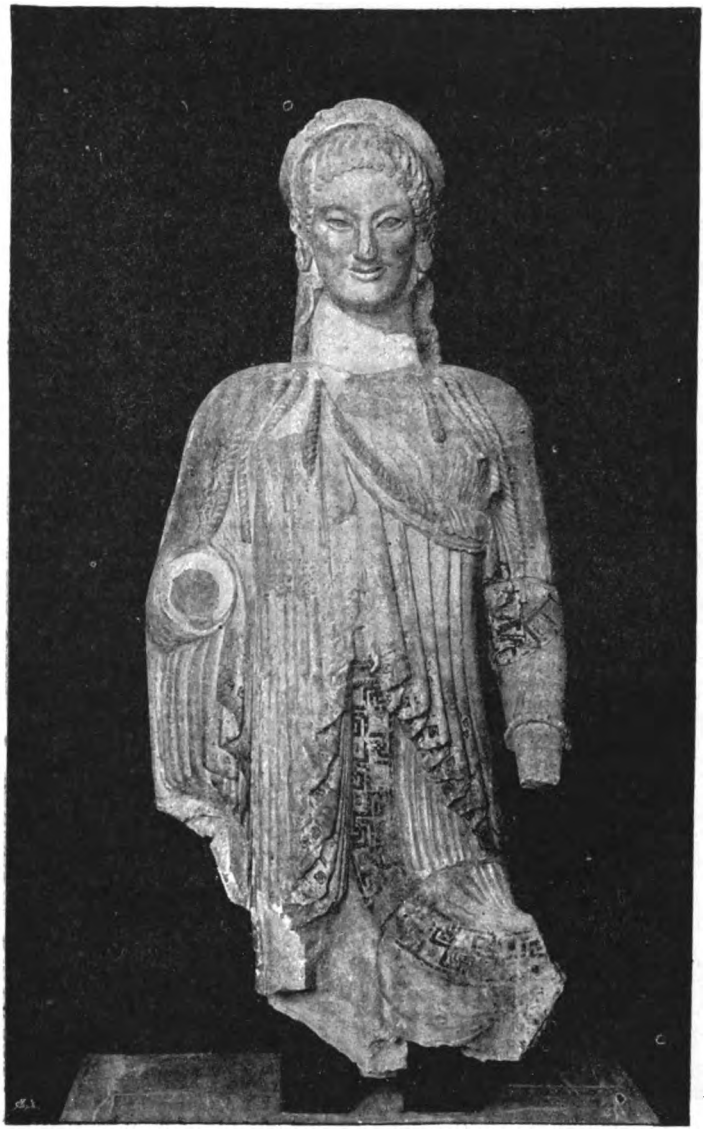
THE BURIED TREASURES OF THE ACROPOLIS.[1]

By R. S. HAYDON, M.A., The Grammar School, Dewsbury.

A VISITOR to many galleries of Greek sculpture might imagine that the Athenians sprang suddenly and at one bound to excellence in the art of copying the human form in stone. But just as the age of Phidias was followed by a series of famous schools of art, so the centuries that preceded were full of art history and development, as they were full of great events. Till 1885 almost nothing was known of early Attic sculpture.

Between 1885 and 1889 excavations over large areas of the Acropolis brought to light a set of statues of female draped figures which have revolutionised our knowledge.

When Xerxes sacked Athens, temples and statues were thrown down, and the Athenians, on their return, buried the fragments in large numbers. One of the chief finds has been in a pit near the Erechtheum on the Acropolis. The statues evidently represent worshippers who dedicate themselves to a goddess, probably Athena, the foundations of whose temple have been unearthed close by. They date from the early part and middle of the sixth century, the period just before the Persian nvasion. So great is their number that they have been classified according to the development of art. The earliest show the stiffness or squareness and the grimace or stare of all archaic work, like the numerous so-called "Apollos," which were previously almost the only

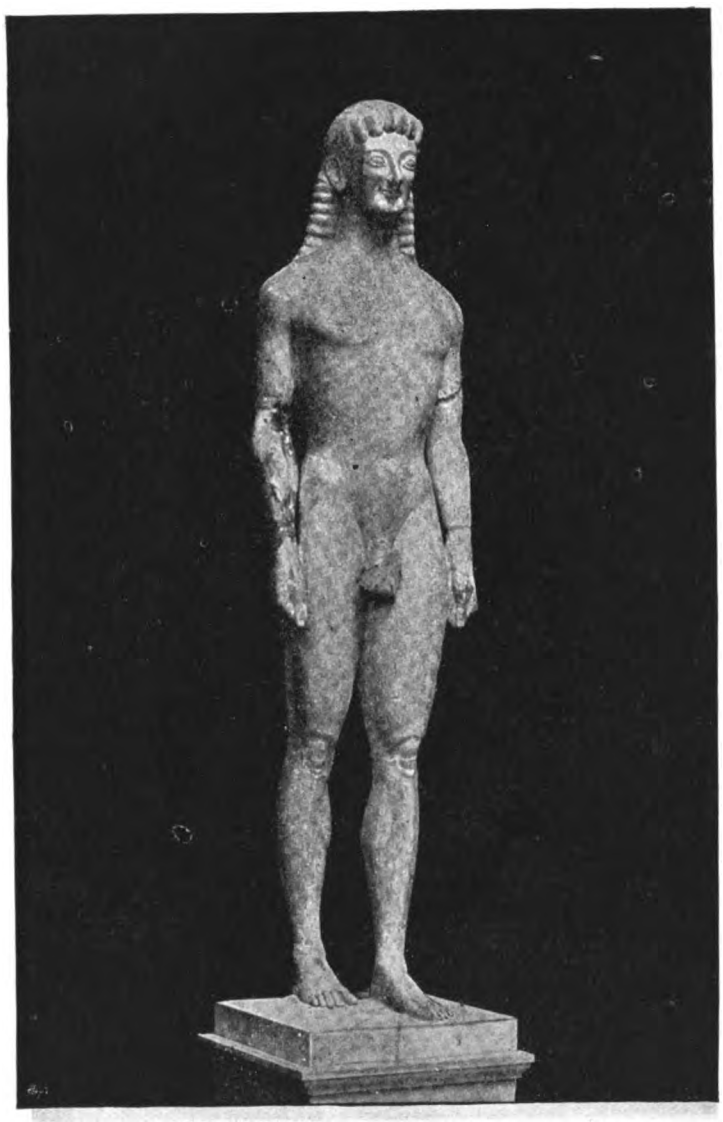


DRAPED FEMALE STATUE (ATHENS, ACROPOLIS MUSEUM.)

[1] The illustrations are taken from Prof. E. Gardner's "Handbook of Greek Sculpture."

relics of sculpture of the early period. While the type varies little, the artists were constantly introducing refinements of details. The treatment of the eye is an example, the artists endeavouring to avoid the old stare by many devices. But the chief feature of the whole series is the extreme elaboration of the drapery. Some of the figures wear a peplos, which is in marked contrast to the simplicity of the Doric style of dress adopted by Athenians in the fifth century. We see that the early Athenian ladies were far more fond of dress than the matrons on the frieze of the Parthenon. This is clear from a study of the brooches or buttons fastening the chiton, which thus seems to have sleeves, and also has bands of embroidery at its edges. Over it is a peplos, the band of which is elaborately decorated.

Fortunate it is for us that such numbers have been preserved by being buried to fill up the terraced area of the Acropolis, and it is the privilege of modern eyes to study in the Museum at Athens statues with the original surface and colouring intact, preserved with no damage since that inflicted by the Persians in the year 480 B.C.



"APOLLO" FOUND AT TENEA (MUNICH.)

Books and Studies.—

Crafty Men Contemne Studies; Simple Men Admire them; and Wise Men Use them: For they teach not their own Use; But that is a Wisdome without them and above them, won by Observation. Reade not to Contradict and Confute; not to Beleeve and Take for granted; not to Finde Talke and Discourse; but to weigh and Consider. Some Bookes are to be Tasted, Others to be Swallowed, and Some Few to be Chewed and Digested. That is, some Bookes are to be read onely in Parts; Others to be read but not Curiously; and some Few to be read wholly, and with Diligence and Attention: But that would be only in the lesse important Arguments, and the meaner sort of Bookes.—Bacon's "Essay on Studies.")

WOMEN AND LATIN.

By Camilla Jebb.

"SHALL girls learn Latin?" has long ceased to rank amongst the burning questions of the day. An affirmative answer has been given by all educationists of any note, except that small and select body who consider such knowledge equally undesirable for boys and girls alike. The history of that strange prejudice against Latin for women which most of us can still remember is one of much interest, and even now by no means free from mystery. To describe its decline and fall is an easier task than to trace its origin and general development. For that it did not always exist is obvious from the very nature of things. Juvenal, for example, denounces the learned ladies of his day with quite as much humour and nearly as much logic as any Englishman of the last century. But even Juvenal would scarcely have refused to his countrywomen the accomplishment of understanding their own language.

When Latin ceased to be a living tongue, it still remained, as we all know, the universal language of everybody who had the slightest pretentions to education. Hence, throughout the Dark Ages, though we hear a great deal, and can conjecture a great deal more, of female ignorance, the mere fact of a woman's knowing Latin was scarcely more remarkable than that she should read her own language. It is well known that from the Revival of Learning women were by no means excluded. We have all heard, perhaps a little too often, of the classical lore possessed by Lady Jane Grey, the daughters of Sir Thomas More, and the

ladies of Elizabeth's Court. We also know that English society lost this high ideal, and that classical learning, from being a source of praise, became a scorn and a reproach to women.

The date and the causes of this alteration are alike involved in obscurity. Most people, Lord Macaulay amongst them, believe that it was one of the numerous evils which followed upon the Restoration. The unbridled vice and frivolity of that period played their part, no doubt, in confirming the change, but there are indications that it had already commenced. Mrs. Hutchinson records the fact that her father "would have her learne Latine," as evidently more remarkable than the installation of a Frenchwoman in her nursery who taught her "to speake French and English together." Sir Ralph Verney was certainly neither vicious nor frivolous, yet writing to his little friend, Nancy Denton, in the year 1652, he gives utterance to the following appallingly narrow sentiments:

"Good sweethart, be not so covitous (as to wish to learn Latin and Greek); believe me a Bible (with y^e^ common prayer) and a good plain cattichisme in your Mother Tongue being well read and practised, is well worth all the rest and much more suitable to your sex . . . . *In French* you cannot be too cunning" . . . .

To Nancy's father, he writes:

"Let not your girl learn Latin nor shorthand; the difficulty of the first may keep her from that vice, *for soe* I must esteem it in a woman."

Already we find the delightful *à priori* argument that Latin is unsuited to women flourishing in full force, and side by side with it the corresponding conception of French as an essentially feminine study.

Locke, in his book on education (published in 1690), speaks of Latin as "absolutely necessary for a gentleman." He was strongly of opinion that it should be taught by conversation and without any grammar whatever! A Frenchwoman, he says, can teach an English girl to read and speak French perfectly in a year or two, "without any rule of grammar, or anything else but prattling to her." Why should sons be thought duller than daughters? These passages, and others to the same effect, prove conclusively that French had not yet completely supplanted Latin as the common language of educated persons. Nobody now would propose to teach Latin conversationally. The present writer has indeed encountered one Cambridge don who tried the experiment with his (female) pupils. But his efforts were not attended by conspicuous success.

Locke by no means disapproved of Latin for women. In fact, he mentions with commendation examples of ladies who had taught themselves that language, and recommends to others the method which they followed. But plainly the practice had become unusual, and French was considered the proper mental food for girls. Mrs. Mary Astell, writing about the same time, speaks much to the same purpose:

"We are taught only our Mother Tongue, or perhaps French, which is now very fashionable. . . . . Indeed a learned education for the women will appear so unfashionable that I began to startle at the singularity of the proposition."

But it was not till the "fatal eighteenth century" that this prejudice attained its full height. About the middle of that century, we find Lady Mary Wortley Montague urging her daughter, Lady Bute, to have one of *her* daughters taught Latin and Greek. But she adds the advice "to conceal it with as much solicitude as she would hide crookedness or lameness." Very similar is the declaration of the sprightly Miss Byron, in "Sir Charles Grandison." "Who, I, a woman, know anything of Latin and Greek? I know but one lady who is mistress of both, and she finds herself so much an owl among the birds that she wants of all things to be thought to have unlearned them." Mrs. Hannah More testifies to the continuance of this state of things at a much later date. In "Cœlebs" (published during the first decade of the eighteenth century), Mr. Stanley, the model father, explains that he has taught one of his six daughters Latin, on the ground that "there is here and there a strong mind which requires a more substantial nourishment than the common education of girls affords."

With elephantine archness, he observes:

"I assure you I never intend to smuggle my poor girl on any man, by concealing from him this unpopular attainment, any more than I would conceal any personal defect."

Johnson, with that strong common sense which he always displayed when none of his special whims intervened, was of opinion that "a woman would not be the worse wife for being learned." But here even Boswell dared to differ from him admitting, however, that to "be sensible and well-informed" is a great advantage for a woman.

Probably Boswell represented the views of even fairly liberal-minded men on this point. But these excellent gentlemen were quite unconscious that in allowing the desirability of sense and information in a woman (which would have been strenuously denied fifty years earlier) they had permitted the thin end of the wedge to be inserted. To vary our metaphor, the tide of female education was rising, though they complacently thought it would stay for their bidding. Sydney Smith's article on female education in the *Edinburgh Review*, published in 1809, in which he distinctly advocates classical studies for women, is a proof that more enlightened views were spreading, though as yet only amongst men in the van of progress.

From the "Snob" papers and "Vanity Fair" we learn that by the time the 'forties were reached, a woman was no longer considered a monster for pretending to know Latin. Indeed, such a pretence (it was seldom much more) was rather an advantage than otherwise, especially to instructresses of youth. Plainly, the times were ripening, and accordingly 1848 witnessed the birth of Queen's College, London, where girls were encouraged to learn Latin. The new venture met with much opposi-

tion and ridicule, but the movement continued steadily to increase. In 1865, the Cambridge Local Examinations for boys were opened to girls. In 1867, we hear that five out of seven senior girls, and six out of eight juniors, passed in Latin. The Report of the Schools Inquiry Commission, held in 1868, mentions a few girls' schools where Latin is taught. In 1872, the Girls' Public Day School Company is founded, and soon Latin becomes an integral part of the curriculum at this company's schools.

From this point it seems unnecessary to pursue our investigation. As has already been observed, it is not the decline of this mysterious prejudice, but its origin and growth which present problems for solution. This imperfect sketch has been written in the hope that it may lead to some further elucidation of so interesting a question.

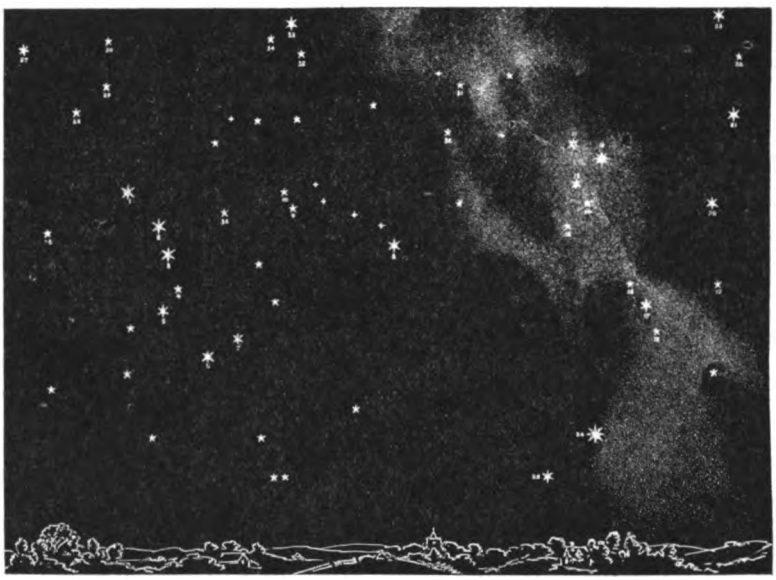
Science and Culture.—I venture to think that the pretensions of our modern Humanists to the possession of the monopoly of culture and to the exclusive inheritance of the spirit of antiquity must be abated, if not abandoned. But I should be very sorry if anything I have said should be taken to imply a desire on my part to depreciate the value of classical education, as it might be and as it sometimes is. The native capacities of mankind vary no less than their opportunities; and while culture is one, the road by which one man may best reach it is widely different from that which is most advantageous to another. Again, while scientific education is yet inchoate and tentative, classical education is thoroughly well organised upon the practical experience of generations of teachers. So that, given ample time for learning and destination for ordinary life, or for a literary career, I do not think that a young Englishman in search of culture can do better than follow the course usually marked out for him, supplementing its deficiencies by his own efforts.—Huxley's "Collected Essays," vol. iii.

THE STARS OF AUGUST.

By R. A. Gregory, F.R.A.S.

Professor of Astronomy, Queen's College, London.

Constellations.—The fact that some of the brightest stars form groups of a characteristic shape which does not alter has been noticed by everyone who has looked heavenward. To the ancients, many groups of stars bore a fancied resemblance to figures of men and animals, or some peculiarity was attributed to the groups which was also possessed by classical characters in mythology. The earliest systematic arrangement of stars into groups appears to have been made by Ptolemy in his *Almagest*, written nearly eighteen hundred years ago. In that catalogue the stars are classified into forty-eight groups or constellations, most of which bear names of characters connected with the voyage of the ship *Argo*. These constellations are still retained. Their boundaries are very irregular—as are the boundaries of countries on the earth—and the stars in them, dotted here and there like cities in different countries, differ widely in number and brilliancy.



WEST.

Map of the sky looking north on August 15th, 10 p.m.; August 30th, 9 p.m., and September 15th, 8 p.m. Drawn by W. H. Wesley.

No.	Name of Star.	No.	Name of Star.	No.	Name of Star.
1.	η Ursae Majoris	13.	γ Cassiopeia	25.	β Aurigae
2.	ζ ,, ,,	14.	δ ,,	26.	α Canum Venatici
3.	ε ,, ,,	15.	ε ,,	27.	ε Boötis
4.	δ ,, ,,	16.	γ Persei	28.	γ Böotis
5.	γ ,, ,,	17.	α ,,	29.	β Böotis
6.	β ,, ,,	18.	δ ,,	30.	δ Boötis
7.	α ,, ,,	19.	β Persei (Algol)	31.	α Cephei
8.	α Ursae Minoris (Polaris)	20.	γ Andromedae	32.	β ,,
9.	β ,, ,,	21.	β ,,	33.	γ Draconis
10.	γ ,, ,,	22.	δ ,,	34.	β ,,
11.	β Cassiopeiae	23.	α ,,	35.	ξ ,,
12.	α ,,	24.	α Aurigae (Capella)	36.	α ,,

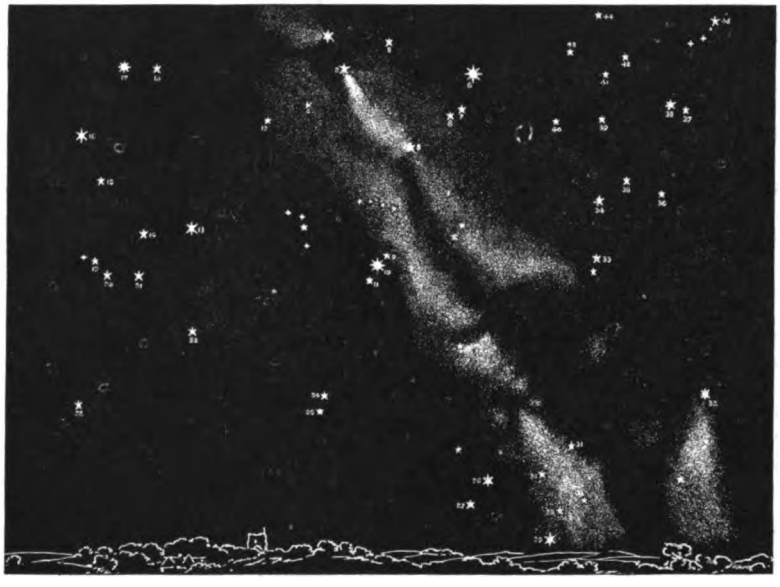
Names of Stars.—Particular names (mostly of Arabic derivation) are possessed by many of the brightest and remarkable stars, but the systematic plan of designating stars in a constellation is by means of letters of the Greek alphabet, α (Alpha) usually indicating the brightest star in the constellation, β (Beta) the next brightest, γ (Gamma) the next, and so on. The name of the constellation is put in the genitive case. Thus, α Andromedae signifies the star Alpha of the constellation Andromeda; β Lyrae designates the star Beta of the constellation of Lyra. On account of the

different methods of nomenclature referred to, many stars have two or more aliases. This will be seen from the index of stars below each map.

Stellar Magnitudes.—As to the differences of stellar brightness, astronomers employ a scale of magnitudes according to which all stars visible to the naked eye are regarded as contained within six degrees of brilliancy, the brightest among them being of the first order or magnitude, while the stars just within the limits of visibility on a fine night belong to the sixth order or magnitude. In the accompanying maps only a few stars fainter than the third magnitude are represented, in order to avoid overcrowding.

Explanation of Maps.

The two maps represent the heavens as seen from England when facing north and south respectively at about 10 p.m. in the middle of August, 9 p.m. at the end of August, and 8 p.m. in the middle of September. The stars overhead are at the middle of the top of each map, and a few of them appear on both maps, in order to indicate how the two overlap. The astronomical designations of the stars represented can be found by reference to the index below each map. This plan has been adopted in preference to the usual one of placing the name of a star or a Greek letter against it, for several reasons. If the names are printed in full, they mar the general appearance of the map, and if only the Greek letters are given the constellation boundaries must be shown, as every constellation has its stars designated by the letters α, β, γ, &c. By means of the method here illustrated, in which the numbers given to the stars follow one another more or less regularly, it becomes an easy matter to find the name of any star upon the maps by the index. Moreover (and this is more useful for our purpose), the observer can be guided from one star or group of stars to another by directing his attention from one number to another. The stars upon the maps may, in fact, be regarded as pictures upon the sparkling canopy of heaven; and the object of these notes is to take the observer around this celestial gallery, here and there pointing out some particular features of the objects passed in review.



EAST. WEST.

Map of the sky looking south on August 15th, 10 p.m.; August 30th, 9 p.m., and September 15th, 8 p.m. Drawn by W. H. Wesley.

No.	*Name of Star.*	*No.*	*Name of Star.*	*No.*	*Name of Star.*
1.	α Cygni (Deneb)	16.	α Pegasi (Markab)	31.	μ Sagittarii
2.	γ ,,	17.	β ,,	32.	η Ophiuchi
3.	β ,,	18.	η ,,	33.	β ,,
4.	ϵ ,,	19.	ζ Aquarii	34.	α ,,
5.	δ ,,	20.	γ ,,	35.	α Herculis
6.	α Lyrae (Vega)	21.	α ,,	36.	κ Ophiuchi
7.	β Lyrae	22.	δ ,,	37.	γ Herculis
8.	γ ,,	23.	β ,,	38.	β ,,
9.	γ Aquilæ	24.	α Capricorni	39.	δ ,,
10.	α ,, (Altair)	25.	β ,,	40.	μ ,,
11.	β ,,	26.	σ Sagittarii	41.	ϵ ,,
12.	ζ Cygni	27.	ζ ,,	42.	ζ ,,
13.	ϵ Pegasi	28.	δ ,,	43.	π ,,
14.	θ ,,	29.	ϵ ,,	44.	η ,,
15.	ζ ,,	30.	λ ,,	45.	α Coronae

Stars seen when facing North.

Looking towards the north-west, the most striking group is the well-known Plough, or Charles's Wain, formed by the stars numbered 1—7. These belong to the constellation of the Great Bear (Ursa Major). A faint star not mapped will occasionally be seen very near to No. 2; and a small telescope or field-glass will show that No. 2 itself is composed of two stars so close together that they appear to be one when viewed without optical aid. These two stars travel around one another in a period of sixty years. The stars 6 and 7 are known as the Pointers, on account of the fact that they point very nearly to the Pole Star or North Star (8). In England this star appears a short distance more than half-way from the horizon to the zenith. The star is not exactly at the north pole of the heavens—the point directly above the north pole of the earth—but its distance from that point is comparatively small. There is, of course, no reason why any star should be directly above the northern extremity of the earth's axis, and the fact that there is really a star near enough to be a Pole Star must be considered as a happy accident. The Pole Star and the stars between it and 9 and 10, which are termed the "Guardians of the Pole," belong to the Little Bear constellation (Ursa Minor).

Looking now to the east of the Pole Star, a group of stars 11—15, shaped something like the letter $\geq$ lying on one side, is seen. A line carried in the mind's eye from 3, through 8, and continued for nearly the same distance, points out this group, which contains the chief stars in the constellation Cassiopeia.

Carry a line from 13, 14 downwards, and a chain of three stars, 16, 17, 18, belonging to Perseus, is seen. Midway between 14 and 16 is a splendid double cluster of stars, visible to the naked eye, and a wonderful sight in even a small telescope. The most noteworthy star in the constellation

of Perseus is Algol (19), situated at the right angle of a right-angled triangle formed by 17, 19 and 20. Algol varies periodically in brightness in a remarkable way. For two-and-a-half days it shines brightly, but then it suddenly commences to dim, and in about four-and-a-half hours it becomes quite faint. In about half an hour it begins to increase in brightness, and goes on increasing for four hours, when its original brilliancy is regained. This cycle of changes is repeated every 2 days 20 hours 49 minutes, and is due to the periodical partial eclipse of the bright star Algol by a non-luminous, or dark star, revolving round it. Algol is the chief star in the head of the Gorgon, Medusa, who was killed by Perseus.

Andromeda, the daughter of Cassiopeia, was rescued by Perseus from destruction by the sea-monster Cetus; and as all the actors in a mythological drama represented upon the heavens are usually together, the constellation of Andromeda is near that of her saviour. The stars 20-23 above Perseus all belong to Andromeda.

Below Perseus, and slightly towards the west, the brilliant star Capella (24), or The Goat, is seen. This is the brightest object in the constellation of Auriga (The Charioteer), who carries the Goat. The star (25) below Capella is β Aurigae, which has been proved by spectroscopic observations to consist of two stars having a united mass nearly three times the mass of our sun, and revolving round one another in a period of four days.

The stars below the Pointers (6 and 7) all belong to the Great Bear, and are near the limits of this constellation in their directions. To the west of the highest star (1) in the Plough, and in a line nearly at right angles to the direction from 1 to 2, is the star 26, Cor Caroli (the Heart of Charles), belonging to the constellation Canes Venatici. The constellation is a modern one, the name of the star Cor Caroli having reference to Charles I.

The stars above the Plough in the west belong to the constellation Bootes (pronounced Bo-otes).

The remaining stars above the Pole Star are in the constellations Cepheus and Draco. The quadrilateral of stars between Cassiopeia and the Pole Star belong to the former constellation. The bright star (33) nearly overhead, at the apex of a triangle formed by the Pole Star and 2, constitute, with the two fainter stars near it, the head of the Dragon (Draco). The stars forming a long curved line around the Pole all belong to Draco. The star 36, lying midway between 2 and 10, though inconspicuous, is noteworthy on account of the fact that it was the Pole Star about five thousand years ago. From ancient astronomical records it appears that the star was much brighter then than it is now.

Stars seen when facing South.

A great cross formed by five stars (1-5) can easily be distinguished overhead. These stars belong to the constellation Cygnus. The brightest star of this group is α Cygni, or Deneb (1); the lowest (3), when viewed with a small telescope, is seen to consist of two stars, one dark blue, and the other orange in colour.

The brilliant star (6), a little to the west of the cross of Cygnus, is Vega, belonging to the Lyra constellation, and one of the brightest objects in the whole heavens. Between Vega and β Cygni (3) are the two stars β Lyrae (7) and γ Lyrae (8). The former star is a good example of a star which continually varies in light, going through a series of changes in the course of a few days. In a period of twelve days this star twice rises and falls in brightness, each increase and decrease taking about three days.

The chain of three stars (9-11), due south below the cross of Cygnus, is the distinguishing mark of the constellation Aquila. The brightest (10) of the three is α Aquilae, or Altair. The faint stars between the Altair group and β Cygni (3) belong to Sagittarius; and the group of stars to the east of Altair constitutes the chief stars in the constellation of Delphinus, the Dolphin.

A line from 1 through ξ Cygni (12) if continued for a slightly greater distance reaches ϵ Pegasi (13), a star which is shown on the nose of Pegasus, the winged horse in the old pictures of the constellations. The stars 13-18 all belong to Pegasus. The stars α Pegasi, or Markab (16), and β Pegasi (17) are at two corners of a well-marked square—the Great Square of Pegasus—only part of which is shown in this map, the two other stars being γ Pegasi, and α Andromeda in the north-east corner.

The remaining stars in the south-east portion of the map belong to the constellations Pisces, Cetus, Aquarius, and Capricornus. Below Vega (6), near the horizon, is the constellation of Sagittarius, the most conspicuous stars being 26-31.

The constellations of Hercules and Ophinchus are to the west of Lyra (6-8) and Aquila (9-11). α Ophinchi (34) forms a large triangle with Vega (6) and Altair (10); and β Ophinchi (33) is a little distance south of it. The stars 37-44 are in the constellation Herculis. The quadrilateral formed by 41-44 serves as a configuration which enables this constellation to be found. This group is midway between Vega (6) and a striking little arc of stars having the star α Coronae (45) near the middle. The stars in the arc are the chief stars in the constellation of Corona Borealis.

COMMERCIAL EDUCATION IN YORKSHIRE.

The West Riding Technical Instruction Committee have been requested by a number of teachers of modern languages and commercial subjects in the West Riding to assist them in forming an association for (*a*) the periodical discussion of questions bearing upon commerce and commercial education generally, and (*b*) the reading and discussion of papers on the teaching and elucidation of special branches of their work. Owing very largely to the exertions of Mr. James Graham, the Inspector of Commercial and other subjects for the Technical Instruction Committee, arrangements have now been made for the formation of the "Yorkshire Association for Commercial Education," to which several prominent educationists, commercial men, and members of Parliament have already promised their active support. The inaugural meeting was held in Leeds last month, with the result that the Association has started its operations in most auspicious circumstances.

The work in commercial education which has been already accomplished in the West Riding is very considerable, and the new Association should prove very useful in co-ordinating local effort and in providing means for the ambitious student, in whatever centre, to continue his study of the highest branches of commercial science. It will be helpful to teachers and committees in less progressive districts to know what has up to the present been done in this division of Yorkshire.

Evening Schools of Commerce.

Evening schools of commerce, providing as broad and systematic a training as can be given by evening work, have been and are being established in all large centres. A general preparatory course for backward students precedes the special commercial course. In order to produce strong third-year (Honours) work, the smaller schools in various districts are grouped around a large "District or Central School." The

smaller neighbouring schools are required to cover the first and second years only of the senior course of work, and then to systematically pass on their students to the "District School" for the third year's work. It is thought that this policy of concentrating or focusing the advanced work in the larger schools will specially commend itself to the Chambers of Commerce of the West Riding.

Modern Language Circles.

In order to prevent the Technical Colleges and Schools from losing touch with their Modern Language students at the time when they are most in need of help towards a practical conversational knowledge of a language for business and other purposes, the West Riding Technical Instruction Committee have encouraged the establishment of "Modern Language Circles," conducted by capable native teachers, at Barnsley, Bradford, Dewsbury, Halifax, Huddersfield, Sheffield, Wakefield, Leeds and Keighley, in which the lectures, papers, instruction and discussions are in the foreign language only. These circles are intended to serve the surrounding districts also.

It is felt, and local schools feel, that if commercial men co-operate actively by encouraging their *employés* to attend the "Evening Schools of Commerce," and later the "Modern Language Circles," and by recognising in a practical manner the value of these courses, the efforts of the West Riding Technical Instruction Committee and of the various local schools to provide an intelligent and all-round commercial education for those already engaged in offices cannot be otherwise than successful, whereas without such co-operation real success is doubtful.

It is suggestive to notice the efforts which two or three West Riding Chambers of Commerce have already made to encourage such commercial work, viz. :—

(*a*) By the payment of a small money grant to the local school to help on their "Evening School of Commerce." This sum is devoted to scholarships or exhibitions, prizes, medals, &c. For instance, the Batley Chamber of Commerce has given £20 to their local school for these objects.

(*b*) By giving preference to candidates for employment who have been through these systematic courses.

(*c*) By making promotion within the office dependent to an appreciable extent upon successful work in connection with these courses.

(*d*) By visiting the classes, and by offering suggestions for improving the courses.

Commercial Education in Day Schools and Higher Commercial Education.

The Committee are endeavouring to promote the teaching of subjects having a practical bearing upon commercial life in certain of the secondary schools and technical colleges in the West Riding, and it is hoped that a suitable scheme for higher commercial education may also be carried into effect at an early date. At the close of each session, examinations in certain commercial subjects and modern languages are held throughout the West Riding, and certificates are awarded to successful candidates in the advanced stages. The examinations come within the purview of the Joint Examining Board for the East, North and West Ridings, who have now under consideration the question of increasing the number of subjects for which such examinations shall be held.

LORD ROSEBERY ON THE MAKING OF MEN.

IN distributing the prizes at Epsom College on Saturday, July 29th, Lord Rosebery, in the course of his address to the boys, referred in eloquent language to one of the chief features of our English public school education, described by his lordship as the turning out of men. The following selections from the speech are taken from the report in *The Times*.

The Primary Object of a School.

The first and primary object of every school is to turn out men. There is one platitude which people are apt to forget, though it is a platitude—that every boy, if he lives, must inevitably become a man. It is often forgotten, and yet that fact is absolutely certain, that it is on our men that we depend for the future of our country. Now, some of the nations owe almost everything to their schools. Scotland, Switzerland, and Prussia do, I believe, owe to their schools that place they hold in the race of the world. In England I hope we are not ungrateful if we say that as regards the old schools, despite our adherence to the studies of classics and mathematics, I do not feel sure that we have been so successful in turning out men with an exact education fitted to enabling them to meet the difficulties and competition of life. But, at any rate, we are sure of this—that in England our schools have turned out men. They have been the best schools of manhood that the world has ever seen, and, if they have succeeded in that, I, for one, put all the studies of the sciences and classics and mathematics in a secondary position. You know we, in this country, have always paid special worship to the virtue of manhood. We worship it not merely in our own, but in other nations. When we get to know of a man anywhere who stands out for the qualities of manhood beyond his fellows, we admire and we honour that man, and we don't care what country he belongs to. I will give you an instance of a man whose name may be familiar to most of you—I mean Captain Marchand. He is a Frenchman, and not long ago accomplished a three years' journey right across Africa from west to east, amid incredible hardships, with scarcely any companionship of his own nation, surrounded and followed by the savages whom he made devoted to him, and he succeeded in that enterprise in a manner which will always crown his name with glory. And, what was more, when he had accomplished his task, he bore himself with such dignity and such modesty that he is one of the men that England delights to honour. Last year, as some of you know, his duties placed him in momentary collision with the interests of England; but I am convinced of this—that, in spite of that passing incident, if Captain Marchand were to come to England, he would get a reception second only to that which he had in his own country. It has always been so in England. The greatest receptions that have been given in London in the last half century have been to men who have been foreigners. I saw the enthusiasm in honour of Kossuth, of whom, I dare say, very few of you have ever heard; but England saw in him a man, and their heart leapt out to greet him. As a child, I remember the flags and decorations which welcomed him. Then the other was the reception given to Garibaldi. Garibaldi was received with such honour as no one, except the Princess of Wales on her arrival, ever received in London. Why was it? Because he was a man, because people saw that he had the qualities of a man—not merely courage and integrity, but he was no self-seeker, he had no personal interests to gain, and he laid down the claim he might have had, and the millions he might have received, as if they were dross in comparison with his honour as a man.

The Virtue of Manhood.

Now in England we do not honour those men because we can produce none like them, but because, in the training which our schools give, we have not merely formed men, but have been enabled to appreciate manhood. And do not think that you boys here, even the youngest of you, need fall short of the qualities of manhood because you have not reached man's estate. From the very moment you leave the nursery you can exercise some of the qualities of manhood. They can be exercised all through school life—those qualities, not merely of industry, but of self-denial, and that which perhaps shows the most manhood in a boy, the power to say "No." Well, boys, I hope you will remember when you come here, perhaps in after life, that Epsom taught you the elementary lessons of manhood. You, I suppose, will be scattered all over the world, some of you exercising that profession with which the college is so much associated, that which in its essence contains, perhaps, the most supreme elements of manhood of all the professions—I mean, the medical profession. That profession needs tenderness and courage in the highest degree—tenderness to alleviate sickness and suffering, to help the sufferer by sympathy; and, indeed, if the physician be not the patient's most welcome sight, that physician is a failure. But not merely is it tenderness and courage that the physician needs. His profession requires more stubborn and obdurate courage than any other. He is always fighting one lifelong battle in which he knows that he must be beaten, he is always fighting a lifelong contest with the Angel of Death, and he knows that, struggle as he may, the Angel of Death must win in the end. The profession of the physician is one long struggle in which, like the Englishman, he must never know when he is beaten until victory has gone against him. He must be tender, and he must be brave. And, therefore, when you are scattered all over the world, having in view what was taught you here, you may have some cause to thank Epsom College for the training which you have received.

A HOLIDAY CAUSERIE.

"Satius est otiosum esse quam nihil agere."—C. Plinius Caec Sec.

By this time the jaded teacher will be in the full enjoyment of "the long" vacation, as we still love to call it in memory of our university days. Under any name, however, the summer holidays are welcome. Not long ago we noticed a discussion on the best resort for tired journalists. It would seem these educators of public opinion are not able to solve the question satisfactorily. Not so with your wielder of the birch. You meet him tramping over mountain and moor, or whipping lonely streams, or exploring the historic cities of the continent, or camping up river, or golfing at St. Andrews; whatever and wherever his fancy recreation is, he is as gaysome as any of his escaped pupils, and knows not the brain-fag which cannot be conquered. Perhaps his conscience is not so restless as the newspaper man's.

At the end of term we bade good-bye with a sense of relief to the master's room, redolent of time-tables and exercises to be corrected. Only those of us who have passed its sacred portals can appreciate the feelings which the very name conjures up. There the staff assembles in hurried haste to don gowns and interchange a few words of greeting, what time the victim is "creeping like snail unwillingly to school." There we gather during the "break," or the dinner-hour, to get a glimpse of the morning papers and the magazines. There again when evening sets us free we put off our professionals, be they gowns or frowns, and become as other men. But for the nonce we forget it, and have left it behind us. Term urgeth onward fast; let us alone.

It is interesting to the profession to learn that a school may be held to be a local "nuisance," and, in the eyes of the law, takes rank somewhere between the noisy barrel organ and the barking dog. Personally we are inclined to think otherwise. A well-conducted school (and most schools at least claim that epithet) is quite a cheerful neighbour. We know many people who set their clocks by the school bell, who miss the merry shouts of the lads at play during the holidays, and who take a certain pleasure in watching the decent and orderly parades to church on Sundays. It introduces, often unconsciously, a degree of regularity into their lives, and then it is so agreeable to be always surrounded with the breezy freshness of youth. No doubt there is something to be said on the other side. Let schoolmasters see to it by trying to remove all reasonable grounds for the opinion that a school is an undesirable adjunct to a "select neighbourhood."

The classical man is continually lamenting the increasing difficulty in getting boys to take an interest in "the trade in classic nicities," to use the sneering words of Wordsworth. Boys have got it into their heads that Latin is "of no use," and we are afraid parents are largely responsible for this view. Not only the classics, but even pure mathematics of the higher kind, are put under the utilitarian ban. Nor does it stop there. We have known cases in which parents insisted on their young hopefuls doing long tots during the Scripture hour. Happily there are still schools in which the headmaster is able to lay it down that the whole business of education shall not consist in turning out cash registers.

A headmaster sends us one of his own experiences. An irate mamma called upon him to protest against her boy being taught, what she called, "ekloyd." Neither her husband nor his father had learnt the subject, and they had done very well, and she did not want her son bothered, said she. "Very well, madam," replied the headmaster, "I will discontinue the subject, and I will substitute throughout the school the very useful study of geometry." "Ah!" said mamma, "my husband and I both want the boy to learn geometry, and we are much obliged to you." The headmaster still continued to use Euclid's elements.

One is tempted to ask when will philosophers be parents and parents be philosophers. Until that epoch arrives we shall never hear the last of the grievances against those who have the privilege (and toil) of bringing up the intellects of others' children. That day is probably as distant as Plato's ideal state, and the teachers meanwhile must grin and bear it. We recollect once overhearing a conversation on the drawbacks of teaching as a profession, one saying that "schoolmastering would be all very well if it was not for the parents, and if it was not for the boys." "Yes," was the rejoinder, "but you can't have the golden eggs without the geese." "Not too much golden," came the reply.

Ought one man to be on duty for thirteen hours a day, as is the case in some establishments? It is not that the work itself is so heavy; but the feeling of being tied to the premises, and of being responsible for so long a period is extremely irksome to most natures. The assistants themselves are very often consenting parties to these long hours. They prefer to take their spells of duty in large doses, so as to have uninterrupted periods of comparative freedom. But in such arrangements, what of the man who is physically unfit to stand the strain of, say a whole week's continuous duty? When will the Hyde Park orator make an eight hours' day for the pale usher a leading plank in his platform?

In the large public schools, which were wont in the pages of "Whittaker" to boast long lists of assistant masters, such a thing as duty is almost, if not quite, unknown. We speak of "duty" in the technical, and not in the moral, sense of the word. In view of the vagaries for which the law of libel is so notorious, we have carefully hedged that last statement. There is no need to mention names; everyone knows that at these schools the position of the assistants is a sinecure. Beyond a little teaching for four or five hours a day, and an occasional hour of detention, they have nothing whatever to do but draw their salaries. *O terque quaterque beati!*

It is not advisable to attempt to convince a lunatic by logic, as the following shows:—"A patient in an English insane asylum imagined himself dead, and nothing could drive the delusion from his brain. One day the physician had a happy thought, and said to him: 'Did you ever see a dead man bleed?' 'No,' he replied. 'Did you ever hear of a dead man bleeding?' 'No.' 'Well, if you will permit me, I will try an experiment with you, and see if you bleed or not.' The patient gave his consent, the doctor whipped out his scalpel and drew a little blood. 'There,' he said, 'you see that you bleed; that proves you are not dead.' 'Not at all,' the patient instantly replied; 'that proves that dead men can bleed.'"

Turning the pages of our Goldsmith the other day we came upon the following dialogue. It occurs, as every reader will remember, in that delightful tale, "The Vicar of Wakefield." Fancy being interviewed by a prospective headmaster in these terms:—

"Can you dress the boys' hair?" "No."

"Then you won't do for a school. Have you had the small-pox?" "No."

"Then you won't do for a school. Can you lie three in a bed?" "No."

"Then you will never do for a school. Have you got a good stomach?" "Yes."

"Then you will by no means do for a school."

At the present day interviews are not conducted quite so candidly as the above; yet we doubt not the walls of many a scholastic agent's office have heard conversations equally amusing. But let those speak who will; as for us we will preserve a holy silence.

Between the cricket and football seasons there is sometimes in schools a slackness in outdoor pastimes. From Ireland we hear a good suggestion. The climate, as is usual with that country, was at the bottom of it. A spell of wet made cricket impossible, but exercise was necessary. Everybody was tired of the gym, and one day an older boy suggested they should turn their energies to making a tennis court. The "chief" gladly gave his consent, and the captain of the school soon had the whole force at his command—some thirty-five boarders—working in a corner of the field where the ground was less sloping than the surroundings generally. The senior boys measured and staked out the ground, and took the necessary observations with levelling instruments, and for a month the young navvies once more vindicated the dignity of manual labour—and made a tennis court. Mr. Ruskin did not preach in vain when he went road-making at Oxford.

A little practical engineering of this kind might with advantage be introduced in many schools, and especially where, from whatever cause, there is a difficulty in making needful or desirable improvements. Indoors these same boys employed their practical skill and energy in fitting up a small room as a museum last winter. Sweet are the uses of an inclement climate if such results are its outcome. English lads might follow a worse example, but the boys, of course, must take the lead themselves.

At a school debate, when the question of the concert of Europe was down for discussion, one of the orators (not of Irish descent), referring to a defence of "the concert" by a previous speaker, said: "If that gentleman cannot hear the rift within the flute (*sic*) all I can say is he has no ear for music!" This was from the lips of an assistant master who, when excited, combines a slight impediment in his speech with a capacity for making "bulls."

How is it that schoolmasters are generally so shy in society? Native modesty will perhaps account for it in some measure, but not wholly. There are men engaged in the teaching profession who, in the cricket-field, in the common-room, even in the school-room, are most charming fellows. They can amuse and impart interest and enthusiasm; and yet people complain that schoolmasters are dull dogs, and we have often seen an ignorant man of ordinary parts carry it over them. How is it? Can any correspondent explain it?

That it is an old complaint Montaigne has quaintly testified. We give the English of Florio's classic translation:—"See but one of these our universitie men or bookish schollers returne from schole, after he hath there spent ten or twelve years under a Pedant's charge: who is so unapt for any matter? who so unfit for any companie? who so to seeke if he come into the world? *all* the advantage you discover in him is, that his Latine and Greeke have made him more sottish, more stupid and more presumptuous than before he went from home." This is a sweeping indictment against all University men, up to and including schoolmasters. We know many instances of its utter truth.

The above passage is taken from an amusing chapter on "Pedantisme" in the First Book of Montaigne's Essays, with which every "Pedant" might do well to occasionally refresh his memory. It contains, as also the chapter following (chap. xxv.), much advice on the theory and art of teaching, not written in the dry and unattractive style of a text-book, but a "pithie, sinnowie, full, strong, compendious and materiall speech." What better motto could a teacher set before him than this:—"It is not a mind, it is not a body that we erect, but it is a man, and we must not make two parts of him"?

Apropos the vexed question of athletics, a speaker at the prize-day of Cheltenham College declared recently that "muscle never ruled the world; mind did, always had done, and always would." With all due admiration for such optimism, is it strictly true? It is the old theme, "Men of action *versus* men of thought," which a few years ago, and maybe now, was a favourite to set in scholarship competitions for the essay. The subject admits of hair-splitting definitions and subtleties, and involves the deep and far-reaching problems of the philosophy of history. Teachers who take themselves seriously might set it to themselves as a holiday task!

Collectors of examination curios may be glad to add the following to their note-book. In a "general paper" occurred the question: "Name the first ten people in the realm." The wording is a little ambiguous, but the intention was to ask for the first ten in order of official precedence. Here is the answer of a fifteen-year-old: "The Queen, W. G., Balfour, Rhodes, Ranjy, ——, Salisbury, Rudyard Kipling, Conan Doyle, Irving." In the blank space was written the name of the headmaster of a well-known public school, of which the examinee was a pupil. There is no reason to doubt the sincerity of the lad's compliment. The "head" in question is thought

highly of by the budding intellects committed to his charge—a happy state of things both for master and pupils. Were Carlyle with us, this might inspire him to add a chapter on "The Hero as Schoolmaster." He rated the profession most highly.

ITEMS OF INTEREST.

GENERAL.

It is intended to begin a series of test-papers for the most largely-taken subjects of the Cambridge Local Examinations in our September issue. A teacher can find out for himself whether his class knows what it has been taught; some external test is, however, sometimes desirable to discover whether what has been taught amounts to an adequate knowledge of the subject. The papers published in our first six numbers were designed to supply such an external test of the standard of knowledge and to save teachers the unprofitable labour of searching through the examination papers of the past. It is now proposed to extend the test-paper scheme (1) by affording heads of schools with the means of testing the standard of knowledge attained in their classes by submitting the answers to such test-papers to the judgment of School World examiners familiar with the examinations to which they refer; (2) by supplying at a low rate copies of the papers appearing in our issues from time to time in a form suitable for distribution in class. Such papers could be supplied before the publication of the number of the School World in which they will appear.

Naturally the extent to which we are able to be useful to teachers in this direction depends upon the demand there is for such outside opinions. From letters we have received it would appear that many teachers would be glad of a means of discovering in what directions their instruction ought to be supplemented before their pupils are presented for the various public examinations. It should be clearly understood that we have no desire to start a new examination. Our idea is to be of service to teachers in preparing their classes for the examinations which have become part and parcel of their school work. We hope that all teachers who would be likely to avail themselves of such a scheme as is here proposed would write to us, mentioning the examination, the subject, and the number of test-papers which would probably be needed, and stating whether any answers to the test-papers would be submitted for an opinion.

In reply to Professor Jebb in the House of Commons on July 17th, Sir John Gorst explained that when the Board of Education was in something like working order a third official will be appointed as assistant secretary for secondary education, whose responsibilities to the chief secretary will be different from and equal to those of his two other colleagues. In reply to Colonel Lockwood during the following week, Sir John said the special duties of the assistant secretary who was to deal with that part of secondary education which was not under the Science and Art Department will be considered after the Board of Education Bill has become law. They will be finally decided on by the Board of Education, not by the departmental committee.

On the occasion of the consideration by the House of Commons, on August 2nd, of the Board of Education Bill as amended in Grand Committee, an animated debate took place. Lord Cranborne put a series of questions to Sir J. Gorst with reference to the proposed transfer of the educational powers of the Charity Commissioners to the new Board of Education, and was, in reply, assured that the Education Department would exercise the powers transferred to it under the same restrictions as now existed. Sir J. Gorst further explained that the proposed consultative committee was not intended to relieve the Minister for Education of his responsibility to the Legislature. The motion for the consideration of the Bill having been agreed to, many amendments were proposed, but of them all the only one agreed to was that proposed to Clause 4 by Mr. Bryce, providing that the register of teachers should be kept "in manner to be provided by order in Council," instead of by the Board of Education.

Amendments designed to provide (i.) that the President of the Board of Education must be a member of the House of Commons; (ii.) for the establishment of three separate departments for secondary, technical, and elementary education; (iii.) for the substitution of "relating" for "appearing to Her Majesty to relate"; (iv.) for the addition of the words "power to make a scheme for educational endowment under the provisions of the Charitable Trusts Act of 1860"; (v.) for the omission of Clause 3 dealing with the inspection of secondary schools; (vi.) for the insertion of words providing that some of the members of the Consultative Committee should be women; were all of them, after some discussion, withdrawn.

Of the amendments negatived the following should be noted: (i.) That to Clause 2 providing that the Commission should not have power to determine whether an endowment is within the exemptions specified in the Endowed Schools Acts; (ii.) that for the insertion of words in the clause providing that "any question as to the interpretation or construction of any instrument regulating an educational endowment" should be determined by the Charity Commissioners, and not by the Board of Education; (iii.) that for the deletion of Clause 3; (iv.) that to exclude from the work of inspection all bodies except such as were concerned with secondary or technical education; and (v.) to alter Clause 5 to provide that Orders in Council should become operative "unless within such four weeks an address has been presented by one or other of the said Houses praying Her Majesty to withhold her consent from such order, or any part thereof, then it shall be." The Bill was then read a third time.

The Council of the Teachers' Guild have forwarded the following resolution to the Lord President of the Council and the Vice-President of the Committee of Council on Education:—"That under the proposed Board of Education, secondary education should be departmentally organised on a separate footing, co-ordinately with the Department of Primary and Technical Education."

The supplementary vote of £65,000 required by the Government to make the necessary arrangements for the occupation of the Imperial Institute building at South Kensington by the University of London has been passed by the House of Commons. The lease under which the buildings are held from the Commissioners for the Exhibition of 1851 will be transferred to the Commissioners of Works as representing the Crown, and the latter Commission will thereupon become responsible for maintenance rates, custody, and protection of the buildings. An agreed portion of the building is to be assigned to the Imperial Institute free of rent, but the chief part will form the new home of the London University. The space which will be given to the University in the building will be much greater than is now enjoyed by that body. In consideration for the transfer of the lease to the Office of Works, the Government will pay off the existing mortgage of £40,000, and discharge the floating debt of £15,000. In addition to the cost of structural alterations, estimated at £7,000, the vote included £3,000 for the

half-year's maintenance and repair of the buildings, and for the purchase of the necessary furniture.

THE list of successful candidates in the June Matriculation Examination of the London University is an interesting study. By no means the least gratifying characteristic is the large number of pupil teachers' names which occur. This is undoubtedly one of the most hopeful signs for the future of elementary education. From the excellent analysis of the list which the *University Correspondent* has made we see that 19 schools and colleges are credited with as many as ten successes each. Leaving out the University Correspondence College, with its usual large contingent, Borough Road Training College takes the foremost position with 36 names on the list, and it is a noteworthy circumstance that the Chelsea and Battersea Training Colleges divide 40 successes between them almost equally. Of secondary schools proper, the North London Collegiate School with 29, and King Edward's School, Birmingham, with 17 matriculants, take the highest places. The fact that the names of so many higher-grade schools occur on the list should do a great deal in the direction of defining the true position of these schools in any scheme of national education.

WHILE the average amount granted to Urban Authorities under Sect. I. (3) of the Local Taxation Act (1890) is under 10 per cent., that of Berkshire to its Urban Authorities is, we learn from the Report of the Technical Education Committee, 29 per cent. Nor is this all. The Urban Authorities in this county have received other financial advantages in addition, in order that they should regard themselves as educational centres for the neighbouring parts of the county. All the Authorities, with one exception, have accepted this view of the situation, and it is hoped that next session this borough, too, will place itself on the same basis as the others.

THE first number of the re-issue of Dr. J. G. H. Murray's "New English Dictionary" has come to hand. The cheaper price will bring this monumental work of laborious and patient scholarship well within the reach of many whose incomes would not permit of the expenditure necessary to purchase the first edition. A work which has put even the "Century" dictionary into the shade has naturally completely eclipsed the earlier efforts of Johnson and Webster. The depth of philological research displayed by the compiler in the elucidation of each word may serve as a model for the scholars of other nations. When they, too, learn to overwhelm an inquirer by the like wealth of their historical quotations, the art of dictionary making and the labour of dictionary study will have reached that climax from which alone the hope of a universal dictionary of human speech may be reasonably entertained. It is to be hoped that as a knowledge of the significance of this work becomes more widely spread by this re-issue, the English public themselves will accept some of the responsibility for making such a record of the English language as complete as possible.

COMMENTING on the Grantham Grammar School case, which was so ably explained in Mr. Swinstead's letter in our last issue, the *Athenæum* says:—"It never seems to have occurred to the managers or the outgoing headmaster, or his successor, that assistant masters have individual rights or claims, and cannot properly be treated *en bloc*, or cashiered for not possessing qualifications never mentioned at the time of their engagement. To be dismissed by some *one* out of *three* uncertain authorities, without cause shown, and dispatched in middle life on the road towards the workhouse, with a honorarium of limited amount and of more than doubtful legality in your pocket, sounds more like the plot of a Savoy opera than an experience of to-day; yet it *is* the latter, though perhaps it may become the former also."

THE "Supplement to the Uppingham School Roll," just published by Mr. Edward Stanford at 1s., completes the list of Uppingham boys up to the end of 1898. The opportunity is taken, in a brief editorial note, of thanking Mrs. Mullins "for the unwearied and long-continued labour which she has devoted to the trying work of keeping the school records." A sketch map of Uppingham, on the large scale of ten inches to the mile, adds very much to the interest of the publication.

THE regulations of the Oxford Local Examinations in 1900 for senior, junior and preliminary candidates show that changes have been introduced affecting religious knowledge and languages for seniors and juniors, natural science for preliminary candidates, and drawing for juniors. Italian has been added to the subjects of the Senior and Junior Examinations. It is specially pointed out in the regulations that it is not necessary that a candidate for either the Senior or Junior Examination should have previously passed the Preliminary Local Examination.

IT is to be hoped that the educational experiment which is being tried at Bradford will prove successful. We learn from the *Athenæum* that a certain number of highly competent teachers are to be sent from Paris to the higher schools of Bradford, and an equal number of teachers will proceed from Bradford to conduct English classes in Paris. These mutual engagements are to extend over one year.

A WRITER in the July *Circular to Members*, published by the Assistant Masters' Association, who signs himself G. F. B., gives some interesting figures, from which we select the following:—"The Public Schools Year Book for 1899 gives details of about 89 schools. In these schools there are 1,365 assistant masters, of whom 199, or 14·5 per cent., are clergymen, and 1,166, or 88·5, laymen. Six assistants out of seven, therefore, are laymen. But of the 89 headmasters 61, or 68·5 per cent., are in orders, and only 28, or 31·5, are laymen. Thus two headmasters out of three are clergymen. This means that two-thirds of the headmasters of these schools are chosen from one-seventh of the assistants. What effect this has upon the standard of efficiency amongst headmasters, it would be profane to enquire. The interesting fact to which these figures point is, that the severance between the clerical and teaching profession is now almost complete, and one difficulty which has long stood in the way of teachers being recognised as a distinct profession is nearly cleared away."

As a first instalment of the complete design for the permanent buildings of King's College School, which was transferred to Wimbledon in 1897, the council have erected the large hall and class-rooms which were recently opened by the Duke of Cambridge. The *Builder* says: "The new school buildings consist on the ground floor of six new class-rooms, each 24 ft. by 17 ft. and 12 ft. in height. These open off a corridor 7 ft. wide, and are connected by a still wider corridor with the old school buildings. On the upper floor is the Great Hall, which measures 84 ft. by 42 ft. 6 in., and which has a height of 20 ft. to the tie beam. This is one of the largest school halls in England. It is covered with a decorative open timber roof of queen-post type. The walls of the hall are of red brick, the roof being stained a dark colour. There will eventually be a gallery across the entrance end of the hall, as shown in the interior view. The exterior of the building is faced with red bricks. The traceried and mullioned windows are executed in Corsham Down stone."

For the purpose of encouraging the study of botany, the London Technical Education Board have had the botanical gardens in Battersea, Ravenscourt and Victoria Parks laid out upon an organised plan. Good collections of plants, representing various natural orders, have been obtained, and suitable arrangements have been made for the convenience of teachers and students. The more important trees and shrubs in the parks have been labelled, and lists have been supplied for insertion in the botanical guide which the Board proposes to issue shortly for the convenience of students. Teachers of botany can obtain tickets for themselves and pupils for admission to the botanical gardens at the Battersea, Ravenscourt and Victoria Parks by application to the Secretary of the Board.

The London County Council have decided to purchase a site in High Street, Poplar, with a view to the erection of a technical institute. The district has long been in need of an institute of this kind, and the Board have for some time past been making efforts to acquire a suitable site. It is only recently, however, that appropriate premises have been found. The buildings which the Council will acquire have a frontage of 85 ft., and adjoin the property of the Poplar workhouse in the rear. It is hoped that before long a commencement will be made with the erection of a large well-equipped institute, in which instruction will be given in the various branches of mechanical and electrical engineering, marine engineering, navigation, and such trades as carpentry and plumbing.

In connection with the Paris Exposition next year, an Educational Exhibition of school work will be held in Paris. As already announced, it was arranged a short time ago that England, Scotland, and Wales should each hold a preliminary separate exhibition, and that from these should be selected the British specimens to be sent to Paris. The English exhibition will be held in January next in London at the Imperial Institute. In the same month, it is understood, there will be a Scotch exhibition in Edinburgh. Wales has been the first in the field, and her exhibition was recently opened at Cardiff by Sir George Kekewich. The exhibits cover the entire range of Welsh schools, from the kindergarten to the University. They are divided into seven groups, and include specimens of work from the elementary and continuation schools, from the schools under the Welsh Intermediate Education Act, from science and art and technical schools, from schools for the blind and deaf, from private schools and training colleges, and from the University. Among the most interesting elementary exhibits are plans of school buildings, and photographs of children receiving instruction in their class-rooms, workshops, and laboratories, or occupied in different out-of-door games, and at school drill. This valuable collection of photographs, illustrated in some cases by models of apparatus and of school furniture, and in all cases by the school time-table, and the children's note-books, give a graphic picture of school life in the different parts of the country. The work of the intermediate schools is not particularly well represented, owing partly to the lack of time for preparation, and partly to the fact that the arrangements for the exhibition interfered with the school examinations.

Dr. Reginald Farrar has sent the *British Medical Journal* the following amusing "protest against that odious word 'reliable,' which is creeping into journalistic literature":—

I quite admit—my worthy friend—the English language pliable,
A very useful tendency, the fact is undeniable;
But no convenience can excuse that odious word "reliable."
I fear the foul abortion shows signs of being viable,
Yet, ere we grant the creature life, let's think to what we're liable.
A thrilling "shilling shocker" will be advertised as "cryable,"
And a gentle maiden's sorrows be versified as "sighable,"
If we weakly grant admittance to that hybrid word "reliable,"
A monster whose existence is quite unjustifiable.
A purchasable picture will be catalogued as "buyable,"
The marriage-knot be registered a ligature "untiable,"
A legitimate experiment be spoken of as "triable";
Historians will praise immortal glory as "undiable,"
And the poultry-monger's pigeons be ticketed as "pieable,"
An oath at which we say "Oh, fie!" be called henceforth "Oh-fiable";
E'en now the Cockney terms a trip to 'Ampstead 'eath "enjyable."
Now let us all with one consent consign it to the Diable!
And when we mean "trustworthy" let us never say "reliable."

We have no love for the word which Dr. Farrar anathematises so vigorously: it is superfluous, it is of doubtful legitimacy, and many writers avoid using it. Dr. Farrar, however, in some of his instances, seems to have missed the real objection to the word from the purist's point of view: the fact that "rely" cannot stand alone without the preposition "on," which is needed to complete the sense. But against all the objections which philological orthodoxy can bring against "reliable" must be placed the solid fact that it is sanctioned by common use.

The negotiations which for some time past have been carried on between the Royal Geographical Society and the University of Oxford, with a view to the establishment at Oxford of a fully-equipped School of Geography, for the use, not only of Oxford graduates and undergraduates, but of others who desire to avail themselves of such an opportunity, have come to a satisfactory conclusion, and the school will begin operations in October, under the direction of Mr. H. J. Mackinder, University Reader in Geography. The Royal Geographical Society is to contribute £400 annually for five years out of the £800 required, and the School will be under the supervision of a joint committee of representatives of the Society and the University. Mr. Mackinder will deal specially with historical geography; Dr. A. J. Herbertson has been appointed assistant to the Reader, and will deal with physical geography, cartography, and surveying; Mr. H. N. Dickson has been appointed Lecturer on Physical Geography; and Mr. G. B. Grundy will in 1899-1900 lecture on ancient geography. The work of the School will include a course of systematic instruction primarily intended for graduates and other advanced students, with classes, demonstrations, and practical work in physical geography, cartography, and surveying. Courses of lectures will also be given with special reference to the historical and scientific teaching of the University.

The object of the Agricultural and Technical Education (Ireland) Bill, which has just passed through both Houses of Parliament, is to promote and foster agriculture and all the kindred interests, and also to promote technical education. The Bill in its mechanical part proposes the creation of a department composed of the Chief Secretary, a vice-president, and officials, for whose appointment powers are given. To them will be transferred various powers now scattered over other boards. As to the financial resources to be placed at the disposal of the new department, it is calculated that the total income from all sources will amount to from £160,000 to £170,000 a year; and this money will be applied to aiding and encouraging agriculture and other industries and technical instruction. The board to be formed under the Bill will be aided and advised by three bodies to be called into existence—a council of agriculture, a board of technical instruction, and an agricultural board—which will have very wide and important duties to perform. Speaking broadly and generally, the income of the board is to be devoted as follows: £55,000 to technical instruction; £10,000 to the improvement and development of the sea fisheries: and the remainder to agriculture and rural industries.

SECONDARY as well as elementary schools are now beginning to appreciate the advantage of having upon their staff one or more teachers who thoroughly understand the application of the theory and practice of hygiene in school life; and the desirability of emphasising the necessity of this knowledge in the code for elementary schools is now being pressed upon the Education Department by memorials from several important bodies. To encourage the systematic study of the subject, the Council of the Sanitary Institute have decided to arrange a thorough theoretical and practical examination, which will be open to both classes of teachers and to those preparing as teachers. The first examinations will be held during February and June next year.

ON July 24th the Duchess of Sutherland laid the corner-stone of the new buildings of the School of Art, Science and Technology and County Silk School at Leek. The school is an extension of the Nicholson Institute, and £10,000 is now being expended. About £1,500 has been received from local sources, the Technical Committee has made a grant of £1,925, and the Science and Art Department has contributed £476.

OUR perennially delightful contemporary, *St. Nicholas*, in reporting upon the Prize Competition of lists of twenty five books for a young folks' library, finds that a great many children are mightily occupied with the joys found between book-covers, and that numbers of the lists sent in by children and young people are *better* than many of those made out by careful parents, teachers, and librarians. No fewer than five thousand lists were received. The report informs us that "most of the lists, even those from the smallest competitors, had a few great names that stood out like stars." "Robinson Crusoe," "Æsop's Fables," "Midsummer-Night's Dream," "Gulliver's Travels," all make a great showing. The first prize list was as follows: (1) "Ivanhoe," Scott; (2) "Quentin Durward," Scott; (3) "Pathfinder," Cooper; (4) "Last of the Mohicans," Cooper; (5) "Jungle Books," Kipling; (6) "Westward Ho!" Kingsley; (7) "Arabian Nights"; (8) "The Rose and the Ring," Thackeray; (9) "Wonder Book," Hawthorne; (10) "A Tale of Two Cities," Dickens; (11) "Christmas Stories," Dickens; (12) "Poems of Longfellow"; (13) "Works of Shakespeare"; (14) "Treasure Island," Stevenson; (15) "Child's Garden of Verses," Stevenson; (16) "Tom Brown at Rugby," Hughes; (17) "Pilgrim's Progress," Bunyan; (18) "Sketch Book," Irving; (19) "The Man Without a Country," Hale; (20) "Robinson Crusoe," Defoe; (21) "Gulliver's Travels," Swift; (22) "Alice in Wonderland," Carroll; (23) "Uncle Remus," Harris; (24) "Jackanapes," Ewing; (25) "Wild Animals I Have Known," Thompson.

THERE was a very numerous attendance at Winchester High School for Girls on July 19th, the occasion being the presentation by the Bishop of Winchester to Miss Charlotte Yonge of an illuminated address in connection with the foundation of a university scholarship in her honour, and as a fitting memorial to her life work. The idea originated in a suggestion made last year by Sir Walter Besant, and was heartily taken up, with the result that the interest of £1,880 is available for a scholarship at Newnham, to bear the name of the Charlotte Yonge Scholarship. Miss Yonge lives at Otterbourne, five miles from Winchester, and has always been interested in the local High School for Girls.

MESSRS. CASSELL have just issued a tracing book containing 34 pages of specially-prepared paper to accompany "A Practical Method of Teaching Geography," by Mr. J. H. Overton. The first book of this Practical Method dealing with England and Wales has achieved quite an exceptional success, and it has already been adopted in many elementary and secondary schools. The second book of this series, containing maps of Europe, will be ready in the early autumn.

THE *Report of Proceedings* of the ninth annual general meeting of the Museums Association held in Sheffield last year has recently been published. The papers reprinted in the well illustrated volume should prove of great service to the curators of school museums. We especially commend to their notice "The Relation of Museums to Elementary Teaching," by Professor Denny, of Sheffield; "The Arrangement of Museum Herbaria," by Mr. Holmes, of the Museum of the Pharmaceutical Society; and "The Modes of Exhibiting Specimens," by Mr. White, of the Ruskin Museum, Sheffield. We congratulate the editor, Mr. Herbert Bolton, of Bristol, on the attractive volume produced under his editorship.

IN the July number of *The Nineteenth Century* Mr. Edwin Collins, editor of *The Dentist*, deals in a valuable article with the "Teeth of the Schoolboy." So startling are some of the statistics which the author brings forward that we earnestly commend the paper to the notice of school authorities. The parting advice of this well-known dental expert in summarising his article is:—"It is the duty of parents, of the heads of schools, and of all who have the care of the young, to provide for the regular inspection, and, where necessary, the treatment of children's teeth, no less than they provide for their children's food. It is really absurd to provide food for our children without taking care that they should be able to properly assimilate it, which is impossible if the organs of mastication are allowed to fall into decay; and it seems scarcely less absurd to provide for mental training without at the same time preventing, so far as may be, physical disabilities from making study irksome and robbing education of half its fruits."

LORD BALFOUR of Burleigh, speaking at Dumfries last month, referred to the general question of consultative committees. He is reported by the *Educational News* to have said: "He heard very much in those days about what was called consultative committees. They were very much in fashion, and were thought to be a panacea for all the ills of education. They might in some respects do good. He should not close the door to the consideration of that proposal, but he earnestly entreated his fellow-countrymen not to allow responsibility to be divorced from the department on which it should rest. If they expanded the functions of a consultative committee into administering, they were perfectly certain to get a much worse article than they got at the present time. He had great doubts whether a consultative committee could be made sufficiently representative to include a sufficient amount of the knowledge they wanted without being too large, but if they chose to have a committee for one branch, and another committee for another, he thought that perhaps such an arrangement might be made to work."

THE Scotch Education Department have issued their first separate Return as to the application during 1896-7 and 1897-8, by County and Town Councils and police burghs, of the Residue Grant available under the Local Taxation (Customs and Excise) Act, 1890. During these two years we find that the sum devoted to education has been increased by £4,000, but it must be borne in mind, says the *Record of Technical and Secondary Education*, that an additional amount of £10,000 was available for this purpose in 1897-8. The following table of selected counties, where the County Councils allocate the whole fund to education, will show the extent to which the present action of the burghs in those counties is responsible for the diversion of funds to the relief of rates :—

County area.	No. of Burghs.	Total Residue Grant for 1896-7.	Amount allocated to education.
Aberdeen ...	11 ...	£3,042 ...	£2,527
Ayr	14 ...	2,596 ...	2,264
Dumbarton ...	6 ...	1,109 ...	744
Dumfries ...	7 ...	1,101 ...	1,093
Edinburgh ...	8 ...	6,584 ...	1,359
Fife	28 ...	2,227 ...	1,592
Forfar ...	9 ...	2,972 ...	2,642
Lanark ...	12 ...	13,180 ...	9,479
Perth ...	12 ...	2,037 ...	1,634
Renfrew ...	8 ...	2,410 ...	1,007

THE following, taken from *The Record of Technical and Secondary Education*, is a brief summary of the sums annually appropriated for technical and intermediate education in Wales:—

Residue grant under the Local Taxation (Customs and Excise) Act, 1890	£38,000
Raised by rate under the Technical Instruction Acts, 1889 and 1891	25,000
Raised by rate under the Welsh Intermediate Education Act, 1889, with equivalent grant from Her Majesty's Treasury...	35,000
Total	£98,000

Of the total amount raised under the Technical Instruction Acts, a sum of £10,400 is provided in the county of Glamorgan alone, while the three county boroughs of Cardiff, Newport and Swansea are together responsible for a sum of £6,500. In the counties of Cardigan, Glamorgan and Merioneth an aggregate amount of £19,000 has been accumulated from the above sources for educational purposes.

THE Holiday Science Courses for Teachers, held for the first time this summer in the Royal College of Science, Stephen's Green, Dublin, have been extremely successful in every way. Arrangements were only completed about the middle of May, and names had to be sent in before June 20th, so that there was a very short time in which to make the classes known through the country. Nevertheless, 80 teachers attended, 10 of whom were ladies. Of these, 46, including 4 ladies, attended the physics course; 16, including 2 ladies, the geology course; and 18, including 4 ladies, the botany course. The courses occupied three weeks in July, and the greatest satisfaction was felt in the progress made by the students during the short time. National teachers, and those belonging to schools in connection with the Science and Art Department, were admitted free, other teachers paying a fee of £2. Dissatisfaction has been felt at the treatment given to Irish teachers by the department. Similar vacation courses are held in London, but to them the teachers are admitted free, their travelling expenses are paid, and £1 a week is allowed towards living expenses. The difference of treatment is but one example of the unwise parsimony with which the English Treasury frequently treats Ireland in similar matters.

THE Board of Irish Intermediate Education have issued their rules and programme for the examinations to be held in June, 1900. They are generally published at the end of March; this year they did not appear till July, and it was surmised that some changes might appear in the 1900 rules in consequence of the Royal Commission which has been sitting on the Intermediate System during the past twelve months. No changes, however, have been introduced into the rules and programme. The Report of the Intermediate Commission, which was expected in June, has not, up to the time of writing, been published. It is hoped by many Irish teachers that considerable changes in the direction of making the system more truly educational and less open to the charge of examination cramming will be one of the results of the Commission.

ALL the Arts examinations of the Royal University of Ireland (which resembles the London University in its constitution), with the exception of the Honour Degree examinations, are held in June. This year the most remarkable feature in the results of the examinations in Honours is the success of the women students. They are only about one-fourth (if as much) as numerous as the men students, but in the matriculation the exclusively women's colleges have taken 62 out of 168 Honours awarded, and 7 out of 29 Exhibitions. In the First Arts examination they have taken 30 out of 87 Honours awarded, and 6 out of 27 Exhibitions. In the Second Arts they have taken 47 out of 101 Honours, and 11 out of 22 Exhibitions. This, however, much understates the true number, only students from women's colleges being counted in the above figures, and not those otherwise prepared.

FOREIGN.

FROM the observations made in 1892 on 33,500 boys and girls of St. Louis, Dr. Porter thinks the results of his research, which he has just published, warrant him in asserting that "no child whose weight is below the average for its age should be permitted to enter a school grade beyond the average of its age, except after such a physical examination as shall make it probable that the child's strength be equal to the strain."

THE "Handbook of British, Continental and Canadian Universities," compiled for the graduate club of Bryn Mawr College, Pennsylvania, by Dr. Isabel Maddison, B.Sc., has reached a second edition. Special mention of the courses open to women is given in the case of each university. The book is published by the Macmillan Company of New York.

Some South African authorities evidently think that the teacher should always consider his school in deciding the way he will spend his holiday. In an interesting article, "Teachers in Council," in *The Educational News* of South Africa for June we find the following: "Teachers should remember that holidays are the times in which to recruit. They should, during the week or weeks granted them, endeavour to lay up a store of fresh strength for the work of the succeeding quarter. Let them have as much pleasure and amusement as they can manage to get; but let them remember that to pass all the time in hard work or in merrymaking (which often is the hardest work of all), without the rest which mind and body need after a long quarter's work, is harmful to themselves, unfair to their principals, to the pupils entrusted to their charge, to the Board under which they stand, and to the department which employs them, all of whom have a right to expect from them the best which they can give."

FROM the *University Extension Journal* we learn that the University of Oviedo has determined to see what it can do in the direction of university extension among the towns of Asturias. From a report of Professor Adolfo Posada it appears that a list of lecturers and courses has been drawn up and circulated, and that three centres have been at work during the past session—Oviedo itself, Avilés, and Langra. Among the subjects provided by the central authority are history, economics, philosophy, and various branches of the natural and mathematical sciences, and the organisation of the work is mainly identical with that which prevails in England. It will be interesting to watch the development of the University Extension movement in this corner of Spain.

A COLONIAL college, to be confined to the study of colonial matters, and the preparation of suitable colonists, was recently

opened at Witzenhausen, near Cassel. The college has been established by a limited company with a subscribed capital of about £5,800, and donations amounting to £1,000, of which £500 was given by Herr Krupp, and £240 by the German Emperor, and an extension of the capital in the near future is foreshadowed.

CURRENT HISTORY.

FOR the future, foreigners will be subject to the ordinary civil and criminal jurisdiction of Japan. This "far eastern" power thus signalises its entrance into the circle of European civilisation. For, in the East, and elsewhere among "savage" nations, Europeans, when they are strong enough to insist on the point, do not allow themselves to be controlled by the authorities of the country in which they reside, but demand to be under the jurisdiction only of their own Consuls. The European Powers do not recognise such countries to be States like themselves, do not treat them on a footing of equality, but, using the "resources of civilisation," protect in this artificial way those of their subjects who trade in those parts of the world. We congratulate Japan on her advancement.

WE are sometimes asked the old foolish question, "What is the good of learning history?" It is often difficult to give an answer suited to our interlocutor's understanding, or capable of giving satisfaction to his utilitarian instincts. But this month is supplying an answer adapted to the most "practical" and simple of intellects. This country has a discussion with Venezuela with reference to the ownership of certain rich lands lying on the borders of British Guiana and the South American Republic. The question has been referred to arbitration, and Sir Robert Webster is elaborating the British arguments in Paris. The summaries of his speeches are interesting reading. They consist largely of a history of the country closely based on original documents. He has apparently begun at the beginning, and is tracing carefully the whole history of Spanish and Dutch rule in northern South America. Let us hope the speeches will be published in full!

ARE we coming to a temporary end of the tension in South Africa? Quite apart from the practical interests of the question, it is instructive to study the relationships between English and Dutch at "the Cape." After the conquest of the Dutch colony at the beginning of the century, the Boers moved across the Vaal to pursue their patriarchal method of life. Patriarchal in more senses than one, sometimes approving itself to our modern taste, sometimes otherwise. But the all-energetic Britisher has pushed on after them, and now the Transvaal population is largely "Outlander" and foreign. The Boers are, and are not, subject to the Queen's authority. She is their "suzerain," and what that quite means must be studied in the "Conventions." But as the Transvaal must have "no foreign relations," how can there be, in the technical sense, "war" between us and them?

SAMOA is an island of the Pacific, whose inhabitants are of the mildest and most inoffensive, most kindly and courteous, if reports are to be believed. Yet the name occupies often a leading position on the posters of our daily papers, and nothing attains that notoriety unless mischief is brewing. Three civilised powers, Germany, the United States of America and the ubiquitous Britain have undertaken to govern this worldlet together, apparently because each would like to govern it solely, and will not be let alone by the other two. So whether it is M— or N— whom the Samoans would like for their king, cannot be known for weeks because of the disturbing factors from outside. So was it in Poland last century. So is it ever where armed "civilisation" has "interests," specially if those interests are commercial and political combined.

SIMPLIFIED PSYCHOLOGY.[1]

MUCH as the fact is to be deplored, it is none the less a fact that the great majority of British schoolmasters know nothing about systematised psychology, and we hear it hinted from time to time that they care just about as much. This is, of course, a pity. All sorts and conditions of problems connected with mind action are continually turning up in the class-room, and the teacher, ignorant of even the rudimentary laws governing brain activity, finds it impossible to tackle such exceptional concatenations with the old cut-and-dried formulæ of his common practice.

For some reason or other the ordinary person regards psychology in much the same way as a non-mathematical man thinks of the Binomial Theorem or Euler's Series. There is doubtless some explanation to be found of this innate horror of what is really a fascinating subject. Perhaps the want of attractiveness in the method of presenting psychology and the tendency to unnecessarily increase a somewhat weird nomenclature may partly account for it. Teachers have not always been able to command the help of such delightful exponents as Dr. James. Of one thing we are confident—if teachers can only be got to read and think about these "talks," the old dread and distrust of psychology will vanish. From the winsomeness of the author's style the first reading of his papers may lead one to suppose that after all there is not much in psychology which can be utilised in the every-day work of teaching.

Dr. James writes few prescriptions for particular cases; he does what is far more valuable he exhibits, with a masterly ease and wonderful clearness, the broad principles which should and must become part and parcel of the equipment of a successful teacher—whether recognised as part of psychology or not. While this is true, yet as Dr. James says: "To know psychology is absolutely no guarantee that we shall be good teachers." In another place it is written, "The amount of this science which is necessary to all teachers need not be very great." But we would strongly urge all teachers to become familiar with the amount in these "talks," whether it be considered great or small. Even if it were possible to imagine that no help in his work could be got by a teacher reading this volume, yet for the pleasure in following Dr. James we would recommend its perusal. But there is help and inspiration, enough and to spare for the careful reader.

Are you in doubt as to the place of marks and prizes in school work? On p. 53 you will find "Can the teacher afford to throw such an ally away? Ought we seriously to hope that marks, distinctions, prizes, and other goals of effort, based on the pursuit of recognised superiority, should be for ever banished from our schools? As a psychologist, obliged to notice the deep and persuasive character of the emulous passion, I must confess my doubts."

Are you ever guilty of "nagging"? Listen to the expert. "*Don't preach too much to your pupils or abound in good talk in the abstract.* Lie in wait rather for the practical opportunities, be prompt to seize those as they pass, and thus at one operation get your pupils both to think, to feel, and to do. The strokes of behaviour are what give the new set to the

[1] "Talks to Teachers on Psychology: and to Students on some of Life's Ideals." By William James, Professor of Philosophy at Harvard University. xi.+ 301 pp. (Longmans.) 4s. 6d.

character, and work the good habits into its organic tissue. Preaching and talking too soon become an ineffectual bore" (p. 71).

Are you a believer in the desirability of breaking a stubborn child's will? Professer James shows that the "balky will" must be specially treated. "Certain children, if they do not succeed in doing a thing immediately, remain completely inhibited in regard to it; it becomes literally impossible for them to understand it if it be an intellectual problem, or to do it if it be an outward operation, as long as this particular inhibited condition lasts" (p. 182).

"When a situation of the kind is once fairly developed and the child is all tense and excited inwardly, nineteen times out of twenty it is best for the teacher to apperceive the case as one of neural pathology rather than as one of moral culpability . . . . Drop the subject for the time, divert the mind to something else; then, leading the pupil back by some circuitous line of association, spring it on him again before he has time to recognise it, and as likely as not he will go over it now without difficulty" (p. 183).

The only way to appreciate how helpful Dr. James can be is to study what he has written. We commend the volume to the immediate attention of every teacher.

GERMAN HIGHER SCHOOLS.[1]

The evolution of national genius is a study of unique interest. Without premeditation, almost without self-consciousness, the great nations of antiquity appear to have moved along certain specific lines, developing in their progress particular aptitudes for grappling with problems political, social, moral and æsthetic. Hence it has often been remarked that Rome taught the world law, that Greece taught it art, and the Hebrews religion. In like manner may not the future historian's verdict be that the national genius of Germany exerted its force on the problem of education? As early as the eighth century Charles the Great was applying himself assiduously to this question, and his famous proclamation of 787 has been called the First General Charter of Education. A large part of its aim was to deliver the schools from ecclesiastical absolutism. But unfortunately the rise of feudalism gave a serious and prolonged check to the good work effected by the general charter. With the Renaissance, however, dawned a new era for the schools of Germany, and the Reformation under Luther, with his powerful advocacy of Protestant schools, laid the foundations of a complete and organised educational system. The electorate of Saxony made the initial move towards State control, but the first German State to organise a complete system of public schools was Würtemberg. The example once set, other states rapidly followed suit. In this great enterprise Melanchthon was the master mind. He had many capable lieutenants, the most distinguished being John Sturm, a humanist of the humanists, who was above all "impressed with the almightiness of the classical languages." Around the "humanistic" controversy the battle raged long and loud. In the seventeenth century Comenius appeared as a mediator between the advocates of Latin on the one hand and the positive sciences on the other. He was, to a considerable extent, successful.

Then followed, under Frederick the Great, the period of Enlightenment in Germany. *Real* schools, holding an intermediate position between the common schools and the classical *Gymnasien*, were established in all directions. Later came the New Humanism—the ascendancy of Greek—with the recognition of the "perfectibility of the individual through education." In 1794 followed the secularisation of the schools, when the Prussian Magna Charta declared boldly, "Schools and Universities are State institutions, charged with the instruction of youth in useful information and scientific knowledge. Such institutions may be founded only with the knowledge and consent of the State. All public schools and educational institutions are under the supervision of the State, and are at all times subject to its examination and inspection." Yet it was not till 1825 that provincial school boards were established. Humboldt had already (1810) introduced a measure for the certification of teachers, from which time "the teaching profession has steadily grown in technical and social importance." In 1855 the *Real* schools were set on a sure and popular foundation. Finally, in 1890, the present Emperor emphasised the necessity of making the schools the bulwarks of German commercialism and German militarism. His words are frank and explicit: "The foundation of our gymnasium must be German. It is our duty to educate men to become young Germans, and not young Greeks and Romans."

Such is a rugged summary of Dr. Russell's most instructive sketch of the history of German Higher Schools. He then outlines the Prussian (as typical of the whole) system of German schools. The central authority is a Cabinet officer, under whose direction are sundry secretaries and counsellors. Religion is taught in all schools, but provision is made for pupils holding other than the Lutheran creed. Private schools and city schools are allowed considerable latitude in self-government, but there is always a minimum requirement of teaching efficiency and remuneration. Dr. Russell regards the provincial school-boards as the mainstay of the Prussian school system. In Germany, however, the military spirit is paramount. The successful completion of a six years' course in a higher school confers upon every German boy the right to claim exemption from the usual two years' conscript service, and to choose instead one year's service as a volunteer, with every prospect of promotion. And of all higher school courses the Gymnasium or Classical School course is the most sought after. Graduates of the Gymnasien are alone regarded as cultured; and certain of the higher professions can be reached only through the portals of the gymnasium. In the *Realschulen* the classical languages are not taught.

The curricula of the various orders of secondary schools are carefully formulated by Government. Hygiene receives attention at the hands of permanent expert officers. Discipline, of course, is of the military order, and is practically perfect. The sedentary habits and studious disposition of the German boy predispose him to prove an apt pupil. Examinations, as understood in English and American secondary schools, have no place. It is not *Wissen* but *Können* that counts. "No checking of errors as they occur, and no marking by percentages, is allowed under any circumstances." "Under no circumstances is it permissible to give a pupil his relative standing in class." In the final test a boy's chief examiner is his teacher, who alone is fully capable of appraising him at his real worth.

The methods of religious instruction, and the manner in which sectarian demands are met, is dealt with by the author in a lucid and interesting chapter. It is noteworthy that an expurgated—never a complete—edition of the Bible is used.

Teachers in English secondary schools will find much that is suggestive and helpful in the chapters concerned with the teaching of modern and classical languages. The phonetic method of teaching the former is especially worthy of attention. Dr. Russell is of opinion that geography is, of all subjects, the

1 "German Higher Schools: the History, Organisation, and Methods of Secondary Education in Germany." By James E. Russell, Ph.D., Dean of Teachers' College, Columbia University, New York. xii. + 455 pp. (Longmans). 7s. 6d.

best taught. The *Gymnasien* still cultivate classics to the detriment of mathematics. The best results from the teaching of the latter are found in the *Real-gymnasium* of non-Prussian States. German educational authorities are now satisfied that an intimate knowledge of several sciences cannot be given in the higher schools. As the author well expresses it: "As between a little of all that can be known and all that can be known of a little, there can be no doubt in the German mind; to drink deep or not at all is surely a German characteristic." The child's first instruction in the natural sciences must never take him out of his environment. School equipment, however, is well nigh perfect,—herbaria, maps, charts, &c., being most liberally supplied to every higher school. And along with all practical science work drawing is systematically cultivated.

That there are defects in the German system goes without saying, and the author has not been careful to conceal them. But Germany is still working at the educational problem. So far she has succeeded in formulating and administering a system which is an object lesson to the world. She has shown that teaching can be raised to first rank among the professions, and she has trained a body of men who, for skill and efficiency, are unrivalled by any similar body of teachers the world over. How this has been done is clearly and interestingly shown in the latter part of Dr. Russell's book.

It should be mentioned that this work is the outcome of Dr. Russell's appointment, in July, 1893, as European Commissioner of the Regents of the University of the State of New York, and shortly afterwards as Special Agent of the Bureau of Education of the United States for the study and investigation of German schools. In his book, Dr. Russell shows an easy mastery of his subject; his method is orderly and consecutive; his judgments are eminently fair and impartial; he has enriched his pages with luminous and valuable statistical tables; and he has crowned the whole with a skilfully compiled index. No student of secondary education can fail to find in this volume an instructive contribution towards the solution of pressing educational problems.

COMMON SENSE IN EDUCATION.[1]

MR. BARNETT writes as one having authority and not as the arm-chair philosopher. He nearly always carries conviction. There is a tone about his pages which at once suggests experience in the class-room. Every type of youth to be met with in an English school seems to have been studied and understood. The author's previous writings have led us to expect helpful, suggestive, and tonic advice whenever he mounts the teacher's platform, and in "Common Sense in Education" Mr. Barnett more than maintains his previous reputation.

We confidently recommend the volume under notice to the careful attention of all teachers young in experience, and are certain, moreover, that veterans in the cause of education can with advantage "read, mark, and inwardly digest" most of these chapters.

Yet we do not agree with everything which is here set down. That does not matter. The peculiar value of Mr. Barnett's writing is that whether you agree with him or not you are set thinking—old problems present themselves in new lights, familiar things seem to be placed in a new setting—and the consequent stimulus is to the mind what a mountain breeze or a mouthful of sea air is to the jaded body.

Judging from some of his remarks, Mr. Barnett is not sympathetically disposed towards science as a subject of school instruction. This sometimes leads to a little unfairness. Two short paragraphs, one each from the two first chapters, with all the author's inverted commas, will show what we mean:—

"The pitfall that here commonly waits for the unwary teacher is the favourite fallacy of the illogical generalisation on too few particulars. It happens most frequently in what are called 'science' lessons. The 'scientist' shows that a bar of iron expands under heat or that steam takes up more space than water; he then triumphantly requires his class to infer that all bodies expand under heat. . . . . Nevertheless, teachers, and especially teachers of experimental 'science,' often seem to be doing their best in this operation to cultivate our natural depravity, our tendency to jump to conclusions on insufficient and unchecked evidence, the fount and origin of as many human woes as indulgence in strong drink" (p. 15).

"But from the want of logic and from a touching belief in the performance of 'experiments' as 'science,' the science lessons in particular are often full of reckless deceptions. When, for instance, a child is invited to infer from a single experiment of the familiar kind that 'heat causes things to expand,' he is made to commit that particular offence against logic and truth which is the fountain of most of the errors of reasoning that plague mankind — the inference of a general law from one particular" (p. 53).

Mr. Barnett has been unfortunate in the science teaching with which he has come into contact. The unscientific treatment of the change in size which accompanies an increase of temperature described in the selections given is not typical of the instruction in physics which goes on in an average secondary school, and Mr. Barnett ought to know that.

Where all is so good it is a little difficult to make choice of typical parts to accentuate the general excellence. We select the following remarks on "Audible Speech" because more than one instance has come before our notice where a woful loss of force and usefulness has resulted from the possession of an untrained and unmanageable voice by otherwise excellent teachers:—

"A harsh and irritating voice, a noisy voice, a muffled voice, a monotonous voice, are all in their way ineffective; that is, they all hinder the teacher from producing on his class the result that he desires to produce. They all distract and tire according to their degree, where the effect should be interest and gentle stimulus. The uneasiness and restlessness of a class may often be safely set down to the unimpressive or harassing voice of the teacher; the pleasant voice is emphatically one of the best means of legitimate 'suggestion' that a teacher could use. . . . . A teacher should therefore be quiet, restrained, and distinct in speech. Let his words be few, but let every one of them have its value for the class. There should be no loss by the way. A soft voice is an excellent thing in teachers" (p. 148).

We have especially enjoyed reading the chapter on "The Making of the Teacher." It abounds in evidence of Mr. Barnett's practical acquaintance with his subject. Listen to this:—

"Genial 'chaff' is a weapon far more potent and infinitely less dangerous than sternness, which should be reserved for such serious cases as deserve more displeasure" (p. 308).

"We cannot aim too high; but it is not possible to be straining at every moment after a high ideal" (p. 309).

But isolated scraps do not adequately call attention to the

[1] "Common Sense in Education and Teaching. An Introduction to Practice." By P. A. Barnett. xii. + 321 pp. (Longmans.) 6s.

value of this book. It should be bought and studied by every teacher who wants to do the best he can with his powers for the individuals he is called upon to educate. At all events, every teacher will regard his work more seriously after very few of Mr. Barnett's pages have been read.

RECENT SCHOOL BOOKS.

Classics.

Vergil. Æneid VI. By A. H. Allcroft, M.A., and B. J. Hayes, M.A. 95 pp. (Clive.) 1*s.* 6*d.*—This book has reached a second edition, and as we have not had an opportunity of calling attention in these columns to an edition of a book of Vergil in the "Tutorial Series," we note here that no difficulty seems to have been left without an explanation which will very materially help the student to a full understanding of the book. At the end we find a very useful appendix on such matters as the declension of Greek substantives, archaisms, grammatical peculiarities, and metrical irregularities, together with lists of words which vary according to quantity, which will serve to bridge over what would otherwise be dangerous pitfalls to the unwary.

Livy. Book II. By A. F. Hort, M.A. viii.+166 pp. (Rivington.) 2*s.*—The second book of Livy, containing, as it does, stories of early Rome, such as the defence of the bridge by Horatius, the battle of Lake Regillus, and the devotion of the Fabii, is well adapted as an introduction to the study of that author by boys who have read Caesar and are able to go on to something more advanced. The publishers have been well-advised in adding this book to their series of "Middle Form Classics" and in placing it in the hands of Mr. Hort, whose previous work in this series we have noticed favourably. The notes have been prepared and set forth with full knowledge of the help required by boys, and teachers will be grateful for them. We are glad to find a good index.

Thucydides. The Athenian Disaster in Sicily. By E. C. Marchant, M.A. xix.+106 pp. (Macmillan.) 1*s.* 6*d.*—This is a very excellent addition to the series of "Elementary Classics." Mr. Marchant has made careful selections from the seventh book of Thucydides, with historical and geographical introductions, an outline of events in the eight days of the Athenian retreat, and an indispensable map of Syracuse. The notes are simple and to the point, and are preceded by a section on the peculiarities of the author under the headings of Form, Choice of Words, and Syntax, with spaces to be filled in by the reader with examples from his reading. There is, moreover, an appendix consisting of questions on each chapter, which will be most useful to the teacher in his endeavours to see that no point of scholarship or criticism is overlooked by his pupils.

A Handbook of Translation. Latin. Part II. 96 pp. (Stanford.) 2*s.*—This book contains a large selection of advanced passages from Latin authors suitable as tests for Civil Service candidates, most of them having been taken from papers set in the examinations. Teachers will be glad to have such a collection ready to hand, and will welcome the index of references.

Grammar.

Word Building. By Robert S. Wood. Vol. I., Parts I.—IV., 1*s.*; Vol. II., Parts V., VI., VII. (Macmillan.) 2*s.*—We have tested these books with several of our classes, and we can speak from experience of the enthusiasm with which their use is hailed by children. They are of immense value in enlarging the vocabulary and securing the use of the right word in the right place. Teachers of English will be delighted with the freshness of treatment that is so characteristic of Mr. Wood's two volumes.

Edited Books.

The Companion Ranger Series. Vols. I., II., III. About 250 pp. (Arnold.) 1*s.* 6*d.* each vol.—Mr. Edwin Arnold's well-known and popular "Ranger Series" of reading booklets is here presented in a more substantial form. Printed in clear type, well illustrated and strongly bound in cloth, these little volumes appear likely to command increased attention. The idea of giving such healthy food to the youthful imagination has been already assured of success, and no better class books for reading in middle forms than these could easily be found. Unlike Mr. Stead's deleted "penny novels," these "scenes" are likely to develop a taste for the completed stories from which they are taken.

The Works of Shakespeare. (Eversley Edition.) Vol. VI. 515 pp. (Macmillan.) 5*s.*—This volume continues the historical plays and comprises "King John," "Richard II.," and the two parts of "Henry IV." Space forbids any detailed account of the treatment bestowed by Professor Herford upon these productions. Suffice it to say that the editing represents the quintessence of scholarship and criticism, and the introductions to each play are, to vary a celebrated speech of Judge Jeffreys, "as full of matter as an egg is full of meat." Probably the contrasts between Hotspur and Prince Hal and Falstaff have never been more happily delineated than in the present case, and this is to mention only one of the critical excellences of this volume.

History.

Analysis of English History. By W. C. Pearce and Dr. S. Hague, revised by W. F. Bangust. 204+40 pp. (Thomas Murby.) 1*s.* 6*d.*—A short statement of the chief events in English history with index and biographical appendix. It is an "improved, revised, and enlarged" edition of a book which has already been edited ninety-two times. It contains some of the later knowledge, but one could wish that it had been entirely re-written. As it is, it reminds us of the "new cloth" and "old garment" of the parable.

Source Book of American History. Edited by A. B. Hart. xxxvi.+408 pp. (Macmillan.) 3*s.* 6*d.*—A selection of original documents from American history, beginning with an extract from Christopher Columbus, and ending with one from an address in Boston by the Governor of Massachusetts in 1895. It is intended "for schools and readers," and there is not a page which is not interesting. Comments are added in the margin. An "introduction" expounds the use of the documents, and there are two or three facsimile reproductions. The editor is most fair in choosing extracts from opposite sides, *e.g.*, the Civil War period. We heartily recommend the book.

Geography.

Object Lessons in Geography. By T. F. G. Dexter and A. H. Garlick. 319 pp. (Longmans.) Price 3*s.* 6*d.*, or in three parts for Standards I., II. and III. respectively, 1*s.* 6*d.* each.—An attempt is here made to teach the elements of geography by means of object lessons, and the result is eminently satisfactory. Some useful hints are first given on the making of geographical models, the materials employed being clay, sand, and paper pulp. There are more than 300 diagrams and maps,

and the book should prove of considerable value to all teachers of this fascinating subject. We unreservedly recommend it.

Geographical Handbooks. (Arnold.) 3*d.* each.—The series consists of ten books, each containing about fifty pages and including several maps and useful diagrams. Among the latter we notice those illustrating the Pamir Plateau, the heights of English and Welsh mountains, and several comparisons of areas. The information given is well up-to-date, a fact that is impressed upon us as we read the descriptions of Rhodesia, the Trans-Siberian Railway, European Powers in China, &c. How many boys could give the names of the seven English cities that are entitled to call their chief magistrate Lord Mayor?

Mathematics.

Plane Geometry. By G. A. Wentworth. Revised edition. viii. + 256 pp. (Arnold, and Ginn & Co., U.S.A.)—In its general features this is very similar to the work of Messrs. Beman and Smith noticed below, except that solid geometry is excluded. The hints and especially the figures given with many of the exercises will be very useful. In the solution of problems of construction the figures are properly given in a fairly practical shape. Why did not the author go further and explain the use of a set square for drawing parallels? On p. 94 Mr. Wentworth tries to *prove* (of course, unsuccessfully) that the perimeter of a circle is equal to the limit of that of an inscribed polygon. This is the only positive error we have detected in the book, which certainly deserves commendation. It is not impossible that America will supply us with the long-desired model treatise on elementary geometry.

An Elementary Course of Mathematics. By H. S. Hall, M.A., and F. H. Stevens, M.A. x.+98, 134, 110 pp. (Macmillan.) 2*s.* 6*d.*—This useful book contains a revision course of arithmetic, algebra up to quadratic equations exclusive, and the first book of Euclid. The algebra and Euclid are practically taken from Hall and Knight's "Elementary Algebra," and the authors' edition of Euclid. The book is mainly intended for students attending evening classes or working by themselves, and will, no doubt, be found very helpful by persons of this class.

The Preceptors' Trigonometry. Edited by W. Briggs, M.A., LL.B., F.C.S. 258 pp. (Clive.) 2*s.* 6*d.*—This is intended for students preparing for the College of Preceptors' examinations, but is suitable for anyone of that standard. The discussion of logarithms and the use of tables is distinctly above the average, and ought to enable the reader to make practical use of a book of tables. It is hard to see why the "practice" method of taking differences, explained on p. 129, is not used in the worked examples. The formulæ for sin (A + B), &c., are proved *after* the solution of triangles. This involves some rather artificial bookwork in the earlier chapters; for example, in Art. 145. The numerous hints and cautions to students are likely to be of great service, especially to those who are reading the subject by themselves.

Euclid's Elements of Geometry, Books III., IV. Edited by C. Smith, M.A., and Sophie Bryant, D.Sc. vi.+161-288 pp. (Macmillan.) 2*s.*—On the whole this is a useful and well-arranged edition. Euclid's unsatisfactory proofs of III. 11-13 are replaced by better ones, and III. 26-29 are proved by superposition. On page 265 we have the usual inaccurate statements about the construction of regular polygons. It ought to be clearly pointed out that the "impossible" cases have reference only to rule and compass constructions; moreover, such possible cases as $n = 34, 51$, &c., appear to be excluded from the editors' classification.

New Plane and Solid Geometry. By W. W. Beman and D. E. Smith. x.+382 pp. (Ginn & Co., Boston, U.S.A.)—A revised edition of a work which has attained a well-deserved success. The authors are thoroughly competent mathematicians, and this agreeable fact appears in various ways. Thus it is properly stated as an *assumption* that the circumference of a circle is the limit of the perimeter of an inscribed or circumscribed regular polygon; and while adopting the arithmetical treatment of ratio, the authors rightly point out the assumption that lengths, areas, &c., are all capable of numerical measurement. The figures in the solid geometry are drawn with unusual care, and will help the beginner to realise the forms intended almost as well as models. Such matters as symmetry, similar figures, and spherical geometry receive a due amount of attention, and altogether the work may be cordially recommended as a favourable specimen of the modern treatment of the subject. Criticism might be offered on some small points; for instance, the equality of straight angles should be proved instead of assumed, and the remarks on reciprocity (p. 27) may lead to misunderstanding. But these are comparative trifles, and to emphasise them here would be unfair. It deserves to be recorded that on p. 212 the regular polygons which can be drawn with rule and compass are correctly specified, a very rare, if not unique, occurrence in a work of this kind.

Examples in Arithmetic for Schools. By the Rev. J. B. Lock, M.A. 264 pp. (Macmillan.) 3*s.*—A separate issue (without answers in the copy sent to us) of the examples in Mr. Lock's well-known "Arithmetic for Schools."

The Principles of Mechanics. By H. Robson, B.Sc.Lond. 156 pp. (The Scientific Press, Ltd.) 2*s.* 6*d.*—This is a hopelessly inaccurate work, which painfully illustrates the uncertain value of University degrees. Here are some samples: On p. 13 we read, "Two numbers are said to be proportional when they are so connected that any change of one of them necessarily produces a change of the other"; on p. 20, that "the gravitation between two bodies always acts as if it were exerted between two mathematical points"; and on p. 35 there is this gem of the first water: "We may here consider more exactly why it is that g is so nearly constant. Let x and y be the respective masses of the earth and of a body near its surface, and let d be the distance between the centres of gravity of the two masses. Then g varies as xy/d^2. Now x is in all cases enormously great as compared with y, and is, despite meteoric showers and perhaps unknown sources of gain or loss, practically invariable. Hence even changes in y, which may be very great from the point of view of the magnitude of y, will not appreciably affect xy. Again, as the radius of the earth at the particular place is by far the larger part of d, d^2 may be also regarded as fixed without making any error of importance." If space permitted, we should like to quote the paragraph on Machines (p. 91), which is a fine example of paradox, as is sufficiently indicated to those who know by the sentence "mathematicians and scientists do not seem to have the courage to confess this in print, although they are well aware of their own ignorance." A judicious teacher might profitably give out to his classes passages from this book for criticism; there are plenty of mistakes in it which an average matriculation student ought to be able to correct. In all other respects the book is absolutely useless, and worse.

Science and Technology.

Manual of Human Physiology. By Leonard Hill, M.B. With 173 illustrations. xii.+484 pp. (Arnold.) 6*s.*—Mr. Hill writes chiefly for the general reader and avoids technicalities as much as possible. It is a little unusual in books on physiology to find the first six chapters given up to an

elementary introduction to science. At first one takes the subject of the book to be what is often called physiography, though when the seventh chapter is reached on p. 42, with its title "Life," we begin to see where we are. Then, after short chapters on "Sun-Energy and Protoplasm," "Bacteria-Cell Physiology," "Differentiation of Structure and Function," we reach, in chapter xi., at page 72, the subject proper. We imagine this book will prove most useful to nurses undergoing hospital training and others who similarly want to obtain the essentials of the subject along the line of least resistance. The volume is well printed and illustrated.

Skertchly's Geology. By James Monckman, D.Sc.(Lond). viii.+256 pp. (Thomas Murby.)—This is a new edition of a very well-known primer of geology. Dr. Monckman has endeavoured to keep the individuality of treatment due to the late Mr. Skertchly, while at the same time bringing the subject matter up to date. A fourth section of eighty pages has been added, which, since it supplements the original chapters of the book, is of a very scrappy nature. The information in the new part is correct enough, but its arrangement suggests a dictionary. A large number of new illustrations have been added, and though the syllabus of the Science and Art Department on this subject is fairly covered, the book is neither as nicely printed nor as attractive as some other books on the market which have come before our notice.

The Arithmetic of Electrical Measurements. By W. R. P. Hobbs, R.N. 112 pp. (Thomas Murby.)—The fact that Mr. Hobbs's little book has reached its seventh edition is evidence enough that it satisfactorily meets the requirements of the class of students for whom it is intended.

Miscellaneous.

Public School Writing Book. (Allman.) In 16 parts, 1-8A. —We have already called attention to these excellent copy-books (p. 268), and have much pleasure in endorsing what has been said about No. 4. The complete series has now been published, and all the numbers are quite up to the high standard set by No. 4. The books are certain of a large sale, and should do a great deal towards improving the unsatisfactory penmanship of many secondary schools.

Anatomical Diagrams: for the use of Art Students. By James M. Dunlop, A.R.C.A. 71 plates or 150 subjects printed in colours. (George Bell & Son.) 8vo. 6*s.* net.—This admirable work of "artistic anatomy" is the direct outcome of the enlightened spirit which animates the Glasgow School of Art. Glasgow has cause to feel proud that its public-spirited policy has produced such a result, and its school of art is to be congratulated upon having the wisdom to engage such a teacher as Mr. Dunlop evidently is, as well as upon having such a congenial soil for the teacher to work. The book is the art students' *vade-mecum* in the study of artistic anatomy. The author is his own draughtsman. Each one of the 71 plates is a complete study, and the volume contains 150 subjects treated in three colours. Anatomy is the scientific side of the study of art in its higher branches like sculpture, and there is no doubt that it was better understood in the days when the Greeks produced their imperishable creations than it is to-day. Michael Angelo, perhaps, of all the great creative minds of the "Renaissance Period of Art," carried his knowledge of anatomy to excess. Mr. Dunlop has given just such information as all art students who attempt "figure design" should possess, and his book is distinguished for the logical system upon which it is based. On the left-hand page of each section of his work the author gives the osseous or bony system of the human frame; and on the right-hand page the "muscular system." He also clearly shows the true position of "The Bones as in Action," and also of the muscles. Further, the work has a most interesting series of tabulated facts arranged on each side of every plate. Every art student should possess a copy of this most interesting and thoughtful work.

A Graduated Course of Drawing for Infants. By Constance A. Fowler. 21 Plates. (Macmillan.) 4*s.* 6*d.*—Might be better called a "Graduated Course of Inventive Drawing for Infants," seeing that it is based on the cultivation of the inventive faculty in children. Given a ruled blackboard and some coloured chalks, this book could be made a mine of wealth to an intelligent teacher in stimulating the infant mind to enjoy the drawing lesson as one of the most interesting in the school course. Miss Fowler proves by irresistible logic that infants can be taught to invent patterns of great beauty, *e.g.*, on Plate I. eleven distinct combinations based on the straight line are given. Examples 7 and 8, with the addition of a little colour on the small squares in the design, would prove a source of true delight to the infants. There is a notion prevalent that the power to design is limited to the skilled draughtsman. This may be true in the higher branches of art, but Miss Fowler has clearly shown that it is not so in its more elementary stages. Her book contains "original designs" of a most interesting character by children of five, six, and seven years of age. Miss Fowler is to be congratulated on having solved the problem of "how to interest the infant mind in a love for art," and clearly shows how the kindergarten drawing lesson "may be made the means for teaching the elements of original design." Her book marks the growth of educational method, and is of real value.

High Aims at School. By the Rev. R. A. Byrde, M.A. x. + 134 pp. (Elliot Stock.) 3*s.* 6*d.*—No one who has not tried knows how difficult it is to preach to boys. It is no easy matter to make a good school sermon. Though Mr. Byrde is not always successful, some of his sermons are excellent. We agree with Dr. James of Rugby about many of them, who says in a preface to the volume, "They are simple, direct, and interesting." We are quite sure that the addresses can be studied with profit by all who are liable to be called upon to go into the school pulpit.

CORRESPONDENCE.

The Editors do not hold themselves responsible for the opinions expressed in letters which appear in these columns. As a rule, a letter criticising any article or review printed in The School World *will be submitted to the contributor before publication, so that the criticism and reply may appear together.*

The Teaching of "Euclid's Elements."

"Euclid's Elements" is still the accepted text book of geometry with us, and its definite order and grouping is invaluable. The freer use of symbols both in printing and in written exercises has done much to rid the Elements from the charge of stilted and difficult language. It is primarily as a mode of reasoning that geometry holds its place in a school curriculum, and the difficulty of teaching Euclid is mainly that of quickening the logical faculty of the pupil. This difficulty exists to an equal degree in other branches of mathematics, but

is disguised by what is mainly an effect of memory, namely, an acquired power to use rules, the bases and foundations of which are too often unknown and unexamined. One of the advantages of Euclid is that the rigidity of its logic prevents any such apparent progress.

The definitions, axioms and postulates lay down the minimum here required of those primary notions which lie at the base of every science, and which must be settled before reasoning is possible. For a definition the requirements are a sufficient description without having too much by including some property resulting from the rest, or too little, which would leave the term too wide limits. The first introduction of a beginner should be the making up of definitions of common objects, the teacher pointing out when they err on the side of redundancy or defect. For example :—

Define *pen*	A pointed thing to write with.
Why not a pencil?	A pointed thing to write with by means of ink.
Or,	
Define *book*	Something to be read.
Why not the blackboard? ...	It must consist of several sheets.
How can an unused exercise book be included, &c., &c., leading to the definition ...	Several sheets connected together containing or intended to contain something to be read.

Passing on to Euclid's definitions, the first one to present a difficulty is that of the straight line. We have three forms to choose from : (1) "Lying evenly between its extreme points," (2) "the shortest distance between two points," (3) "lying in the same direction throughout its length." The objection to (2) and (3) seems to be that all our ideas of measurement and direction are founded on the straight line, and the thing is being defined in terms of itself. The remaining one can well be taken as meaning that any portion of the straight line can be made to lie along or coincide with the rest, and so every portion possesses similar properties. This property satisfactorily seems to give Euclid's idea of the straight line, and in conjunction with Axiom 10 justifies what is the foundation of Euclid's reasoning, namely, the ability to place any two straight lines so as to fit one on the other. Of course, arcs of circles of equal radius partially possess this property, but the fitting together is not possible for all positions of the lines. This meaning of the definition also justifies the Postulates I. and II., showing that the instrument required is a straight-edge. The definition of a plane surface can be illustrated in the ordinary manner, but the importance of the word "any" is often forgotten, as straight lines can be drawn in certain directions on non-planar surfaces such as cones or cylinders. The Euclid definition of an angle is best supplemented by the trigonometrical one derived from the idea of a rotation and which is very closely connected with the process of superposition, and hence in agreement with Euclidean ideas. The limitation of angles to those less than two right angles can be discarded, at any rate so far as to include the "straight angle." The definitions of the right angle, obtuse and acute angles, easily follow. The definitions of the plane figures 15-23 call for little remark, nor should the two methods of classifying triangles. The rest of the definitions are best left until Props. 1-26 have been done. Postulates I. and II. demand the use of a straight-edge, and Postulate III. the use of the compasses with the imperfect screw joint, a limitation that can be dropped after Prop. 2 has been demonstrated.

The modern division of the axioms into eight general and four geometrical axioms is a distinct gain. In dealing with the general axioms, after introducing the signs = > and <, exercises of the type below are useful.

What conclusions can be drawn from the two statements?

(1) A=B	B=C
(2) A+C=B+D	C=D
(3) A+C>B+D	C=D

In fact, let the axioms be learnt in symbolical as well as a verbal form.

Of the four geometrical axioms the equality test and the singular nature of the straight line joining two points need no further remark. Axiom 11 may be pointed out as capable of being deduced from Axioms 7 and 8. Axiom 12 is best left until the theory of parallels is reached.

The literal notation of our Euclids presents a difficulty to some beginners, especially that of an angle, and should be well practised before propositions are commenced.

In dealing with the earlier propositions, the lines and angles may be coloured and referred to by that colour, and the use of coloured chalks in figures on the blackboard for *vivâ voce* work may be even at a much later stage combined with the literal notation as a guide to the eye. Enunciations need not be learnt by heart, it is here as a rule the "stilted language" still lingers; it should be stated in as many forms as possible by the teacher, who should afterwards be satisfied with a correct statement in the pupil's own words. It will be sufficient to remember only the numbers of the more important and often quoted propositions such as I. 4, 5, 8 and 26. The text also must be freely illustrated by the exercises and riders which modern editors add, and at first these should be almost direct applications of the propositions or group of propositions in question, hence an edition in which such exercises occur is to be recommended. For revision purposes a second set not so obviously grouped is useful, and in this many editors now insert a number of supplementary propositions of utmost importance. The teaching of a proposition should be conducted in three stages, (1) the explanation with a variety of figures and comments on important points, (2) the first recital which should be *vivâ voce* and followed by exercises also *vivâ voce*, (3) the last stage, which should be the writing out again, accompanied by one or two of the exercises done at the second stage, and fresh ones also. The use of symbols should be insisted on. Prop. 1 calls for little remark. Props. 2 and 3 may well be put aside on a first reading, that is, the limitation in Postulate III. dropped. In Prop. 4 "angles opposite to equal sides" wants illustrating by using a figure with one triangle reversed. The use of the alternate method for Prop. 5 is only shirking a difficulty which will appear later, probably in Prop. 16. The ordinary proof is simplified if written out in symbols and the proof divided into four sections, thus :—Sect. I. Two triangles, use Prop. 4, giving the three deductions. Sect. II. Subtraction of equal lengths. Sect. III. Two triangles, Prop. 4 gives two deductions. Sect. IV. Subtraction of equal angles. The use of coloured chalk at the first demonstration is helpful to mark the results of each stage.

The division of the proof of a proposition into its component sections and giving the pupil short headings as indicated above is often useful, and the pupil soon does this for himself. In written work care should be taken that premises and conclusion are well marked by proper spacing.

The point to be brought out in Prop. 6 is the fact that the *areas* of the two triangles are equal, and that in applying Prop. 4 they are reversed to one another as regards position. The nature of a converse proposition would here be discussed. Prop. 7 can, if thought necessary, be omitted at first, substituting the equivalent statement that two circles do not intersect in two points on the same side of the straight line joining their centres, which is easily grasped from practice with the use of compasses. If omitted, the alternative form of Prop. 8 should be learnt, but on a second reading both Prop. 7 and the usual

form of Prop. 8 must be done, remembering that it is methods more than facts that we are trying to teach. The same remark applies to most alternative proofs. The wording of the end of the usual form of Prop. 8 should not be allowed to degenerate into a mere catch phrase, as it is often allowed to do, but the reference to Prop. 7 should be clear.

The four constructions, Props. 9-12, should also be given in the form adapted to ruler and compass work, in which isosceles triangles take the place of equilateral, the proofs remaining unaffected. On these constructions can be based many experimental exercises which should not be omitted. Prop. 13 should be stripped of its old cumbersome and unnecessary steps. In Prop. 16 it is useful to distinguish the two internal angles, one is opposite the side produced. Prop. 20 does not seem unnecessary unless the second form of the definition of a straight line is assumed. Props. 22 and 23 add two more constructions to our geometrical drawing, the latter generally modified by having equal lengths first cut off the arms of the given angle and so saving one circle of construction. In Prop. 24 "of the two sides DE.EF let DE be the one, &c.," should be brought to the pupil's notice and the demonstration that it ensures the required consequence gone through. One part of Prop. 26 should also be proved by superposition.

Euclid's definition of parallels should now be given and Props. 27 and 28 followed by Prop. 31, which together justify the construction of parallel lines by means of set squares which can be added to the other two instruments. The remaining definitions can now be done, and their parts illustrated by constructing such figures to given measurements, but the methods adopted should follow the definitions.

Axiom 12, or one of its equivalent forms, must be accepted as a fundamental property of the Euclidean plane. Playfair's form should be given, and the identity of the two shown. To Prop. 34 as a corollary the diagonals should be proved to bisect each other. In Prop. 35 the double wording "whole or remainder, &c.," may well be avoided by taking the two equal lengths each in turn from the whole, and in Prop. 36 the necessity of proving the figure formed by the construction to be a parallelogram should be pointed out. After Props 35-41 are finished the method of measuring rectilineal areas should be discussed and illustrated by numerical examples. Props. 46, 47 and 48 may be done next, the others being left until later, but when pupils have reached so far the difficulties of 42-45 are not very formidable. With regard to Prop. 48 it is as well to have learnt as a corollary that if the square on one side is greater or less than that on the other two, the latter include an obtuse or acute angle which can be proved in a similar manner, using Prop. 25 instead of Prop. 8.

From Prop. 48 the length of the perpendicular from one angle of a triangle on to opposite sides can be worked out in terms of the side, a simple literal equation only having to be solved, if the length of one of the segments of the base is taken as an unknown, and the two values of the perpendicular equated; hence the formula for the area, $\sqrt{s\,(s-a)\,(s-b)\,(s-c)}$, can be proved.

The first book once digested, the rest of the books generally read should present little difficulty. III. 1-34 is sometimes read before Book II., as it furnishes further additions to the practical constructions. In Book II. the alternative forms of 9 and 10 are preferable, if only as an exercise on 4 and 7. The enunciations of 4, 5, 6 and 7 must be learnt, as they are often quoted, and their algebraical analogues noticed.

Lastly, Book V. should not be neglected, as it so often is. The representation of the ratio as the scale and the illustration by it of Euclid's definition of equal ratios or proportion should be taught, and also the measure of the ratio of two commensurables by a fraction deduced. The propositions, although not often required for examination purposes, have great educational value, and one of the most just attacks on the modern use of Euclid's Elements has been on this neglect of them.

F. W. RUSSELL.

University College School,
July 29th.

The Teaching of Geometry.

MAY I be allowed to offer a few remarks on the subject of the teaching of Euclid? I cannot claim length of experience, and most of my experience has been at the Owens College, where comparative beginners in the subject have the advantage of a fairly mature age, and a power of reasoning not generally found in boys at school. A boy at school is too ready to accept the dictum of a master on points connected with mathematics as final, whether substantiated or not; and so to use faith to the exclusion of intelligence. Erroneous definitions, for instance, or invalid proofs given possibly in a "Euclid made easy" spirit, are accepted by the boys, and pave the way for hours of labour in their eradication. The responsibility of a master who first introduces boys to Euclid is great, and his difficulty is also great whether Euclid's definitions and logical sequence be retained or discarded as a basis for instruction.

If Euclid was set aside (though I would not venture to question Prof. Minchin's statement that it would conduce to greater intellectual knowledge of geometry), the difficulties of the master in question would be immeasurably increased. He would have to build up a logical sequence in geometry for himself, and teach it without the aid (at present) of a text-book, to which a boy will always turn in preference to notes when he wishes to refresh his memory. If all boys could take notes in such a way that they were easily readable, and so convenient for reference, this particular difficulty would subside; but very few boys, unfortunately, have this gift, and we schoolmasters must cater for boys as they are, and not as they should be. But the greatest difficulty of all would be in connection with examinations. If every teacher of geometry is at liberty to take any logical sequence that he pleases, how can any examination paper be set which will meet the requirements of more than the class of the individual teacher, and how can any examiner be sure that the reasoning in an isolated theorem is in accordance with the logical sequence taught to the examinee? So long as we have Euclid as our basis for reasoning, whether we adhere to his phraseology, &c., or substitute our own, we have a ground on which we can meet examiners, and a definite course of geometry. So that the limits of what is offered or required for an examination can be clearly stated, and when we depart from Euclid's order of propositions we can point out to the boys that it is a departure, and must be justified in an examination.

I strongly disagree with the principle that mathematics should be taught in one way, and "crammed" for examination in another, and the thin edge of this principle seems to me to appear in Mr. Robjohns' letter.

Mr. Robjohns asks for a working definition of an "angle." I fancy that the ordinary definition used in trigonometry is quite applicable to elementary geometry, viz., "the angle contained between two intersecting lines is the quantity of rotation necessary to bring one of them into the position of the other." This has the advantage of requiring no contradiction when a boy begins trigonometry, and also of paving the way for the conception of positive and negative angles; it also allows of angles greater than two right angles, and therefore simplifies Euclid III. 22 among other propositions.

A. P. MCNEILE.

Bury Grammar School, Lancs.
July 26th, 1899.

IN one of the letters published on this subject the working definition of an angle was asked for. My own experience is that no definitions can convey an idea in advance of the precepts (sense impressions) which are the particulars which the definition combines. There are three steps of perception which go to make the concept of an angle.

(1) The angle as a corner, both of a solid and of a plane surface, may be shown as sharp, square and blunt, with cut soap and cut paper.

(2) The angle as defined by the edges of the cut plane surface, and its representation by lines.

(3) The division of the circle into 360°, and the angle as formed by a revolving radius.

Boys who have thus acquired the idea of the *thing* can, I find, thus readily grasp any suitable form of *words* which defines it.

S. DE BRATH.

Grande Rocque School,
Guernsey.

On a Lingua Franca.

THE discussion being carried on in various papers regarding the need of a common language, understood, as Latin once was, throughout all the civilised world, will I hope draw attention once more to the great impediment which stands in the way of English being that common language.

There are in English almost no declensions and genders to learn; the verbs have but few terminations, and the syntax is extremely simple. This gives English a great advantage over every other language, and were it not for our absurd spelling, would make it the most easy of adoption.

Miss Soames, who spent much in the cause of spelling reform and published many books in conjunction with continental philologists, has left in the hands of her trustees a considerable sum of money, which they are expending for a propaganda. It would be well if educational papers would promote discussion and bring the subject before teachers.

It seems marvellous that England should still spend millions on keeping up the worship of an idol, admired only in its insular home and not even venerable, as it was set up only at the time of the introduction of printing. Those who have taught foreigners English know that the language could be acquired in an exceedingly short time were it not for our extraordinary "orthography," or rather "heterography." Some defend our spelling for philological reasons; but it obscures philology, and in many instances substitutes the false for the true. It is unanimously condemned by philologists; I name those best known in England. Professor Max Muller pronounces it "a national misfortune," and has written an article against it. Professors Sayce and Skeat, Ellis and Sweet, Dr. Murray, editor of the "Etymological Dictionary," the distinguished linguist Pagliardini, and many others condemn it.

(1) Educationally it is a great hindrance; at a time when the developing intelligence of the child is rising out of mere empiricism, and seeking for some scientific law, he is baffled at every turn, and taught that there is no law or order in the representation of sounds. As Miss Soames writes, "Whilst we aim at teaching all other subjects on some well-planned method, the sounds of language are left to be picked up anyhow, by mere imitation and sheer force of memory, so that setting aside students of shorthand, it is probable that not one person in a thousand could enumerate the principal sounds of our language, or of any other, or has any clear conception of the principles on which they should be classified."

I give two examples only—To represent the sound *t* we employ thirteen different symbols—t, th, tt, ed, tw, bt, ct, pt, cht, phth, z, te, tte, as shown in the following words—ten, thyme, better, stopped, two, debt, indict, receipt, yacht, phthisis, mezzotint, caste, gazette.

We have nineteen different symbols for *n*—in, net, dinner, opening, pardoning, gnaw, John, know, mnemonics, pneumatics, puisne, Lincoln, Wednesday, riband, ipecacuanha, gunwale, compter, borne, Anne, coigne. The variety of letters used for representing one vowel sound are even more numerous.

(2) As Dr. Gladstone has shown, in his book on spelling reform, hundreds of thousands are spent, and years of children's lives wasted in teaching them what is useless and unnecessary. According to a Liverpool schoolmaster of great experience, it takes from six to seven years to learn the arts of reading and spelling with a fair amount of intelligence, *i.e.*, about 2,000 hours. Mr. Ellis, who did so much for education, writes, "Careful experiments have established that pupils may be taught to read books in phonetic print in from ten to forty hours, and that when they have attained fluency in reading ordinary print, the pronunciation is much improved, the interest in study kept alive, and a logical training of enduring value given . . . . and they acquire the art of ordinary spelling more readily than those instructed on the old method.

It is objected that books in the old spelling would be illegible by those who have learned to read phonetic books. But this is not so—a shorthand writer has no difficulty in reading longhand. The objection that printers would have to go to the expense of two sets of type is surely a most insignificant one. They have already a great variety of foreign and English types, and a few new letters would add but little to expense, and on the other hand the number of letters required to print a page in phonetic type would be at least twenty per cent. less than are now required.

(3) The real danger which every year's delay makes more imminent is that the language of England and her colonies will cease to be the same. Dialectic varieties are arising, which, if unchecked by phonetic symbols corresponding with speech, will develop into different languages. The longer we delay the greater will be the difficulty of agreeing upon a common notation. At present the differences of pronunciation in England and the colonies, or the States, are slight, but those who have heard the English of the States spoken by the children of German immigrants will recognise the danger.

The increased demand for shorthand writers has forced upon many a phonetic alphabet. I earnestly hope that a Royal Commission may be appointed to deal with this important matter. Every year the difficulty increases. The societies for spelling reform are too democratic; each member has his own pet system, and few have a large enough outlook to sacrifice some immediate advantages to ultimate gain. The Commission should enlist the services of philologists and linguists of different nationalities, and if some universal alphabet could be adopted, such as that proposed by Pagliardini, or the *Société Internationale*, or Melville Bell, the acquisition of foreign tongues would be immensely facilitated.

Germans and Italians have a phonetic alphabet, and they have time to acquire foreign tongues, but Englishmen and Frenchmen have not time to acquire them in addition to their own spelling; either language from its simple structure might become a world-wide tongue, and there would be no need of Volapuk. Let us hope that some day we may be delivered from a tyranny which seems to demand a revolution.

DOROTHEA BEALE.

Cheltenham Ladies' College.

OUR CHESS COLUMN.

No. 8.

THE prize winner in the July competition is :—

E. E. Middleton,
Cleveland House School,
Salisbury.

The following also sent correct solutions :—N. J. Chignell, N. B. Dick, G. C. Fry, A. V. Poyser, A. D. Punchard. R. G. Weil, N. P. Wood.

The mate, which is very ingenious, is as follows :—

WHITE.	BLACK.
	1. Kt—Q5 (ch.)
2. K x R.	2. Kt—K6 (ch.)
3. K—Bsq.	3. Kt—K7 (mate.)

The leaders in the monthly competitions are :—N. P. Wood, 6; N. B. Dick, 5; A. V. Poyser, 5; A. D. Punchard, 5.

The scores in the Inter-School Tournament are :—

School.	Wins.	Losses.	Draws.	Points.
Nonconformist Grammar School, Bishop's Stortford	0	2	0	0
The College, Cheltenham	0	0	0	0
New College, Harrogate	0	0	0	0
Merchant Taylors' School, London	2	0	0	2
Grammar School, Manchester ...	0	0	0	0
High School, Trowbridge	1	1	0	1

The following is a game between Merchant Taylors' School, London, and High School, Trowbridge :—

Danish Gambit.

WHITE (M.T.S.).	BLACK (T.H.S.).
1. P—K4.	1. P—K4.
2. P—Q4.	2. P x P.
3. P—QB3.	3. P x P.
4. B—QB4.	4. B—QKt5. (*a*)
5. B x P (ch.)	5. K—Bsq. (*b*)
6. Q—QKt3.	6. Q—K2. (*c*)
7. P x P.	7. Q x P (ch.)
8. Kt—K2.	8. Q—K2.
9. B x Kt.	9. B x P (ch.)
10. QKt x B.	10. P x B.
11. Kt—Q5.	11. Q—Qsq.
12. Q—KB3 (ch.)	12. K—Ksq.
13. Q—K4 (ch.)	13. K—KBsq.
14. Q—KB5 (ch.)	14. K—Ksq.
15. B—KKt5.	15. Q x B.
16. Q x Q.	16. Kt—QB3.
17. R—QBsq.	17. P—Q3.
18. R x Kt. (*d*)	18. K—Q2.
19. R x QBP (ch.)	19. K—K3.
20. Kt—KB4 (mate.)	

NOTES.

(*a*) Kt—KB3 is the best move, and Black should soon get the better game.

(*b*) K x B was surely better, in spite of Q—Kt3 (ch.), recovering the piece. P—Q4 is then Black's best move.

(*c*) Black might, perhaps, have played with safety P x P or P—QB7 (dis. ch.), when if Q x B, K x B.

(*d*) Of course, if P x R, Q mates. The game has been brilliantly conducted on the part of White, but the Danish Gambit generally means a win for Black, provided that the third pawn be not taken.

My young friends will probably welcome a little easier task for the holidays than usual. They will not find the following too difficult, I hope :—

WHITE.	BLACK.
1. P—K4.	1. P—K4.
2. P—Q4.	2. P x P.
3. P—QB3	3. P x P.
4. B—QB4.	4. P x P.
5. QB x P.	5. Q—KKt4.
6. Kt—KB3.	6. Q x P.
7. B x KBP (ch.)	

Now, why would it be injudicious for Black to play 7 K x B? There is one very good reason! Send in your answer before the 30th inst. The prize offered is a pocket chessboard, or book of equivalent value. One of our prize-winners writes:—"The pocket chessboard is *excellent*." I shall award more than one if there is a sufficient number of entries. I am glad to notice that competitors are displaying much greater accuracy in recording their moves than was the case at the commencement of the year. One card, received from Repton, bore no name.

I want these competitions to become a feature of school chess next term, and in the September number I shall have some suggestions to lay before secretaries.

RULES.

I.—Write on postcards only.

II.—Give name, date, and school address.

III.—Address all communications to

The Chess Editor,
THE SCHOOL WORLD,
St. Martin's Street,
London, W.C.

The School World.

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ON THE TEACHING OF PROPORTION FOR USE IN GEOMETRY.

By M. J. M. HILL, M.A., D.Sc., F.R.S.
Professor of Mathematics at University College, London.

THE difficulty of understanding the theory of Ratio and Proportion is one of the greatest difficulties encountered by the beginner in Geometry. Euclid treated the subject in his Fifth Book, but his treatment is so difficult that it has been generally neglected. The neglect of this treatise, which, though not above criticism, is probably the most masterly of Euclid's works, is a curious phenomenon in the history of mathematics. The more I have studied it the greater has become my admiration for what Euclid accomplished, in spite of his lack of a convenient algebraic notation. It contains, with a single exception to be noticed below, all the most important theorems in the theory of ratio. Professor De Morgan says, on the first page of his Treatise on the Connexion of Number and Magnitude, that it, and the logic of Aristotle, are the "two most unobjectionable and unassailable treatises" which were ever written. In venturing, therefore, upon a material criticism of this work, I know that there is recorded against me an opinion of very great weight. It is only after an experience of teaching the subject extending over nearly twenty years that I write this article to explain why it is so difficult to understand the book, and how the argument may be simplified without departing from Euclid's principles.

The book is an algebraic, not a geometric treatise; but it differs from the corresponding portion of elementary algebra usually taught in schools by being applicable to magnitudes which have no common measure. Its principles, as I hope to show in this paper, may be presented in a form of extreme simplicity, and the proofs of the propositions are far easier than many of those in the Third, Fourth and Sixth Books, which present no insuperable difficulty to beginners. At present, the beginner in geometry who, having mastered the first four books of Euclid, attempts to understand the fifth, meets with difficulties which to him are overwhelming. His teacher may succeed in making him understand the meaning of each individual proposition, if he uses an edition in which an algebraic notation is employed, but seldom succeeds in making him grasp the argument as a whole. More probably he gives him a counsel of despair, and says that no one now reads Euclid's proofs, but as the propositions are required he will supply him with simple algebraic proofs of them. Such proofs are valid only when all the ratios concerned are ratios of magnitudes which have a common measure; and such a teacher will even then probably use Euclid's test for the sameness of two ratios (the fifth definition of the Fifth Book) in two important propositions, the 1st and 33rd of the Sixth Book; but whenever he requires a property of ratio in any of the other propositions, he supplies a so-called algebraic proof. This mode of treating ratio, partly in Euclid's manner and partly from another point of view, necessarily results in confusing the mind of the beginner, and in preventing him from ever grasping the subject properly.

Let us consider, then, what it is that makes Euclid's Fifth Book so very difficult. Passing over the difficulty of notation, already noticed, we come to his definition of ratio. It furnishes no satisfactory answer to the question, "What is a ratio?" and it is of such a nature that no indication is afforded of the answer to the still more important question, "How is a ratio to be measured?" When an answer to the latter has been obtained, it is not necessary to trouble about the former. As there is no agreement as to the proper way in which this definition should be translated, and as Euclid makes no use of it in his argument, the definition itself need not detain us.[1]

But it is worth while to try to get at his view of ratio. He tells us indirectly that a ratio is a magnitude, because in the seventh definition he states the conditions which must be satisfied in order that one ratio may be *greater* than another. Now the word "greater" can only be applied to a magnitude. Hence Euclid must have considered a ratio to be a magnitude.[2] To this conclusion it may be objected that if Euclid thought that a ratio was a magnitude he would not so constantly have spoken of the *sameness* of two ratios, but of their *equality*. One can only surmise that, whenever it was possible, he desired to leave open all questions as to the nature of ratio, and to present all his propositions as logical deductions from his fundamental definitions, which are the 5th, 7th, 10th, and the one marked A by Simson.

[1] De Morgan says, l.c., page 63:—"Ratio is relative magnitude." This seems to me to express Euclid's meaning.

[2] Some writers maintain that the word "greater," as applied to ratio, is not used in the same sense as when it is applied to magnitudes. This seems to make matters far more difficult.

Yet the question as to the nature of ratio is one which forces itself on the careful reader, and is a source of the greatest perplexity, culminating when he reaches the 11th and 13th Propositions.

The 11th Proposition is in effect this :—

If A:B is the same as C:D,
and if C:D ,, ,, E:F,
then A:B ,, ,, E:F.

Now, if a ratio is a magnitude, this only expresses that if X=Y, and if Y=Z, then X=Z.

As this result follows from Euclid's First Axiom, one does not at first see the necessity of a proof.

But Euclid's procedure amounts to this :—

If A,B,C,D are four magnitudes satisfying the conditions of the Fifth Definition, and if C,D,E,F are four magnitudes also satisfying the conditions of the same definition, then he proves that A,B,E,F also satisfy the conditions of that definition.

Remarks of a somewhat similar nature apply to the 13th Proposition.

I come now to

The First Great Difficulty,

which arises out of the fact that Euclid furnishes no explanation of the steps by which he reached his fundamental definitions. To write down a definition, and then draw conclusions from it, is a process which is useful and sometimes indispensable in Advanced Mathematics, but it is wholly unsuitable for elementary teaching. It seems not unlikely that Euclid reached his fundamental definitions as conclusions to elaborate trains of reasoning, but that finding great difficulty in expressing this reasoning owing to the absence of an algebraic notation, he preferred to write down his definitions as the basis of his argument, and to present the propositions as logical deductions from the definitions. Apparently he has left no trace of the steps by which he reached his fundamental definitions, and all that we can do is to endeavour to reconstruct a path which can be followed by beginners from ideas of a simpler order to those on which his work is based.

The most vital of his definitions is the Fifth, on reaching which the beginner, who has mastered the first four books of Euclid, experiences a sense of discontinuity. He knows nothing which can lead him directly to it, he has no ideas of a simpler order with which to connect it; and he is therefore reduced to learning it by rote. His teacher may show him that it contains the definition of Proportion given in treatises on Algebra; but even with this assistance it remains difficult for him to remember its details. He may and frequently does learn to apply it correctly in demonstrating the 1st and 33rd Propositions of the Sixth Book, but that he really understands it I do not believe; and my belief is founded on a long experience both in teaching and examining.

Far more difficult than the Fifth Definition is the Seventh; whilst the Tenth and Definition A, though not so difficult as the Fifth, are rarely grasped by the beginner, for the reason already indicated.

The Second Great Difficulty

in the Fifth Book is the indirectness of Euclid's line of argument, which arises in this way. His Fifth Definition states the conditions which must be satisfied in order that two ratios may be the same (or, if ratios are magnitudes, that they may be equal). *If this definition is a good and sound one, it is evident that it ought to be possible to deduce from it all the properties of equal ratios. This is, in fact, the case.* But Euclid does not always base his proofs of properties of equal ratios on this Fifth Definition alone. He states in his Seventh Definition the conditions which must be satisfied in order that one ratio may be greater than another, and the only use he makes of this definition is to prove properties of equal ratios; *i.e.*, he uses the Seventh Definition where the Fifth alone is necessary. This results in making the proofs indirect and artificial, and consequently difficult. In pointing this out I do not assail Euclid's logic. He is perfectly consistent. His propositions are logical conclusions from his definitions. Why Euclid chose so indirect a path to his conclusions as that which he has actually followed, I am unable to explain.

If the Seventh Definition be avoided, not only does no inconvenience result, but it is possible to get rid of the latter part of the 8th Proposition, and of the whole of the 10th, 13th, 14th, 20th and 21st Propositions of the Fifth Book, and to base the proofs of the remaining propositions which deal with equal ratios wholly on the Fifth Definition.

As it would have been of little use to write this criticism, if I were not prepared with a remedy, I proceed to sketch the way in which I teach the subject to those who have mastered the first four books of Euclid. I assume no knowledge whatever which they have not acquired, and my treatment is wholly within their reach, so that I have succeeded, during the two or three years which have elapsed since I discovered the method I am about to explain, in making the contents of the Fifth Book intelligible to my students, and I have no doubt that any teacher who adopts it will be able to arouse the interest and lighten the work of his pupils.

I arrange my explanation in sections.

I. *Notation.*—Magnitudes are always represented by large letters, whilst whole numbers are represented by small letters.

II. *Propositions dealing with magnitudes and their multiples.*—Propositions 1, 2, 5 and 6 of the Fifth Book of Euclid deal wholly with magnitudes and their multiples, not with ratios. They present no difficulty to anyone who has an elementary acquaintance with algebra.

Instead of Prop. 3 it is convenient to take the following :—

$$r(sA) = rsA = srA = s(rA).$$

To these I add the following :—

$$A \gtreqless B \text{ according as } rA \gtreqless rB, \text{ and conversely.}$$

III. *Axiom.*—It is convenient to take the following as an axiom :

Given two unequal magnitudes of the same kind A and B, then if A be greater than B, a whole number n exists such that nB is greater than A.[1]

This axiom is sometimes called the Axiom of Archimedes, but Euclid used it in the 8th Proposition of the Fifth Book, and it is implied in the Fourth Definition of that book, and elsewhere.

IV. *The earlier part of Euc. V.*, 8.—There remains one Proposition dealing with magnitudes and their multiples which is of extreme importance. It is equivalent to the earlier part of the 8th Proposition of Euclid's Fifth Book, and is as follows:—

If A, B, C are magnitudes of the same kind, and A greater than B, then whole numbers n and r exist such that

$$nA > rC > nB.$$

The proof is as follows:—

Since A and B are magnitudes of the same kind as C, and A is greater than B, therefore A − B is a magnitude of the same kind as C. Hence by the axiom of the last section a whole number n can always be found such that

$$n(A-B) > C.$$
$$\therefore\ nA > nB + C.$$

Now let tC be the greatest multiple of C which does not exceed nB.

Then either (i.) $nB = tC$, or (ii.) $(t+1)C > nB > tC$.

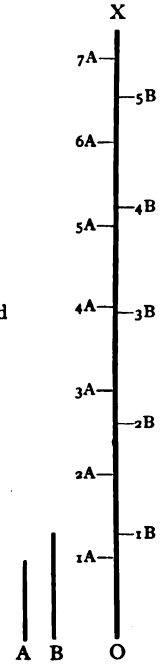
(i.) If $nB = tC$
$nA > tC + C$
$nA > (t+1)C > nB$.

(ii.) If $(t+1)C > nB > tC$
Then $\because nA > nB + C$
$\therefore nA > (t+1)C$
$\therefore nA > (t+1)C > nB$, as before.

If now the integer $t+1$ be expressed by the integer r, then

$$nA > rC > nB.$$

V. *Comparison of two magnitudes of the same kind.*—If it be desired to compare two magnitudes of the same kind with one another, for example two lengths A and B, the most direct method is the following:—



Take a fixed point, O, on a straight line, OX. Mark off on one side of it, starting from O, the successive multiples of A; and on the other side of it the successive multiples of B.

Now one of two alternatives is possible.

Either some multiple of A is exactly equal to some multiple of B, or no multiple of A is ever equal to any multiple of B.

If some multiple of A, say rA, is exactly equal to a multiple of B, say sB, then suppose B divided into r equal parts. (It is assumed that this can be done.) Call each part G.

$$\therefore\ B = rG.$$
$$\text{but } rA = sB = s(rG) = r(sG).$$
$$\therefore\ A = sG.$$

In this case the magnitudes are said to have a common measure, G; and the comparison of A with B is reduced to the comparison of sG with rG.

In the second alternative the comparison of A with B cannot be reduced in the same way exactly, it is only possible approximately. Suppose it to be found that rA is nearly equal to sB, then the comparison of A with B is nearly the same as that of sG with rG.

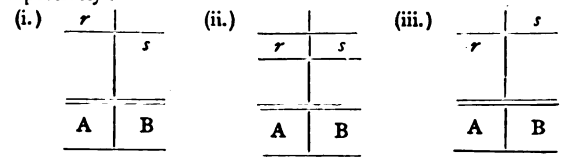
[1] On this it may be observed that if one value of n exists which makes nB greater than A, all greater values of n will also make nB greater than A.

In either alternative the order of succession of the multiples of A and the multiples of B in a single series in ascending order of magnitude is a matter of importance. The next thing to be done, therefore, is to devise a convenient notation for expressing this order.[1]

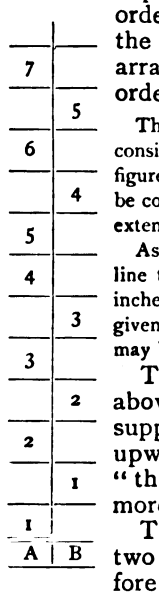
VI. *Graphical Representations of certain Algebraic Statements.*—Let A and B be any two magnitudes of the same kind, and r and s any two integers, then rA and sB are two magnitudes of the same kind, and one of the following alternatives must hold.

(i.) $rA > sB$; (ii.) $rA = sB$; (iii.) $rA < sB$.

These are conveniently represented by the following figures respectively:—

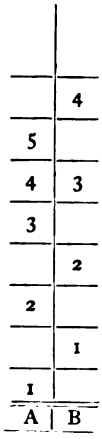


VII. *Relative Multiple Scales.*—This notation renders it possible to represent graphically the order in which the multiples of A and the multiples of B succeed each other if arranged in a single series in ascending order of magnitude.



Thus taking the magnitudes A, B considered in section V., we have the figure on the left, which of course may be continued indefinitely upwards to any extent.

As another example let A represent a line three inches long and B a line four inches long, the order of succession is given by the figure on the right, which may be continued indefinitely upwards.



The portion of these figures above the horizontal double line supposed extended indefinitely upwards is called in each case "the relative multiple scale," or more briefly "the scale" of A, B.[2]

The relative multiple scale of two magnitudes consists therefore of two columns, *each* column containing all the integers 1, 2, 3, ... in their natural order, and the rule for determining the position of any integer r in the first or left-hand column with regard to any integer s in the second or right-hand column is given by section VI. above, viz:—

If $rA > sB$, then r is above s.
If $rA = sB$, then r and s are on the same level.
If $rA < sB$, then r is below s.

By this rule the position of every integer in each column is fully determined, and the whole scale, which is of infinite extent, may therefore be supposed known. The fact that the scale is of infinite extent will be found to present no difficulty.

[1] If the magnitudes to be compared are not straight lines, though it is not possible to draw a simple figure as above, it is still possible to consider the order of succession of the multiples of the two magnitudes.

[2] In teaching I give several examples of relative multiple scales, for example the scale of the side of a square and its diagonal, and the interest of one's pupils is excited by showing how careful drawing will lead to the determination of the first and second decimal places in the square root of 2.

The term "relative multiple scale" was first used by Professor De Morgan in his treatise on the Connexion of Number and Magnitude (1836), but the notation here adopted is substantially the same as one suggested to me by Professor Love.

VIII. *Connection between Relative Multiple Scales and Euclid's Fifth Definition.*—With the notation explained in the last section, the conditions which must be satisfied in order that two scales may be the same are seen to include the conditions of Euclid's Definition, and there is a real advantage in saying that the satisfaction of the conditions ensures the sameness of the scales, because a scale is a thing which has been completely defined. If we follow Euclid, and say that the satisfaction of the conditions ensures the sameness of two ratios, then we can hardly avoid the ever-present question, "What is a ratio?"

I believe, therefore, that it will be recognised in time that, inasmuch as the idea of ratio is not needed for the proof (or even for the convenience of the proof) of any fact demonstrated in Euclid's Fifth Book, the natural order of ideas requires that the introduction of the idea of ratio should be postponed to a somewhat later stage than is usual.

IX. *The two forms of the conditions for the Sameness of two Scales.*—Let us now look more closely into these conditions.

If the scale of A, B be the same as the scale of C, D, let us take any integer r in the first column of either scale, and any integer s in the second column.

If r be above s in one scale, it must be above it in the second scale.

If r be on the same level as s in one scale, it must be on the same level in the other scale.

If r be below s in one scale, it must be below it in the other scale.

These conditions must be satisfied for every value of r and every value of s.

If therefore	$rA > sB$	then must also	$rC > sD$	(1)
,,	$rA = sB$	,, ,,	$rC = sD$	(2)
,,	$rA < sB$	,, ,,	$rC < sD$	(3)
,,	$rC > sD$	,, ,,	$rA > sB$	(4)
,,	$rC = sD$	,, ,,	$rA = sB$	(5)
,,	$rC < sD$	,, ,,	$rA < sB$	(6)

Of the observations which may be made on the above six statements, the following two are the most important:—

(I.) If (1), (2) and (3) hold, then the truth of (4), (5) and (6) follows as a logical consequence, and the relative multiple scale of A,B is the same as that of C,D. This is equivalent to Euclid's Fifth Definition.

(II.) If (1), (3), (4) and (6) hold, then the truth of (2) and (5) follows as a logical consequence, and the relative multiple scale of A,B is the same as that of C,D.

So far as I know, this latter form of stating the conditions for the sameness of two relative multiple scales (or two ratios) was first given by Stolz in his lectures on Generalised Arithmetic.[1] In conjunction with the earlier part of Euclid V. 8 (see Section IV. above), it is a proposition of great value. I shall refer to it as the second form of the conditions for the sameness of two scales.

(To be continued.)

[1] "Vorlesungen über Allgemeine Arithmetik." Part I., p. 87. (1885.)

THE TEACHING OF ENGLISH LITERATURE.

By J. A. NICKLIN, B.A.
Late Scholar of St. John's College, Cambridge; Member's Prizeman for English Essay.

RICHARD II.

I.—The Plot of the Play.

WRITING in a collection of "Essays on Secondary Education," Mr. Beeching has sketched, from the point of view of an examiner, what he considers to be the correct method of teaching English literature. I propose to attempt to apply Mr. Beeching's method to the play of "Richard II.," a play which has been set for the Cambridge Junior Local Examination for December, 1899. In the present paper I propose to deal broadly with the plot of the play, trying to bring out into relief Shakespeare's general conception of his subject. In a second paper I hope to indicate the lines on which the analysis of the principal characters may be conducted by students for themselves. In a concluding paper I would give a somewhat detailed examination of the dramatic construction.

In criticism intended for beginners with little knowledge and undeveloped taste, it is obviously wiser to ignore defects and faults where they do not force themselves into prominence. It is a valuable training for the advanced student of literature to be set to find the limitations of a great genius, and to consider how far the author has realised his intention. But with schoolboys the difficulty is to induce them to believe that there is really a meaning in the work which is put before them, and that a play is not a haphazard assemblage of tirades, with some stage directions interspersed. For the schoolboy, therefore, Mr. Beeching does well to make it axiomatic that "everything is said with a purpose, and reveals character."

The play of "Richard II." is dominated by two interests, the historic and the personal. Its personal interest is the tragedy of a man born to power, taught to regard his person as sacred and his will irresistible, suddenly confronted by a force against which, however much he may challenge its right, he can do nothing, and before which he is obliged to humble himself. The historical interest consists in this, that it is the prelude which gives the note and the explanation to the civil wars which destroyed the old nobility. "Richard II." is primarily, therefore, a study of **the situation of a deposed king** and **the causes of civil war.** In the first reading of the play those points are to be specially noticed which **explain the weakness in Richard's character,** and those which are **prophetic of the Wars of the Roses.**

The play opens with a royal council at Windsor, where King Richard has to hear the accusations brought by his cousin, Henry of Hereford, against the Duke of Norfolk. The turbulent spirit of the mediæval barons is conspicuous in the fierce re-

crimination of Mowbray and Hereford. Richard is courtly and deferential to his uncle, old John of Gaunt, and seems to balance justice with an even hand. Still, it is to be noticed that Hereford, while laying most stress on Norfolk's conduct to Gloucester (for which the king in reality was responsible), puts first in his indictment, as likely to move the king, the charge of having misappropriated money of the royal exchequer. The king seems for the moment affected by this, addressing Norfolk formally and coldly as "Thomas of Norfolk." (Act I., Scene I.)

In the second scene the murdered Gloucester's widow urges Gaunt to avenge his brother, and prays that Hereford's spear "may enter butcher Mowbray's breast." Gaunt rejoins that it is the king, God's "substitute and deputy," who caused Gloucester's death. *Heaven must avenge it.*

Then comes the day of combat at Coventry, when Richard, just as the champions are about to engage, throws down his warder, and, after deliberation with his council, banishes Norfolk for life, and Hereford for ten years, which are immediately reduced to six, out of compassion for Gaunt. The reason given for the sentence is lest "grating shock of wrathful iron arms might from our quiet confines fright fair peace,"—in other words, to avoid the danger of civil war. Notice the tragic irony; since it was Hereford's banishment that eventually produced Richard's fall.

A scene at court between Richard and his favourites shows us the deterioration of the king's character produced by the greed for money which his pleasure-loving and extravagant life has fostered. He rejoices to hear of Gaunt's approaching death, because he intends to seize his property. A note of danger is struck in the observations of the courtiers on Bolingbroke's popularity. We are carried from the frivolous court to the death-bed of old Gaunt. The gloomy and foreboding words which lament the state to which England has been brought by the young king's prodigality seem to have a deeper sense of prophecy than is understood by the speaker himself. Richard arrives with his train of courtiers, and works himself into a rage, *feeling that he is about to commit an unjustifiable act.* Gaunt being dead, and the king having seized his money and lands, the rightful possession of the exiled Bolingbroke, some discontented nobles are secretly informed by Northumberland that Bolingbroke will land and raise the standard of revolt as soon as the king has set out for Ireland.

In the following scene (Act II., Scene II.) the queen is oppressed by a vague presentiment of impending evil, which is quickly realised by the tidings of rebellion. Old York, the king's uncle and keeper of the realm, is full of hurry and confusion, and knows not where to turn. The king's favourites, Bushey, Green and Bagot, are seized with a panic.

The queen's affection for the king, and her friendly relations with the favourites, should be noticed.

Bolingbroke appears before the castle of Berkeley, the nobles rallying to him. He is courteous and insinuating in his address, and constantly affirms that he is only come to ask for the restoration of his estates, and that his loyalty to the king is above suspicion. York encounters him, and takes at first a high tone; then he admits that Bolingbroke has suffered great wrongs; in the end he declares that he will stand neuter, "because his power is weak and all ill left."

At Conway the Welsh, who have been raised by Salisbury to assist King Richard, after waiting for him in vain ten days, disperse, believing the king to be dead. Their belief is confirmed by numerous portents that seem to foretell some fearful change. (Act II., Scene IV.)

Bolingbroke appears before Bristol Castle, with Bushey and Green prisoners. He accuses them, quite unjustly, of having sown dissension between Richard and his queen. They die calling down vengeance on their executioners.

Richard lands on the Welsh coast, and learns of disaster after disaster. His mind is in a tumult. Now he is full of courage and defiance, confident in his divine right, now he is prepared to surrender everything. When he thinks that his friends, Bushey and Green, have made terms with Bolingbroke, he breaks out into savage imprecations.

In the parley between Richard and Bolingbroke, Richard shows a high spirit and kingly bearing. York exclaims, "Behold, his eye, as bright as is the eagle's, lightens forth controlling majesty." He is powerless, however, in the hands of the subtle, cold and inflexible Bolingbroke, who preserves an appearance of the greatest deference, while contriving that the king shall in the end, as if of his own free will, be forced to resign the crown in his favour. A scene in the Duke of York's garden, between the queen and a gardener, prepares us for Richard's deposition, moves our sympathy for the queen, and through her, for Richard, and *puts us in possession of the feeling of common people, who have nothing to do with politics, towards the events that are proceeding.*

The turncoat Bagot, who had been one of Richard's favourites, denounces, in Westminster Hall, Aumerle, the son of York, for having plotted Gloucester's death. There is another furious altercation of nobles, challenges to mortal combat given and taken with the most arrogant and insulting expressions. York comes to announce that Richard has resigned, and Bolingbroke claims the throne. The Bishop of Carlisle protests, accuses Bolingbroke of treason, and prophesies that England will "prove the woefullest division that ever fell upon this cursed earth," if a usurper be allowed to seize the throne. Richard is brought in, to make his surrender publicly; he taunts the treacherous nobles, and does not altogether spare Bolingbroke, but submits to the inevitable. *Bolingbroke remains cold and immovable throughout.* When Bolingbroke and his followers have withdrawn, the Abbot of Westminster invites Carlisle and Aumerle to meet some other nobles at his house and discuss a plot that he has formed.

On his way to the Tower Richard meets his queen. After an affecting greeting, they are in-

formed by Northumberland that Bolingbroke has changed his mind, and Richard must be conveyed to Pomfret, and the queen return to France. Richard foretells that Bolingbroke will soon distrust Northumberland, the "ladder" by which he mounted the throne, and that distrust will soon change to fatal hate. The queen implores in vain to be allowed to follow her husband. Bolingbroke's hypocrisy when he charged the favourites with making a separation between the king and queen thus becomes very evident.

In another scene (Act V., Scene II.), at the Duke of York's palace, York tells his duchess of the entry of Richard and Bolingbroke into London, when the citizens threw dust on the head of the dethroned king. York expresses deep compassion for Richard, but concludes that *the hand of heaven was felt in his overthrow*. He then declares his sworn fealty to Bolingbroke, to whom he is pledged for his son Aumerle's truth. Aumerle enters at this moment. He is gloomy and distracted. His father sees a seal hanging from his bosom, and when Aumerle refuses to show the writing to which it is attached, he snatches it from him. It is a bond between the conspirators (who had fallen in with the Abbot of Westminster's plot) to murder Bolingbroke at Oxford. York is horrified, and rides to Windsor to inform Bolingbroke; but Aumerle is quicker than he, and obtains a promise of pardon from Henry before his father arrives.

Henry, alarmed and exasperated by the conspiracy which has broken out, immediately on his mounting the throne, exclaims, "Have I no friend will rid me of this living fear?" He thinks that while Richard lives he will never be safe from plots.

A knight hears the words, and resolves to carry out his wish. Richard's heart has grown soft in his captivity. He hears music—the only pleasure he has had since his imprisonment—and though the music is bad and jars on him, he feels grateful to the man who thought of giving him the pleasure. A former groom of his stable visits him, and he is touched by the proof of remembrance. But when his keeper refuses to taste the meal that is set before him, he breaks into a fury, curses Bolingbroke, who, he thinks, has devised this new indignity, and beats the man. Exton and armed servants enter at the keeper's cries, and after a hard struggle Richard is killed.

The conspiracy had just been crushed when Henry hears of the murder, so he disowns the "deed of slander," regrets "that blood should sprinkle him to make him grow," and utters many decent expressions of regret.

Teaching of English.—"I do not yet despair of finding in this subject the means of exercising boys' intelligence. But if one would do so, one must utterly abstain from notes and explanations. I have just looked over some answers to questions on Richard II. Wherever the boys could do so, they vomited the note just as they had swallowed it. When there was no note, they showed they had not understood the passage."—R. H. Quick, "Life and Remains." (Camb. Press.)

A TEACHER'S LIBRARY OF ENGLISH HISTORY.

By A. Johnson Evans, M.A.Cantab., and C. S. Fearenside, M.A.Oxon.

In the first number of The School World, our readers will perhaps remember a paper on the defects of much of the history teaching in the Secondary Schools of our country. Much of this falling short is due to the lack of wide reading on the part of those who are entrusted with the subject. And this lack, again, is due to ignorance of the most useful books that are practically available. Every one, we presume, has heard the names of the great historical writers, and knows in a vague way that much has been done in recent years to revolutionise the subject-matter and the methods of history teaching.

But the text-book established in the school for many years has a fascination in its apparent convenience and familiarity. It contains more already than many a teacher remembers of his schoolboy acquisitions. What is this new, unknown field into which the ordinary assistant is invited? What profit will there be in practical every-day work with his classes? How will it improve the percentage of passes at the next Local Examination?

We confess at once that the least useful result of such a plunge into unknown waters will be greater immediate success in examinations. Yet we *have* noted in some recent papers questions which would have been answered better than formerly if the newer results of research and comment had been given in some measure to the candidates. The teacher of Geometry can limit himself to "Hall and Stevens" with far greater safety than the History teacher can limit himself to "little Ransome" or "Oman."

But all prophets make some assumptions, and though the prophetic office which we claim is a very humble one—less than the least—we venture to make the following assumptions:—

(1) That in historical teaching it is desirable not only to train the mind, but also to store the mind with a certain amount of historical information.

(2) That the historical information stored in the mind had better be true than false, had better be coherent than a tangle of unrelated details.

(3) That neither the educational nor the instructional value of history teaching is likely to be great unless the teacher knows very considerably more than he intends even to try to impart to his pupils.

(4) That in order to obtain this broader knowledge the teacher must cut a wider swath in his reading than is cut in the text-book used by his pupils.

(5) That, so long as good school libraries and public libraries are as rare as they still remain, the teacher must depend largely on his own books for supplementary reading.

(6) That it is unreasonable to expect the general

class-teacher to spend much money in the purchase, or much time in the perusal, of books that bear on only one of his many class subjects.

Assuming that these statements are accepted—and we believe their truth will commend itself to every candid reader—we proceed to make a selection of books for the teacher's reading. We do not assert that all the underwritten books are necessary, still less that no more are advisable; but we desire to recommend our selection as a good working library of English History.

We wish it to be understood that this list does not contain "the best" English historical works. These are excluded for obvious reasons of expense. Happy the teacher who is geographically situated within easy access of a good public library. There he can read the volumes by Freeman, Gardiner, and others, which, when once begun, will rival in interest the "Book of the Month"—or of the moment.

Nor does this list pretend to include books desirable for "special periods." For the study of these, special books, of course, would be necessary. Our list professes merely to consist of such books as are useful for general purposes, such books as every teacher should keep on his shelves for constant reference. They should be, in short, to the teacher of our national history what "Liddell and Scott" is to the "Classical" master. Some of the books are "for reference only," some are suitable for continuous reading; but this latter division is not usually of the kind which can be exhausted for teaching purposes in a single reading. When once the teacher knows his way about these books, he will be able to find in one or other information on most points on which he is likely to feel need in drawing up his lessons on English History.

Our list does not contain names of books to be used by the pupils. Such a list would be a very short one, and we prefer to send the teacher to such books as, when read, will enable him to judge and correct the books written as school manuals. As a matter of fact, many of the manuals now in use would simply drop out of publication if the teachers were fairly well informed on the subject and had a voice in the selection of the class-books.

We do not profess to rival the lists of books "recommended for further study" by Dr. Gardiner in his "Student's History," nor those given by J. R. Green at the head of his chapters as sources of information. These are intended for the use of students rather than of teachers; they contain books to be *read*, not to be *possessed* as well as read; and besides, they are far beyond the financial reach of the majority of our readers. We have confined ourselves to five guineas as the outside cost of the books contained in the list—a sum which, regarded as a permanent investment, should not be considered excessive. The cost may be reduced by those able to get good second-hand copies; but in the cases where a special edition is mentioned, we imply a warning that the purchase of a cheap copy of an old edition would be false economy.

It is curious to notice how generally the necessity of such bibliographical aid as we are taking upon ourselves to offer is recognised in the United States, and how generally such necessity is ignored in England. Perhaps in no respect do the first-class text-books of English History fall short of the first-class text-books of "American" History so distinctly as in the omission of hints for collateral reading by teachers and by students. "Green" and "Gardiner" are honourable exceptions; but in respect of subsidiary appliances, in cost, and in typography, they compare unfavourably with the American school histories of Fiske and Channing.

Let us now run quickly through our list, giving some indication of the reasons of our choice, and perhaps incidentally accounting for some of our seeming omissions. We have arranged the chosen books in five blocks, of varying numbers and values.

GROUP I.—WORKS OF REFERENCE.

The first and the last books named—the "Dictionary of English History," and Hall's "Methods of Teaching History"—are not by any means as good as they might be. They are, however, the best books of their kind, and their kind is eminently useful. Gardiner's "School Atlas" suffers from being a revised collection of old plates, not the fresh product of a uniform design. Still, it is the best available corrective to one of the most glaring faults in ordinary school teaching of History—the use of merely modern maps, or, worse still, the total neglect of the atlas. The three epitomes are useful in different ways, and mutually supplement one another. Professor Tout's "Analysis" gives the essentials of English History, grouped topically, and as they present themselves to the mind of one of the most trustworthy of our younger historians. "Acland and Ransome" does not often send one empty away, and the summaries at the end are particularly useful. Mr. Malden arranges his facts in quite a different way from either of the other epitomists, and so helps the teacher to get out of the fatal ruts.

GROUP II.—GENERAL TEXT-BOOKS.

However much opinions may vary as to the educational merits or financial feasibility of Green and Gardiner as class-books, no one, we imagine, will dispute their claim to rank first as our most suggestive text-books for the teacher. The illustrated edition of Green's "Short History" (Macmillan, £2 net) is, of course, infinitely preferable to the cheap edition for the teacher's private library or for the public school library. Ransome's "Advanced" lacked its experienced author's final revision. For this and other reasons some might prefer the three-volumed History by Professors Tout and York Powell, which cost the same money as Ransome's "Advanced," and are less suitable for use as class-books. The Scottish and Irish Histories, which we owe to the editorial search-light of

ex-Professor Prothero, will not only rectify the English habit of ignoring the "Keltic fringes," but also provide the English reader with new points of view from which to regard English History.

GROUP III.—SPECIAL ASPECTS.

To the books enumerated in this group—and concerning which we need say nothing, for "good wine needs no bush"—we might perhaps have been expected to add books on the military, naval, and ecclesiastical aspects of English History. But the fighting part of our national story is, to our mind, quite sufficiently explained in the current text-books of general history; and the ecclesiastical aspect lacks an interpreter. At any rate, the present writers have not been fortunate enough to come across any account of the British Churches, written in the historical spirit (Makower is too technical for our purpose); and we should be glad to hear of any good ecclesiastical history of England or Britain.

GROUP IV.—GENERAL HISTORY.

It is quite safe, for purposes of the current examinations in English History, to ignore European History: hence the extreme modesty of our entries under this heading. But the practically safe is not always the educationally desirable; and we should not be sorry to see such books as Bryce's "Holy Roman Empire," Freeman's "Chief Periods of European History," and Seeley's "Growth of British Policy" more generally known to teachers than they now are.

GROUP V.—SOURCES.

The narrative part of the Gardiner-Mullinger book is of greater use for the general class-teacher than is the bibliography, which is designed rather for the special student. Still, it does the teacher no harm to toy with a critical account of sources. The two source-books mentioned seem to us the most compact and accessible means of connecting the teacher with "sources": for special periods they may well be supplemented by the volumes in Professor York Powell's "English History from Contemporary Writers." The three collections of constitutional documents issued by the Oxford University Press strike us as too technical for the lay teacher: it would suffice that a teacher shall read their scholarly introductions. The source-books mentioned bring the teacher into touch with reality: with the methods and means whereby the teacher may impart a sense of reality to his charges, we are not at present concerned.

SELECT LIST OF BOOKS.

I. Works of Reference.

		s.	d.
S. J. LOW & F. S. PULLING (editors) "Dictionary of English History" (last edition)	Cassells	7	6
A. D. ACLAND & C. RANSOME "Handbook of English Political History" (last edition)	Longmans ...	6	0
Brought forward		13	6
H. E. MALDEN, "English Records"	Methuen... ..	3	6
T. F. TOUT, "Short Analysis of English History"...	Macmillan ...	1	0
S. R. GARDINER, "School Atlas of English History"...	Longmans ...	5	0
G. S. HALL (editor), "Methods of Teaching History"	Isbister	5	0
		£1	8	0

II. General Text Books.

S. R. GARDINER, "Student's History of England"...	Longmans	...	12	0
J. R. GREEN, "Short History of the English People"	Macmillan	...	8	6
C. RANSOME, "Advanced History of England"	Rivingtons	...	7	6
P. HUME BROWN, "History of Scotland"...	Camb. Univ. Press		12	0
W. O'CONOR MORRIS, "History of Ireland"	,, ,,		6	0
		£2	6	0

III. Books on Special Aspects.

Constitutional—				
T. RALEIGH, "Elementary Politics"	Oxford Univ. Press		1	0
F. C. MONTAGUE, "Elements of English Constitutional History"...	Longmans	...	3	6
D. J. MEDLEY, "Student's Manual of English Constitutional History" (second edition)	Blackwell... (*net*)		10	6
Economics—				
G. T. WARNER, "Landmarks of English Industrial History" ...	Blackie		5	0
Imperial—				
J. R. SEELEY, "Expansion of England"	Macmillan	...	5	0
W. W. HUNTER, "Brief History of the Indian Peoples"	Oxford Univ. Press		3	6
A. LYALL, "Rise of British Dominion in India"...	Murray ...	...	4	6
		£1	13	0

IV. Books on General History.

E. A. FREEMAN, "General Sketch of European History"	Macmillan	...	3	6
R. LODGE, "Modern Europe, 1453-1878"	Murray ...	...	7	6
			11	0

V. Sources.

C. W. COLBY, "Sources of English History"	Longmans	...	6	0
T. F. HENDERSON, "Select Documents of European History" (Middle Ages)	Bell ...	...	5	0
S. R. GARDINER & J. B. MULLINGER, "Introduction to English History"	Kegan Paul	...	7	6
			18	6

Gross total (including one net book at 10s. 6d.) ...		£6	16	6
Net total (deducting 25 per cent. discount off £6 6s.)		£5	5	0

CHAPTERS IN SCHOOL HYGIENE.

By C. E. SHELLY, M.A., M.D., &c.

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IV.—Work and Sleep.

IN popular phraseology, school "work" is synonymous with intellectual labour; and although when thus used the term expresses but a portion of all that is comprised in the work of education, it will be employed throughout the present article in this popular, restricted sense. We are still often given to speaking of intellectual effort and physical effort—of the "work of the mind" and the "work of the body"—as though they were dependent upon processes essentially contrasted and distinct. For an intelligent appreciation of all that is involved in the production of school work, and for any useful consideration of its practical significance, it is necessary to recognise, at the very outset, that all intellectual work is but a form of bodily labour, that it implies an expenditure of nervous energy, a destruction of body tissues, and a production of effete, poisonous, waste material, just as occurs in connection with muscular effort. Moreover, this nervous tissue, on the physical changes of which an output of intellectual work depends, is far more delicate in structure, and much more easily disorganised, than is muscle substance; it is far more immature, relatively, at any given age in the young individual; and in relation to the whole race its modern development is, from the evolutionist's standpoint, far more recent and, as it were, less assuredly consolidated than is that of the muscular system. Hence the obvious need of caution and watchfulness in dealing with a tissue which is, in the young, actually in process of formation as well as of development, a tissue so delicate and so liable to injury, easily stimulated, and speedily exhausted, readily moulded in virtue of its physiological and psychical plasticity, endowed with enormous potentialities, yet, in the young child, developed only a little beyond the embryonic stage. Danger lies in the fact that all this may be granted without fully recognising what is implied in the admissions thus made. But very little consideration of the matter is needed to assure us that, while training, exercise, and discipline are needed for the development of the intellectual faculties just as much as for the development of muscular power, the former process is one calling for even finer adjustment, more careful supervision, and at least equally intelligent study of the conditions necessary to a successful result.

FAVOURABLE CONDITIONS FOR WORK.

Broadly speaking, these conditions are threefold: (1) an adequate supply of raw material for growth and repair, in the shape of appropriate food; (2) the affording of proper facilities for speedily eliminating from the system the poisonous waste products which result from the tissue changes involved in nervous activity; (3) rest, sufficient in amount, and taken at the right time, and under healthy conditions. Of these, the first is generally admitted, and as a general rule is fairly practised. The third is also admitted—in theory at all events, while its application in practice is for the most part indifferent, frequently faulty in method, and not seldom quite inadequate. It is, however, with regard to the second that oversight is most common, and mistakes most stereotyped. Yet even those who might be disposed to question the fact that "brain work" depends on the active destruction of a delicate tissue, with the consequent production of poisonous waste which, unless speedily removed from the body, will accumulate with disastrous results, recognise the discomfort which is incurred by attempting to continue intellectual labour in a close and ill-ventilated room. Is it, then, difficult to understand how serious must be the effect upon the delicate, sensitive, immature, nervous tissue of the child's brain if this be supplied, hour after hour, with blood surcharged with the deadly products of its own decay? Not only is the work produced inferior in quality and in amount, but the working tissue itself is stunted in development and degraded in respect of its capabilities. The sensation of fatigue, whether this be experienced in connection with muscular or mental labour, is dependent on two things, both the direct result of that labour, viz., (1) a true fatigue of the tissue, due to the temporary exhaustion—a using up—of its latent energy, which is to be met by nourishment and rest; (2) a true poisoning of the tissue itself by the accumulation of its own waste. This is only to be obviated by maintaining the conditions requisite for the adequate and speedy elimination from the body of these waste products. The main channels of elimination are the lungs, skin, kidneys, and bowels. Each of these can, to some extent, bear a portion of the extra burden imposed on it by a failure in function on the part of the others; but none can be interfered with for long or to any great extent without entailing serious consequences on the whole organism, and especially and immediately, on the delicate and susceptible tissue of the great nervous organs. Now it is obvious that nourishment and rest may be adequately provided for, while elimination, particularly by the lungs and skin, is being interfered with. In this connection it may be mentioned, as an interesting and suggestive fact, that bankers, merchants, and accountants have discovered that their clerks always make more mistakes, and turn out work less accurate and reliable, in damp, close weather, *i.e.*, under just those conditions which tend to aggravate the impurity of the air of ordinary offices, by interfering with the conditions favourable to efficient ventilation by fresh air rich in oxygen. This fact, then, must never be forgotten by the educationalist—that, however small be the tale of "work" exacted, the conditions under which it is to be performed shall be such as ensure an abundant and constant supply of fresh

air to the worker. Some pains have been taken to emphasise this point, because it is rarely placed in the very forefront, as it should be, and because its neglect, in however slight a degree, is inevitably fraught with penalties not the less serious because they are only fully evidenced later on in the worker's life.

Duration of Mental Work at Different Ages.

The amount of work which may fairly be exacted from a pupil will be determined less by his age than by his individual capacity, his mental and bodily development, and his general health. But having due regard to these important points, the following table suggested by Dr. Clement Dukes[1] affords a useful general index, so far as age alone can be accepted as a guide in the matter. It may be taken as indicating the maximum which can be safely exacted, week by week, throughout a school term, from boys in good health, living and working under healthy conditions.

Ages.	Hours of Work.
From 5 to 8 years of age ...	12 hours per week.
,, 8 ,, 10 ,, ,, ...	18 ,, ,,
,, 10 ,, 12 ,, ,, ...	21 ,, ,,
,, 12 ,, 14 ,, ,, ...	25 ,, ,,
,, 14 ,, 15 ,, ,, ...	30 ,, ,,
,, 15 ,, 16 ,, ,, ...	35 ,, ,,
,, 16 ,, 17 ,, ,, ...	40 ,, ,,
,, 17 ,, 18 ,, ,, ...	45 ,, ,,
,, 18 ,, 19 ,, ,, ...	50 ,, ,,

The "hours per week" specified in the above table include Sunday work and all "preparation," while it is assumed that no work is called for during the holidays. Dr. Dukes is careful to point out that the amounts given are not absolute, but relative only; and that the table is, in truth, to be read only as a scale, indicating the *relation between* the hours of work which can be required at different ages. By way of comment, one might add that while most children of eight years old may be expected to work twelve hours a week, under proper conditions, less than half that amount should be required of children aged from five to seven. The precocious child needs keeping back, and the (so-called) "backward" child should never be spurred, particularly at this early stage of its mental development.

Limit of Continuous Work.

The limit of continuous work is more easily assigned. It should not exceed one hour. Careful observation and experiment appear to have demonstrated that the brain of the average pupil, when working under the conditions which obtain in ordinary schools, does not work continuously for more than forty to forty-five minutes at a time without becoming "fatigued"; after this time mistakes are more frequent, and the work tends rapidly and progressively to deteriorate in both quality and quantity. After ten or fifteen minutes' complete rest, especially if this be spent in open-air exercise, work of the same kind may be resumed with as good results as at first, for another three-quarters of an hour. There are reasons to believe that the "brain fatigue" thus noted is largely due to the accumulation of the waste products of brain-action; and that when the work is carried on under conditions which secure a full allowance of cubic space per head, *and* perfect ventilation, this "fatigue" is less marked and is observed less soon. Yet it must not be forgotten that the brain-cell of the child has a narrower working margin than that of the fully developed adult, and that weariness will result, from the exhaustion of its smaller store of available energy, quite independently of the other cause just mentioned. So that we may take it as an inviolable rule that no lesson should exceed fifty or fifty-five minutes in duration; and that the interval between this time and the beginning of the next hour's work should be spent in the open air, if possible. Both teacher and taught would benefit immensely in the long run were such a rule generally observed.

[1] "Health at School," third edition, p. 206.

Overwork.

It is an unfortunate fact, and one which cannot be ignored without serious consequences, that the progressive scheme of school work is so arranged that the pupil, boy or girl, finds the work ranging over a wider field and becoming more difficult to master just as he or she reaches the age at which rapid growth and development begin to make special calls upon the whole system. It is now—if we except that pernicious forcing to which the precocious young child is sometimes mistakenly subjected—that there is most risk of damage and breakdown; and it is at this period of the pupil's school life that the wise teacher will be most of all on the alert to sight those warning signals which Nature is prompt to show to the discerning eye. For it is seldom that the first sign of mischief is shown by an alteration in the character of the work produced. This will follow, more or less speedily, in due course, if it be waited for. But it is always preceded by others sufficiently significant. The rapidly growing boy or girl is always in danger of becoming "overgrown," and then of breaking down from "overwork"; and if the increase in weight, and other indications of physical well-being, do not bear a just proportion to the increase in height, this latter condition—one of danger—has already been entered on. Weariness, listlessness, loss of healthy colour, failure of appetite, alteration in temper and disposition, imperfect sleep, restlessness of any kind—especially any twitching or "tricks" of the muscles about the corners of the mouth, the eyes or the forehead, and of the fingers—all demand immediate and prompt attention, without waiting for definite manifestations of pronounced anæmia, hysteria, somnambulism, or St. Vitus' dance.

The health of a pupil really suffering from the many causes commonly covered by the term "overwork" can be restored often with difficulty; never very speedily; not always quite satisfactorily. It is in every way cheaper to all concerned if the definite breakdown be prevented by timely attention to those signs which indicate the commencement of a period of temporarily lessened physical ability.

BEST HOURS FOR WORK.

The period of the day during which work is carried on is a matter of importance. The best work is turned out, and that with least exhausting effort, when the bodily powers are most vigorous, *i.e.*, practically in the earlier part of the day, before fatigue has been induced, and not too soon after a meal. Writers are practically unanimous in condemning evening work—and especially the "preparation" of lessons in the evening, in schools. And the condemnation is for the most part just, although the reasons for it are usually inadequately stated. Other things remaining the same, *if* the system had not already reached the fatigue point, and *if* the evening work were carried on under proper hygienic conditions, there is no obvious reason why intellectual labour in the earlier evening hours should be more exhausting than the same amount of the same kind of work done in the morning. But, in practical school life as ordinarily carried on—and in the case of younger children especially — the pupil's work during previous hours has already reached his fatigue point, or very nearly so, by the time that his evening work begins. And this evening work is not exacted under good or favourable conditions if it have to be carried on for some two hours or more continuously in a more or less crowded room, often inadequately or improperly lighted by gas or paraffin, and seldom efficiently ventilated. The work of young children should be done wholly and only in the morning. This time may be extended as the physical powers increase and fatigue is less easily produced. But the hardest work should not be relegated to the evening hours. No work should be carried up to bed, nor its subject matter be intruded by the over-stimulated brain within the restful domains of sleep.

SLEEP.

An abundant allowance of sleep is necessary to health, particularly at those periods when growth is most rapid and when development is making special demands upon the system, *i.e.*, during the earlier years of life, and during the commencement and establishment of puberty. Sleep is the body's recruiting time; nothing else can supply its place; nothing can make good the evils produced by its deficiency. The conditions necessary to securing healthy sleep have already been considered under the head of Dormitories. As regards the amount of sleep to be allotted to each individual, it must be remembered that while, in any school, the hour of rising is practically the same for the pupils of all ages, an extension of the time for going to bed means so much more time spent under circumstances which make it specially difficult to maintain the conditions favourable to health. The following table, slightly modified from one given in Dr. Dukes' work, allots to various periods of early life an allowance of sleep which is not excessive for meeting growth and repair, which may even need to be increased for a time in certain cases, and which cannot be reduced without inviting grave evils.

Age.	Number of hours of sleep.	Time.
Under 8 years of age...	12 hours	7 p.m. to 7 a.m.
,, 10 ,, ,, ...	11 ,,	8 ,, ,,
,, 13 ,, ,, ...	10½ ,,	8.30 ,, ,,
,, 15 ,, ,, ...	10 ,,	9 ,, ,,
,, 17 ,, ,, ...	9½ ,,	9.30 ,, ,,
,, 19 ,, ,, ...	9 ,,	10 ,, ,,

During the four darker and colder months the hour of waking should be extended to 7.30 a.m.

ESSAY WRITING.

By C. J. BATTERSBY, M.A.

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THE following notes make no pretence to exceptional originality. They are, however, the outcome of much experience in teaching English Composition to large forms, and the writer publishes them in the hope that they will prove helpful to the junior members of his profession.

A SUITABLE SUBJECT SHOULD BE CHOSEN, AND DUE NOTICE GIVEN.

Let us suppose that we are dealing with a form of boys aged about fifteen. Our first object is to make them write, not very correctly, not very wisely, but with pleasure to themselves, and at a fair length, not less, let us say, than 800 words. It is only by inducing the boys to write a tolerably long essay that we shall inspire them with confidence in their own powers. We must choose a fit subject, one that is well within their mental grasp, and concerning which they already possess, or can easily acquire, plenty of information. Among such subjects are "Annual Ceremonies," "Discoveries and Inventions of the Century," "Inhabitants of the Sea," "Surviving Superstitions," "Uses of Flowers," and "Public Amusements of the English." For this occasion we will select the first-named—"Annual Ceremonies." Notice of it should be given some days before the essay is to be written, and at the same time the subject should be a little unfolded by the master.

HINTS ON THE SUBJECT MATTER.

A few hints will be enough—New Year's Day, Twelfth Night, St. Valentine's Day, Shrove Tuesday with its tops and pancakes, Easter with its eggs, May Day, Whitsuntide, The Fifth of November, Christmas Day, for we must not commit the mistake of going exhaustively into the subject, and so leaving nothing for the private enterprise of the boys. If, in addition to these hints, we tell them that they can probably obtain information about some local customs, which we have not heard of, and should very much like to hear of, we shall no doubt set them burrowing in books and cross-questioning their parents with very excellent results. At any rate, we shall not find them gravelled for lack of matter when the day of essay-writing arrives.

HINTS ON PREPARING AN OUTLINE.

Our next step will be to exact visible proof that such information has been collected, and not only collected, but arranged in satisfactory order. The boys must be told that we shall expect an outline of the essay to be prepared at home and sent up with the essay itself. They will, perhaps, be a little staggered at this, but we shall dissipate their fears by showing that Annual Ceremonies, for instance, can be grouped under the months in which they occur, or, better still, under such headings as (1) Religious Festivals, (2) Historical events, (3) Pagan survivals. Sometimes it will be useful to go to the blackboard and show the class how we ourselves tackle a subject, first, putting down notions just as they suggest themselves, then marking related notions with the same number, and, last, with the numbers to guide us, writing them out afresh in groups. At a later time, when the boys have grown accustomed to breaking up a subject, the headings, which they have previously sent up on a separate paper, may with advantage be transferred to the margin of the essay. This practice gives their work an attractive look, and checks rambling.

RULES TO BE OBSERVED IN WRITING THE ESSAY.

We now come to the hour appointed for the writing of the essay. The boys, brimful of matter, and with their outlines to direct their otherwise erratic courses, are, so to speak, straining on the leash. They wish to start at once, but we must hold them back for a couple of minutes to receive the following final admonitions, which we shall do well to chalk up on the blackboard :

(1) Put your name, form, and title of essay at the top of each page, and number the pages.

(2) Write clearly, joining your letters, and leaving spaces between your words.

(3) Give each division of the subject its own paragraph.

(4) Don't begin sentences with "and."

(5) Don't use "get," "good," "bad," "nice," "nasty," "funny," "silly."

(6) Don't qualify your statements.

On some occasions it will be necessary to add:

(7) In arguing take a definite position, and sum up in favour of it.

(8) Insert marginal summaries.

REMARKS ON SOME OF THESE RULES.

Of these points several, if not all, would occur to any practical teacher; but I feel, nevertheless, that I must insist on the importance of (4), (5), (6), and (7). It is almost useless to tell boys that a series of initial "ands" makes a piece of prose loose-jointed. They will turn a deaf ear to such advice. But if we issue an apparently arbitrary edict against initial "ands," they will obey it without fail. So, too, with "get," that jack-of-all-meanings, and the much-worn adjectives mentioned in (5); they must not be merely condemned, but banished without reprieve. This done, the boys will be compelled to seek out a more vivid vocabulary, and drivel will almost disappear. We shall, of course, extend the list of proscribed words as our pupils progress in the art of self-expression.

Rule (6) is aimed at a shuffling habit of mind common with the uneducated. A half-considered statement is made, and then comes an after-thought, *e.g.*, "We reached home at five o'clock, *or perhaps a little earlier*." Sometimes over-caution begets a needless qualification, *e.g.*, "Hannibal was *in all probability* one of the greatest generals that ever lived." These examples, taken by themselves, may not seem very grave offences, but many such distributed throughout an essay entirely destroy its persuasiveness. They create the impression that we are wasting our time on one who is neither clear-headed nor well-informed. Akin to this fault is the fault, often found in argumentative essays, of see-sawing now to this, now to that, side of a question without any indication of one's own preference. We must tell the boys to choose a side and stick to it. They should state their opponent's case, and then their own, taking care to put the latter in such forcible terms as to justify a strong conclusion in its favour. From a literary point of view, decisiveness, even in a wrong cause, is preferable to shilly-shally.

CORRECTING THE ESSAYS.

Let us now suppose that the essays have been written, and that the time has come for correcting them and giving them back.

After many years' experience, I am of opinion that minute correction of essays is a game not worth the candle. It will be sufficient just to mark what is wrong; at the same time a fixed code of signs should be employed. Thus a misspelling may be enclosed in a rectangle, a grammatical error noted by a marginal star, and a misused word by a marginal query. At the end of the essay a succinct criticism should be put—for example, "handwriting good, arrangement confused, facts sometimes incorrect, expression fluent and clear."

GIVING BACK THE ESSAYS.

We come next to the giving back of the essays. With our boys before us in regular form order, we shall begin by making a few general remarks on the success or failure with which the subject has been treated by the form as a whole. If any boy has done particularly well, we shall bestow public praise on him. Then, taking up the topmost essay from our bundle, we shall tell the writer our opinion of it, and after that bombard him with his errors. If he cannot correct them then and there, we shall pass them down the form for others to correct, and he will lose his place. We shall deal with every essay in the same way. This method has several advantages. It saves school time, puts the boys on their mettle to correct the mistakes they have made, and by continual repetition drives some of the principles of essay-writing into their heads.

A CAUTION.

One caution, however, must be given, If a boy, in the simplicity of his heart, has expressed some sentiment, a little foolish, perhaps, which he does not intend for the ears of the whole form, we must not raise a laugh by reading it out with sarcastic voice and comment. Should we do so, we shall forfeit the confidence not only of the individual boy, but of all his fellows. They will shrink before the possibility of ridicule, and cease to be free and natural in their writing. On the other hand, if they find that we can keep secrets, they will tell us secrets, and enjoy the exercise of that instinct which has produced our finest literature—the instinct of self-revelation.

SUMMARY.

I will now conclude by summarising the chief points of the method here rapidly sketched.

(1) Subjects should be chosen of so easy and interesting a nature that even the dullest boys can write largely on them.

(2) The Master should talk over the subjects with his boys.

(3) Some days should be given for preparation of material, and an outline should be required.

(4) In the interests of style, boys should be forbidden the use of certain colourless words, and of initial "ands."

(5) Errors should be marked, but not necessarily corrected, by the Master.

(6) A brief criticism on broad lines should be appended to each essay.

(7) Errors should be corrected by the boys themselves in class.

WITH regard to the essay, the difficulty to be overcome is not the expression, but the thought. With the previous preparation children ought to know how to say anything if they have anything to say, and the teacher must help them to gain confidence by showing them that if they only think they have something to say. This he can do by stimulating questions.—Principal Salmon in "The Art of Teaching." (Longmans.)

CÆSAR: THE GALLIC WAR. IV., V., 1-23.

ONE OF THE SET LATIN SUBJECTS FOR THE CAMBRIDGE LOCAL EXAMINATION, DECEMBER, 1899.

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IT may be granted at once that the principal object for which we put our junior boys to the study of Cæsar's Gallic War is to improve their knowledge of Latin accidence and syntax, in a word, to help them in linguistic training. But it surely should be possible (and if the possibility does not exist as yet at some schools, it should imperatively be made) to take the subject in some degree as literature at the same time. How we detested the hours devoted to Cæsar in our boyhood! Yet recent editions are so complete from all points of view that there is no reason why, when properly handled, this author should not be positively attractive even to younger boys. We have not yet met the boy who has no liking for the story of a war, nor the boy who is not, in his heart of hearts, involuntarily fascinated by the life history of a truly great man. Is not Kitchener of Khartoum a name to conjure with among boys at the present hour? Was not the recent campaign closely followed by boys at school all over the country?

It should be our task, then, to keep two things well to the front in directing our Cæsar lessons: the record of the particular campaigns and the picture of the man himself. An ancient map and illustrations of Roman army life will be of great service here.

A word, and only one, as to style. To fully master our author, and thus be able to interpret him to our class, we should endeavour to get a due appreciation of the features of his style. With this in view, no better guide exists in English than the introduction to Simpson's "Cæsarian Prose." Froude in his closing chapter touches on the theme, but at no length.

For subject-matter, Napoleon III.'s book on Cæsar is somewhat long and not always accessible. Baring Gould's "Tragedy of the Cæsars" is a useful book. In Mommsen's "History of Rome," the first few pages of the eleventh chapter of the fourth volume are quite indispensable; and Froude's "Cæsar: a Sketch" is full of valuable matter, in particular chapters ten to thirteen, where we have an account of practically all the training in war and administration that Cæsar ever received. Chapter sixteen deals with the campaigns of B.C. 56 and 55-54, and thus embraces the matter of Books IV., V., 1-23.

In addition to some brief account of Cæsar's life and character, it will be well to whet the interest of one's pupils by giving a slight sketch of the books themselves and showing the object of the operations undertaken.

We must not suppose that boys of fourteen or so are unable to take an intelligent interest in the migration of the Aryan tribes towards the west, as

they continually pressed upon and drove each other forward, the only alternative being the annihilation of the weaker clan. Thus, after Cæsar in his first campaigns was confronted by the Helvetii, and by Ariovistus with his tribes from Bavaria, and even when Gaul seemed at the feet of the Roman imperator at the close of B.C. 56, the pressure of the great clan of the Suebi causes the Usipetes and Tencteri to dislodge the Belgian Menapii from their settlements on the left bank of the lower Rhine. Cæsar, therefore, has not only to prevent this disturbing element from invading Gaul, but also to administer a salutary lesson to the Suebi by bridging the river and laying the country waste for some distance beyond.

[It will be a good plan if each member of the class keeps a rough sketch map in his text and fills in the various tribe-names, rivers and places as they occur in this division of the book.]

The reason for Cæsar's feeling it necessary to deal with Britain should be dwelt upon, viz., that in his earlier campaigns the Celts on the mainland had received assistance from the Atrebates, tribes of their own stock who had settled along the south-eastern coast of our island and also penetrated some distance inland, up to and even beyond the Thames. Here might well come in some few words on the changes wrought in this district since Cæsar's time, in particular the disappearance of the extensive Anderida Silva, formerly covering a large part of Kent, Sussex, Surrey and Hampshire, as far as can be ascertained. But more important still will be some account of the Belgic Celts in Britain whom Cæsar had mainly to fight, though the Britons proper (Celts also) confronted him as he marched north. Froude in his fourteenth chapter gives an interesting account of the Druids and the tribal organisation. Reference may also be made to Rhys' "Celtic Britain," or to "Early Britain," in "the Story of the Nations" series, a book more easily obtained.

Without going into the discussion of vexed points such as the site of *Portus Itius*, or the rival claims of Lymne and Deal as the landing point of the two expeditions, a fairly clear route can be determined for the second campaign, and a special map should be drawn of this, to be filled in as the history proceeds.

The preparatory matter thus disposed of, it may not be out of place to throw out a bare suggestion or two on the work to be done by the class, especially if, as is generally the case, it consists of boys who have read very little Latin.

Much is gained by giving judicious help at the outset. An outline in words of the coming lesson will prevent much discouragement. How many a boy has come into class with his words looked up and learnt by heart, but with no idea of getting sense out of the passage set! Such help need not be continued after a few weeks. On the same principle the harder chapters can well be left to a second reading, particularly those chapters which are in oratio obliqua. The same would apply to the chapter on the bridge over the Rhine. What is missed out must be well explained. Again, the syntax might well be taken in stages, all the harder work being reserved till the period of revision, or passed over at the commencement and referred to for comparison later on when a similar usage occurs.

It is far the best method for a master to make up his own sentences for retranslation out of the translation work recently done. This should not involve very much labour or time; it certainly secures the best results both for translation and for composition.

INSPECTION OF HIGHER SCHOOLS IN SCOTLAND.[1]

IN his eighth special report to the Lords of the Committee of Council on Education in Scotland upon the Inspection of Higher Schools, and upon the Leaving Certificate Examination, Sir Henry Craik ably reviews the provisions for secondary education in Scotland, and in dealing with the work accomplished in Scotch schools incidentally provides abundant material for the careful consideration of the authorities who will later be responsible for the development of a properly co-ordinated system of secondary education for England.

Exemption from Fees.

As previous reports have shown, the Education and Local Taxation Account (Scotland) Act, 1892, provides funds for the purposes of this inspection and examination. It has thus far been possible, in all ordinary cases, to relieve the schools (except to a certain extent those under private management) and the candidates at the Leaving Certificate Examination from the fees formerly exacted; but, in view of the increase of the work, it may be necessary, in spite of every effort to curtail expenses, to make such a charge, in order to prevent an undue deduction from the amount available for distribution for secondary education.

Inspection.

The higher schools inspected were this year 85 in number, of which 31 are higher class public schools under the management of school boards, 25 are endowed schools, and the remainder are schools under private management—whether that of a governing body or a proprietor.

The inspection of higher schools was begun in 1886, and there is abundant evidence to prove that it has had a good effect in raising the standard of higher education in Scotland. By means of it, attention ought to be quickly directed to any defects in method and organisation. It has helped to show the difference between sound and specious work, and this result has been obtained with as little friction as possible. The authority of the local governing body, as well as the distinctive methods pursued by the staff of each school, have been duly respected. Experience shows that no system of judging schools solely by the results of the Leaving Certificate Examination, without the further test of inspection, would be satisfactory. The inspectors have been encouraged to confer with the local authorities as to methods of instruction, to point out weaknesses, to show how defects might be removed, and to indicate the direction in which the curriculum might be most effectively

1 "Report for the year 1899, by Sir Henry Craik, K.C.B., on the Inspection of Higher Class Schools, and the Examination for Leaving Certificates."

developed. Abundant evidence shows that such conferences have proved useful to managers and teachers, and the inspectors have by means of them acquired new insight into the methods and aims of the schools. It must be noticed that an inspector may often find it expedient to indicate defects rather than to report in distinctly condemnatory terms of the work of a school. It is the duty of the authorities of each school to study the reports with care, in the light of their own knowledge of local circumstances, and to act upon their own judgment in regard to the steps necessary to remedy any defects indicated. Nor is it less essential that these authorities should turn their attention to the various developments that in recent years have been given to secondary education, if their school is to keep pace with the requirements of the day.

While it is important to maintain a high standard throughout the various schools, it is not the aim of the inspection to mould the schools according to one uniform type. The new Code gives very wide discretion to the managers of secondary departments connected with State-aided schools.

Selection of Inspectors.

The chief aim in the selection of inspectors is to obtain the services of those who, without being exclusively attached to special methods, have had experience in scholastic affairs, whose qualifications as to knowledge are well established, and who have the tact necessary to pronounce a candid judgment on a school without unduly trenching on the functions and responsibilities of managers and teachers. Hitherto it has not been possible to employ any fixed staff, but the inspectors have been selected from a larger number of men of proved qualifications. Provision has been made for a certain continuity of judgment by allowing the same person to visit a school several times, while criticism from a fresh eye has been secured by altering the Inspector, in the case of each school, from time to time. It may be matter for future consideration whether it might be well to have a limited number of officers, set apart for this work, who might visit the schools, not at one season only, but at various times throughout the school year.

Desirable Future Improvements.

While the progress which has been made in recent years is very satisfactory, there are yet many points in regard to which further improvement is to be desired. The premises of the higher schools do not in all cases compare favourably with those of elementary schools, the standard of which has in recent years been greatly raised. There are certain cases in which, by a liberal expenditure from the rates, or by private generosity, admirable premises have been erected for the high schools, and the result has been a marked advance in the prosperity of the schools. But school boards frequently show a certain timidity about incurring such expenditure from a fear that it may be considered to be a matter which interests one class only, and not the whole community. This is a matter which can be altered only by an improved public opinion; but while no error can be greater than that of unduly multiplying the number of higher class schools, and thus producing a wasteful overlapping of agencies, yet it is to be hoped that the constituencies will become convinced that adequate provision for higher education is by no means a matter of interest to one class alone, but is of the most vital importance to every section of the community; that wise expenditure in this direction from local resources will be productive of great benefit, and will ultimately prove of the greatest profit to the inhabitants of the districts prepared to face it; and that no expenditure is more efficacious than that which develops the equipment of Higher Class Schools, devoted mainly to secondary education in its various branches. Recent legislation has made further grants available for these schools; but whatever help in money, or through inspection and advice, may be given by the central authority, it is impossible to dispense with the essential element of local effort. In several cases school boards have taken a high view of their duties, and, in face of serious difficulties, are making earnest endeavours to promote the efficiency of the secondary schools under their charge. In other cases support has been wisely given to them by neighbouring districts, and it is earnestly to be desired that such measures of co-operation should be adopted in a larger number of cases. This would be one of the most efficacious influences for maintaining the high traditions of Scottish education and enabling it to expand so as to meet the advancing requirements of our own day.

Grants Available for Secondary Education.

The grant for secondary education, available under the Education and Local Taxation Account (Scotland) Act, 1892, has again been distributed amongst the various counties and larger burghs in proportion to population, and its allocation has been arranged in schemes drawn up by the secondary education committees (first elected in 1893), and sanctioned by the Department. As pointed out last year, the Minute of June 10th, 1897, to some extent checked the tendency to dissipate the grant in small payments over a large number of schools, the primary function of which is elementary rather than secondary education, and which should look for assistance rather to grants under the Code than to this special fund. It is a matter of regret, however, that this tendency still prevails to a considerable extent, and that payments have been made to schools of a lower grade, by means of which they are encouraged to retain scholars who would, with more benefit both to themselves and to the educational provision of the district, resort to the higher schools. The grant should as far as possible be devoted to the development of the scope and the improvement of the equipment of carefully selected schools, and to providing means whereby promising scholars from other schools should be enabled to take full advantage of the opportunities open at the selected schools.

The new grant under the Local Taxation Account (Scotland) Act, 1898, has provided further funds for the assistance of these higher class schools. The important function which they have hitherto performed in Scottish education can hardly be denied; and it is to be hoped that, in view of the more liberal grants which the Code now offers to the secondary departments of schools aided from the parliamentary vote, the limited grant now set apart for the higher class schools will not be grudged to them. In particular, it should be noticed that the claims of scientific teaching as a part of secondary education are rapidly advancing, and the provision of adequate apparatus for such teaching, and the employment of a sufficient staff of specially qualified teachers, impose burdens which can hardly be met by local effort alone.

Early Age of Removal.

It is, however, found that where liberal educational provision has been made, the inspectors have so often to lament that the pupils are withdrawn at an age too early to benefit fully by it. The pernicious habit of allowing scholars to begin the summer holiday before the close of the session has been severely remarked upon in previous reports; but it is satisfactory to be able to state that this habit is less common than before. This denotes an improvement in the estimate of the value of educational opportunities, and it may be hoped that the improvement will continue, and that the advantage of some prolongation of the school course will be recognised.

Insufficient Preliminary Training.

One circumstance to which the inspectors frequently advert as a serious hindrance to efficiency shows no sign of diminution. This is the fact that scholars who come to the secondary schools from the State-aided schools are not always fitted by previous education to take their places in the same class with those who have had the advantage of being trained with a view to higher education. This tendency is found to be largely increased by the bursaries and free places which are provided, out of the amount available for secondary education, for scholars from elementary schools. The presence of such children in these higher schools ought certainly to be encouraged in every way, but there should be some means for sending them to the higher schools at an earlier age. In any case the managers of the higher schools will find it to their advantage to make some provision for giving them special training when they are first drafted into the school. As a rule, such children are of good capacity, and come to the school with earnest purpose of profiting by it, and it is probable that a comparatively short period in a preparatory class will enable them to take their places, with mutual advantage, side by side with the scholars who have been in the secondary school from an earlier age.

Leaving Certificate Examination.

A decrease in the number of candidates presented for examination is again reported. The number last year was 16,262, this year it is 15,377. The decrease is not very great, but it may be taken as evidence that the rapid increase of previous years has brought the number of candidates to its normal level, and that it will not show hereafter any large variation. It would not be matter of regret if the number showed still further signs of diminishing, owing to the exercise of greater discrimination in the selection of candidates, many of whom are presented each year with totally insufficient preparation.

The number of separate papers worked by these candidates was 51,052, as against 51,649 last year, showing that, while the number of candidates has diminished, the number of subjects taken by each has increased. Of these 19,866 papers represented 4,898 candidates from eighty-one higher class schools, and the remainder (31,186 papers worked by 10,479 candidates) were taken by pupils from 315 higher departments of State-aided schools and by pupil-teachers. From the increase of seven in the number of schools from which pupil-teachers only were presented, it would appear that the Leaving Certificate Examination is being adopted more frequently as a means of qualifying for the earlier stages of a teacher's career, and that school managers have formed the opinion that a good class of pupils may thus be attracted to the profession. There has been a slight increase in the number of papers taken by candidates from higher class schools, and a decrease of 766 papers taken by candidates from State-aided schools.

There has been a slight increase in the proportion of passes obtained when all the subjects are reckoned. The result is not due to any change in the standard this year, but must be attributed to the better preparation in general of the candidates presented. It is still apparent from the reports received from several of the revisers that a large number of candidates have been sent in who have not reached anything like the required standard, and that some school managers and teachers have not yet realised what that standard is. But such careless presentation is diminishing, and the practice of sending in candidates at eleven or twelve years of age has largely disappeared.

Strong representations continue to be made in favour of the issue of leaving certificates, not in single subjects, but in groups. The argument against this is that it might appear to impose a certain fixity of curriculum upon the schools. On the other hand, such grouping undoubtedly represents a more satisfactory scheme of a comprehensive secondary education. As a preliminary experiment it may be well to begin by issuing such grouped certificates, in addition to any issued in single subjects, and the value of such grouped certificates would no doubt soon make itself felt.

The first and principal end of the Leaving Certificate Examination is to fix a standard for scholars who have gone through a course of secondary education, fairly suitable for the country generally, and neither to discourage schools by asking too much nor to degrade the certificate by bringing it down to the level of inadequate work. It is necessary to keep in view the fact that the certificate is accepted by many important public authorities, and not least by the Universities of Scotland, and while the schools are first of all kept in view, the requirements of these public bodies, towards whom a grave responsibility is incurred, are also not disregarded. While guiding the course chiefly by the circumstances of the schools, the responsibility to these bodies has not been lost sight of.

A REVOLUTION IN IRISH SECONDARY EDUCATION.

THE Report of the Irish Intermediate Commission just issued is a statement of the highest importance. If its recommendations are carried out they will effect a complete change in Irish Secondary Education.

The Commission, appointed in June, 1898, consisted of the seven members of the Intermediate Board, who themselves had asked for the Commission in order to make a public investigation into the working and effects of the system which they have been administering for nearly twenty years. Great dissatisfaction has been felt with some of the results of the Intermediate Act of 1879, which provides that a sum, amounting now to about £83,000 a year, shall be spent in prizes and exhibitions awarded to students on the results of public examinations held annually, and in result fees given to the managers of schools on the marks gained by each individual pupil. It was stated that this system has led to all the evils of extreme competition, to overwork (especially of talented children), and a type of teaching in which excessive memory-work takes the place of the development and training of faculties.

The scheme of the Commissioners is designed to meet these evils. After noting some of the suggestions that have been laid before them, they state that they do not approve of the endowment being given wholly on the results of inspection, as a fixed sum has to be divided among the schools in proportion to merit ascertained by some test in which the public have complete confidence, and they do not think that inspection would give such a test. But they recommend that inspection shall be introduced as an additional test of the efficiency of the schools.

Instead of giving so much for every hundred marks made by individual students, they propose to give to each school a capitation grant on the entire number of its pupils on the "Intermediate School Roll." The latter means all the pupils in the school within the ages in which they can enter for the various examinations (*i.e.*, from about twelve to eighteen), whose parents have not given in a written objection to their children entering for the examinations. The grant will be increased from a certain minimum to a certain maximum according to the number of pupils in all the grades who pass a

general pass examination, in proportion to the total number of pupils on the "roll." The grant may be increased beyond this maximum, if (*a*) the pupils in all grades taken together gain a very high percentage of the maximum marks obtainable, or (*b*) if the school be reported by the inspectors as highly efficient, or (*c*) if the passes in the middle or senior grade bear a certain proportion to the passes in the junior grade.

This capitation grant will be estimated on the results of the general pass examination, not for one year, but for three taken together. Thus, for example, the grant given for 1904 would be fixed by the examinations of 1901, 1902 and 1903.

As this capitation grant will constitute the entire endowment given to schools under the Intermediate System, and as it is evidently designed that every pupil in the school between the ages of thirteen and eighteen shall be examined, it is of extreme importance that examinations which will mould the entire secondary education of Ireland shall be such as to produce a good type of teaching, and leave scope for the adoption of new and improved methods. It will be wholly non-competitive, and the words of the report are :—"It should approximate as nearly as possible to the kind of examination of the individual students which ought to be made by an inspector thoroughly testing for the purposes of comparison the educational work done in the school. The papers set at this general examination should therefore be of such a character as (*a*) to test true educational work, as distinct from the mere overloading of the memory, and (*b*) to be within the capacity of a well-taught pupil of average ability." On this ideal being attained it will depend whether the new scheme will help or hinder good education.

Besides the general pass examination, a distinct examination will be held each year for honours and prizes, which will be more difficult and extensive. This examination, intended only for the more able pupils, will be competitive as regards money prizes, but non-competitive as regards honours. Some of the exhibitions will be of the nature of bursaries giving help in education. No results-fees whatever will be given to schools in connection with this examination.

To such schools as prefer it, a certain sum, "The Prize Grant," will be given to distribute among their pupils, on some scheme approved of by the Board, instead of their entering for the public Honour Examination. On what test, if the pupils do not enter for the public Honour Examination, the amount of such a "Prize Grant" to any given school will be determined, is not made clear in the Report.

Inspection will be used to ascertain the sufficiency and efficiency of the teaching staff, the adequacy of the school premises, the sanitary arrangements, the "reasonableness" of the school hours, the adequacy of the appliances for teaching Physical Science practically, the speaking of foreign language, and other matters. Unless the school satisfies the inspectors, it will be ineligible for receiving any grant whatever. Schools may also be required to expend some of the grant on supplying apparatus needed by the school for good teaching.

The Board shall have power to advance money on good security to schools for appliances for teaching and other purposes. It shall also have power to give special advances to establish schools in localities needing them, provided the local authorities give the required security.

Another notable change will be the division of the programme of studies into at least two distinct courses. It has been objected to the present system that it tends to compel all students to take a course of study only suitable to those going on to a university. It is proposed now to have one course for such students—the "Grammar School Course," and another for those intended for agricultural, scientific, or commercial pursuits—the "Modern Course."

The preparatory grade will have a general examination for all students, and there will be no Honour Examination in this grade. In the three higher grades the pupil must take either the "Grammar School Course" or the "Modern Course." The Commissioners express regret that owing to the early age at which boys go to business and other industrial work, they could not postpone this differentiation until after the junior grade age.

No difference is made between boys and girls, except that it is suggested that some special modification of the "Modern Course" may be made for those girls taking it.

A large number of other points are left unnoticed in the Report, as not requiring the legislation which the introduction of the great changes mentioned above will need. Such are the improvement of the papers set, the relative value given to special subjects, or the formation of a "consultative board" of educational experts.

The Report is a most able statement and scheme, expressed with great lucidity. The Commissioners point out that it may be modified in the light of experience, and must at first be regarded as tentative.

Some objections we can already foresee—the forced specialisation in a "Modern" or "Grammar School" course for *all pupils* at an early age; the great subdivision of classes which the two courses and the two examinations in all grades but one necessitate—a serious matter in schools as small as those in Ireland usually are—and the fact that still the bulk of the teaching, that of pupils younger than twelve or thirteen, will be untouched by the help and guidance of the system. It is certain that the profits of schools will be much reduced, but this may not be a hindrance to improved education.

It is of course obvious that the success of the scheme will depend on the manner in which it is carried out, on the equipment and choice of inspectors and the careful conduct of the examinations, but it certainly seems to promise a remedy for some of the most serious defects of the present system.

CONFERENCE OF MEDICAL OFFICERS OF SCHOOLS.

THE first conference of Medical Officers of Schools, in connection with the Annual Congress of the Sanitary Institute, was held at the Hartley College, Southampton, on August 30th. In addition to the papers to which reference is made below, three others occupied the attention of the meeting, viz., "On the Examination of the Eyes of School Children," by Mr. W Butler, M.B., B.P.H., "On the Best Means available in Public Schools for the Prevention of Infection of the Milk Supplies," by Dr. C. Childs, M.A., and "On an Examination in Practical Hygiene for School Teachers," by Mr. H. R. Kenwood, M.B.

The President's Address.

In the absence of the President, Dr. Shelly, M.A., his address was read by Dr. T. W. Reid, who presided over the meeting. After expressing appreciation of the action of the Council of the Sanitary Institute in initiating this first conference of medical officers of schools held in connection with its congresses, Dr. Shelly's paper ably reviewed the various problems with which the members of the Association were confronted. We can only refer to one or two of the topics to which the President invited attention.

Every school, large or small, is a more or less isolated community; and in connection with each there confronts the sanitarian the same array of problems which claim his consideration alike in the teeming city and the scattered hamlet. The peculiar feature—and from the hygienic point of view the most important feature—of a school lies in the fact that it is a closely aggregated collection of young and immature members of the race, specially susceptible to illness, and peculiarly so to the commoner infectious maladies. Although in some senses it occupies an isolated position for about eight months out of every twelve, the school has numerous points of contact with the world around it: each of these may, at any moment, become an avenue of infection; and, although none can be absolutely safeguarded, all of them may be intelligently watched. Are we familiar with any other combination of circumstances which can furnish, under conditions so nearly constant and consistent, and in relation to material so immediately under observation and control, the data needed for investigating some of the most interesting problems of preventive medicine? For instance, the school-age is pre-eminently that during which the common infectious exanthemata are wont to be developed. But it is only comparatively recently that we have begun systematically to collect and compare the important material and observation which have hitherto so largely run to waste. It is thus that we have come more accurately to define the incubation periods and the infective duration of several maladies. We have gone even further. The susceptibility of the individual school-boy or school-girl depends upon whether he or she has secured immunity by a previous attack of the self-protecting disease in question; but the liability of the school to an epidemic outbreak of that malady bears an intimate relationship to the proportion of susceptible individuals—the relative volume of explosive material—present in its midst, at the time when infection is introduced. Dr. George Turner some years ago established this fact in relation to outbreaks of scarlatina amongst the general community. With the more definite conditions present in large boarding-schools, we are able to reduce similar facts as regards some common illnesses to a mathematical formula. We can say with confidence, for instance, that in a school of a certain size, whose pupils enter it at a certain average age, there will be an outbreak of measles or of rubella, as the case may be, when the number of pupils unprotected by a previous attack of one or the other disease reaches a certain known proportion of the whole school; and, if the epidemic begin early in the term, so as to give the malady full time for its work, we can predict, with a very close approach to accuracy, the total number of cases; and, further—knowing the yearly rate at which the unprotected pupils enter the school—we can forecast the date at which the next epidemic will be due.

The Question of Over-Pressure.

While people are roused by allegations of an epidemic of overwork in board schools, and by a prognosis of national myopia, while their sympathies are harrowed by reports of the break-down of pupil teachers and the suicide of sensitive scholars in national and elementary schools, there seems to be some risk of overlooking the dangers—not less real or less painful of their kind—which attend the members of our public and of many private and preparatory schools. That general attention has not hitherto been drawn in this direction may be due in some measure at least to the fact that the life and trials of the public school-boy do not ordinarily come within the ken of the vigilant district visitor, or afford a theme of discourse to an energetic school-board candidate; while it is also too generally assumed that the children of the upper classes are, by virtue of their social position, beyond the incidence of those special causes which are known to be operative in the ranks beneath them. The idea is both fallacious and misleading; fallacious because it ignores the universality of that high pressure and goading competition to which most evils of the modern educational system are attributable; misleading, because it implies that there are no perils attendant on the methods of instruction pursued in public and in high-class private schools. The facts are quite otherwise. If intellect-driving is an irksome novelty to children recruited from slums and gutters, its effects are as evil, and are probably more keenly appreciated, amongst the children of the upper and middle classes. The conscientious son of a professional man who has a position to maintain with a large family and a limited and possibly precarious income, will acutely realise the necessity for early securing a good start in life, for the sake of his parents and of his brothers and sisters no less than for his own. By both friends and relatives he is continuously urged to make the most of his opportunities, and the precept is enforced by reference to examples of brilliant success amongst his fellows; while he is given to understand that he is expected to achieve results proportionate to the special advantages which are supposed to be attached to the favourable circumstances of his birth and social position. And thus, while an extra turn is given to the educational screw, the additional burden of personal worry is brought to bear upon a mind which is, not rarely, unduly sensitive. Moreover, the conditions under which such lads have to work are not by any means so generally favourable as many people are willing to believe. Most fathers will admit that now-a-days their sons are expected to master subjects of a variety, a nature, and an extent to which, in their own boyhood, they were almost strangers. A generation or two since, moreover, when the average standard of school work was considerably lower than is the case at present, the brilliant and clever worker came to the front *proprio motu*—because he could, from sheer natural and spontaneous ability, outpace the crowd; and not because he was forced by a combination of all possible *stimuli* into a precocious and unnatural development. Now, the tendency is rather to work all intellects up to the same standard, to use the conspicuous successes of the few as incentives to further efforts on the part of the less gifted majority, and to fasten upon all the haunting worry of continuous competition. It may well be doubted whether, had he been exposed to influences such as these, Newton would on the one hand have been regarded as a dunce up to the age of eighteen, or, on the other, would have developed into that intellectual giant which the world recognised in his ripened manhood. The forced acorn grows rapidly into a tree sappy as the willow, but it makes no heartwood, and speedily decays; and no system of cultivation will convert a poplar into a yew.

The Treatment of Teeth during School Life.

Mr. S. Spokes, M.R.C.S., L.D.S.Eng., contributed a valuable paper on the Treatment of Teeth, from which the following extracts are made. Dealing with the prevalence of decay of the teeth, it was shown that observations go to prove that high up in the social scale the prevalence of decay is greatest. For instance, out of 560 boys at Haileybury College it was found that 701 of the permanent teeth were already lost, 1,778 had been stopped, 1,743 required stopping, and that only thirteen had sound permanent teeth. Seventy-one others had been rendered artificially sound by stoppings and extractions.

Amongst upper-class boys, it is no uncommon thing to

hear of rejections owing to faulty teeth of those seeking commissions in the Army and Navy. After an expensive educational preparation, and special coaching and cramming, parents are much surprised to hear that the son has failed to pass his medical examination on account of his teeth being below the standard required.

Much—if not all—of this trouble to the individual and the race would be obviated by a recognition of the importance of attention to the teeth during school life. And those whose business it is to treat the teeth are unanimous in their opinion that disease can only be prevented and controlled by a systematic periodical inspection of the teeth with the assistance of the dental probe and mirror. It is of no use to wait until pain comes as a warning; a tooth that is aching has escaped the best moment for "stopping." Early discovery of a cavity of decay, and prompt treatment of it, is by far the better method for both patient and operator. The periodical inspection also shows whether the pupil is doing the best from a prophylactic aspect, by a proper use of the tooth-brush, to keep the mouth in a hygienic state. There can be little doubt that such inspection and early operations can control, to a very large extent, the occurrence of caries during that period of life when most of the mischief is done. The care of the temporary teeth is also of much more importance than is generally allowed, and the various points which arise in the treatment of irregularity (itself a cause of decay) can only be successfully dealt with by periodical inspection by the dental expert.

Mr. Spokes is of opinion that children of the upper classes probably require more attention than any others. Their parents, however, are presumably in a position to obtain the necessary treatment for them, provided they know it is required. Probably much more is done than at any former time. As far as girls are concerned, they seem to escape any systematic supervision whilst at school, but at several public schools the boys are treated more favourably. Those who have not received treatment at home are afforded an opportunity of having necessary work done during term by a dental surgeon visiting the school. In some others boys are allowed to go to town, or the nearest centre, if anything urgent warrants it. At Haileybury College the parents of a new boy are asked, amongst other questions, what is the condition of his teeth, and on his arrival a careful inspection of his mouth is made. The condition of each tooth is marked upon a "chart" containing outlines of the teeth. If the dentition is unsound, as is the case in a very large majority, a copy of the chart is forwarded to the parent, with a report from the dentist and a covering letter from the master, calling attention to the requirements, and requesting that they shall be carried out before the boy returns next term. Boys are not allowed to leave for this purpose during term, but if the parent wishes it, the treatment can be carried out by the school dentist. The matter is, therefore, quite optional, but the parent cannot plead ignorance if anything goes wrong later on. A typical case of what sometimes occurs has quite recently come under notice. A boy inspected on arrival two years ago was found to have already lost four permanent teeth and to have five others with commencing decay. The usual chart and report were made, and the next time he was seen it was for pain from an exposed pulp in the only remaining molar in the left mandible. None of the decay had been treated; all the cavities had, of course, increased in size, and another tooth was also affected. He was proposing to try for Woolwich in a few months, and when told that he would probably be refused on account of ten lost and defective teeth, he was of course anxious that everything possible should be done. His father, a military man, shared his anxiety, but probably will not appreciate the difference in time and fees now necessary to accomplish what would have been a comparatively simple and painless treatment two years ago.

Is it Advisable to allow Junior Boys to Compete in Long-Distance Races?

This question was discussed by Mr. J. F. L. Whittingdale, M.B., M.R.C.S., Medical Officer of Sherborne School. The matter was first brought to the author's notice by the occurrence of symptoms pointing to heart strain in the case of two boys after running in the junior steeplechase, over a course about two and a half miles long. This race is limited to boys under fifteen years of age. Before competing they were both strong and healthy, good at games, and with no symptoms pointing to any affection of the heart. However, shortly afterwards, they developed pronounced symptoms of heart strain, as shown by a tendency to palpitation, dyspnœa, and faintness on the slightest excitement or exertion, which rendered them unfit for games, and even school work, for some considerable time.

With a view to forming some idea of the relative frequency with which such symptoms occur in boys after this race, Mr. Whittingdale examined all the boys who ran in the last junior steeplechase, after an interval of over three months had elapsed. Palpitation and a tendency to faintness were complained of by two boys as coming on without apparent cause, and similar symptoms were noticed after running by three others. Signs pointing to slight hypertrophy of the heart were present in no less than eight cases.

The conclusion arrived at may be briefly stated: That it is manifestly unwise to subject boys at this delicate period to such severe strain as is involved in long-distance races. Mr. Whittingdale thinks that an age limit should be fixed, and that no boys should compete before they are seventeen, and then only after a careful preliminary training, carried out under competent supervision.

A COMPARISON OF THE QUALITY OF MORNING AND AFTERNOON SCHOOL WORK.[1]

THE question as to how far mental fatigue influences the quality of the work done in schools towards the end of the day as compared with that at the beginning is one of interest both to the psychologist and teacher. "Does the work of a day fatigue the pupils mentally, make them really less able to do mental work than they were at its commencement, and, if so, to what extent?" was the problem to which a solution was sought by the following observations.

The method consisted in giving to a sufficient number of scholars a certain test which would measure their ability (in a certain direction, at least) to do mental work, early in the day, and then to give this same test to a *different* lot of children of approximately equal general maturity and ability late in the day. The influence of practice is thus entirely obviated, as the pupils do not have the same sort of work twice. In order to save the results from being vitiated by differences in the general ability of the students, four different tests were used, and the pupils who had two of these tests early had the other two late, while those who had the first two late had the other two early. The influence of possible differences in the average ability of the two sets of students can thus be estimated.

The work given was: (1) a set of multiplication examples to be done in a given time; (2) a page of printed matter full of

[1] Abridged from an article by Professor E. Thorndike, in *Science*. No. 234. June 23rd, 1899.

mis-spelled words which were to be marked in a given time; (3) two sets of nonsense syllables to be written from memory after a ten seconds' look at them, and (4) two sets of figures and one set of simple forms (*e.g.*, square, triangle) to be written from memory in the same way.

About 150 children (four classes) were given 1 and 3 early and 2 and 4 late. An equal number of children of the same standing in the school were given 2 and 4 early in the school day, the other half late. The early tests were all given between 10 minutes and 40 minutes after the opening of school in the morning, while the late tests were given between 40 minutes and 10 minutes before the close of school, half of them at the close of the morning and half at the close of the afternoon work.

Thus, any general decrease in the amount or accuracy of the late work was due to mental fatigue, or to some aversion to work caused by the school day and quite apart from the aversion to conventional routine work or to other factors. And if there is no difference it may be stated with assurance that the day's work has not decreased the child's ability to work; that, though he may in school do less in the latter part of the day, it is not in any wise due to real exhaustion, to a lowering of his mental energy.

As a matter of fact, what difference there was between the early and late work was in favour of the *latter*. All the results obtained seem to show that the mental work of the school day does not produce any marked decrease in the ability to do further work. Taking together the work of all the children tested, it is found that those who had the test late did almost 2 per cent. better than those who had it early.

A glance at the following table, which summarises the more important data, shows better perhaps than more detailed accounts that there is no particular falling off in the quality of school-work towards the end of the day.

Test.	No. of Scholars tested.	Ratio of Late to Early Work.
Multiplication ...	297	102·9 per cent.
Spelling	273	101·5 ,, ,,
Figures	295	102·0 ,, ,,
Nonsense Syllables ...	147	98·0 ,, ,,
Form	145	94·6 ,, ,,
Letters	140	99·0 ,, ,,

COMMERCIAL EDUCATION IN THE UNITED STATES.

A VALUABLE memorandum prepared by the United States Commissioner of Education for the British Embassy at Washington, and appended to the recent report[1] to the Foreign Office on Commercial Education in the United States, deals in an interesting manner with the progress during the last half century of the methods adopted in the various States for providing an education suitable for those who intend to make commerce their life's work.

Commercial or business colleges, so-called, had their beginning in the United States more than fifty years ago. At least one institution of this class now in existence was established in 1840. For many years the branches taught in these business schools were substantially limited to book-keeping, arithmetic in which prominence was given to percentage and commercial calculations, penmanship, and business forms. Later, stenography and type-writing were added. For twenty years or more these private schools made but slow progress, partly because the training offered in these branches was not superior to that which could be obtained by their study in many of the colleges and private academies.

In 1870 the Commissioner of Education at Washington received reports from twenty-six business colleges, although there must have been a larger number then in existence. These twenty-six schools had 5,824 students. In 1880 the number of schools reporting had increased to 162 and the number of students to 27,146.

The demand for stenographers and type-writers caused the rapid growth in the attendance upon these schools. Amanuensis courses were offered in nearly all of them, and students obtained diplomas or certificates of graduation in from two to six months in some of them. Very few of these schools had courses of study extending over more than one year.

In 1890 the number of business schools was 263 with 78,920 students. The high-water mark was reached in 1894, when 518 of these schools reported, with an enrolment of 115,748 students. Since that time there has been a steady decline in the number of schools and a rapid decrease in the number of students. For the year 1898 there were only 337 commercial or business schools reporting to the Bureau of Education, and the number of students was only 70,950. This decrease is attributed partly to the business depression of the past few years, and partly to the fact that so many public high schools as well as many private colleges and academies have established commercial courses in many respects superior to those offered by a majority of the business colleges.

Higher Commercial Education.

It has been long admitted among leading business men that those preparing for business careers should have the opportunity of a commercial education higher and broader than that given by even the best of the so-called business colleges. About ten years ago the American Bankers' Association began to direct the attention of educators and the public to the need of a more adequate professional training for young men preparing for business life. A committee was appointed to find out what was being done in this direction in the institutions for higher education in the United States. It was found that the Wharton School of Finance and Economy of the University of Pennsylvania was the only institution offering a course of study of a grade comparable with the regular collegiate course, and specialising those subjects most important to thorough training for business and citizenship. At the request of this committee, Dr. Edmund J. James, then professor in the Wharton school, was invited to visit the leading educational centres of Europe, examine their best commercial schools, and present a report upon the subject. Prof. James presented his report to the American Bankers' Association in 1893.[1]

The agitation begun by the American Bankers' Association has resulted in the establishment of commercial departments in at least two Universities, those of California and Chicago, the improvement of business courses in a number of colleges, and the organisation of such courses in other colleges, and in many public and private high schools and academies.

The Wharton School.

The Wharton School, founded in 1881, was the first institution in the United States to offer a thorough professional education to young men contemplating business careers. The course in finance and economy constructed upon the plan suggested by

[1] No. 504. Miscellaneous Series. 1899.

[1] Reprinted in the 1895-96 report of the United States Commissioner of Education. Vol i., chap. xv., pp. 721-837.

the founder extends over four years, and is one of the regular college courses leading to the degree of Bachelor of Science in Economics. In 1897-98 there were eighty-seven students in this school. Besides many subjects usually included in higher education, particularly certain branches dealing with political and social problems, the course includes the following topics which relate to commerce:—Accounting, physical and economic geography, practical economic problems, algebra, German, business law, money and banking, business practice, theory and geography of commerce, political economy, economic history, history of law and legal concepts, local and municipal institutions, public finance, and transport.

University of California.

The Board of Regents of the University of California on January 15th, 1898, decided to establish a college of commerce in that institution. The college was formally opened at the beginning of the last term of the same year. The four years' course is parallel with the curricula of the colleges of general culture, about one-half of the subjects studied being prescribed in these colleges. The subjects making up the other half of the fundamental course are selected from a broad field covering philosophical, legal, political, historical, economic, geographical, technological, and mathematical studies. It is stated that "this college is intended to afford an opportunity for the scientific study of commerce in all of its relations and for the higher education of business men, and of the higher officers of the civil service." Besides the fundamental courses, the new college offers a large number of special courses, and the student may arrange his studies with special reference to the future work, the different subjects being more or less closely related to commerce.

University of Chicago.

The next great institution in this country to recognise the importance of the higher business training and to make liberal provision for it is the University of Chicago. The College of Commerce and Politics opened its doors at the beginning of the last summer quarter. President Harper, in his twenty-fifth quarterly statement, presented on October 1st, 1898, says:—"It is with a feeling of great satisfaction that I may announce the inauguration during the past quarter of the College of Commerce and Politics. It will be remembered that the undergraduate work of the University was organised in three colleges, the College of Arts, the College of Literature, and the College of Science, each college taking its name from the groups of subjects upon which special emphasis was laid. When it was first proposed by Head Professor Laughlin that the University should organise work in a line of subjects dealing more closely with the great fields of commerce and politics, it was still a question whether that work should take the form of a professional school or be organised as regular college work. After long debate in the faculties and senate of the University it was decided that the work should be organised as a college and administered as such. Herein lies the great difference between the work as thus presented in the University of Chicago and certain work of perhaps a similar character undertaken elsewhere."

The required course in commerce includes, besides the general branches usually taught in higher education, the following topics specially relating to commerce: Railway transport, comparative railway legislation, financial history of the United States, money and practical economics, banking, processes of leading industries, tariff history of the United States, insurance.

Commercial Education in Public Colleges.

Of the 172 colleges providing commercial or business courses all are private institutions except eleven. Of the eleven, two are supported wholly by the States in which they are located, the nine being agricultural and mechanical colleges supported by funds from the general government supplemented in some instances by State funds. The eleven public institutions offering commercial courses or providing for certain commercial studies are the University of the State of Missouri, West Virginia University, Colorado State Agricultural College, University of South Dakota, South Dakota Agricultural College, Florida Agricultural College, Nevada State University, Montana State College, University of Arizona, New Mexico College, and North Georgia Agricultural College.

Commercial Education in Private Secondary Schools.

Of the nearly 2,000 private high schools and academies reporting to the Commissioner for 1897-98, there were 742 with 14,780 students in commercial and business courses. In the 742 schools there were only forty reporting as many as thirty students each in commercial courses. References to the courses of study in a few of these schools will give a general idea of the work being done in the direction of commercial education by the private secondary schools of the United States.

The Thornton Academy at Saco, Maine, offers a business course extending over four years parallel with the regular courses. It includes, besides the usual secondary studies, business arithmetic, penmanship, book-keeping, business forms, physics, physical geography.

The commercial course in Calvert Hall, Baltimore, Maryland, may extend over one or two years. It includes commercial correspondence, commercial arithmetic, book-keeping, banking, phonography, type-writing, modern languages and drawing.

The business course in the Wentworth Military Academy extends over five years parallel to the classical course. It omits Latin and modern foreign languages, substituting for them commercial arithmetic, drawing, book-keeping, business forms and correspondence, commercial law, civil government, stenography, &c.

The commercial course in the Pawnee City Academy includes most of the studies usually taught in the first and second years of the course of secondary studies together with book-keeping, commercial arithmetic, and commercial law.

Commercial Education in Public High Schools.

There were 5,260 public high schools reporting to the Bureau of Education for the year 1897-98. There were 1,037 of these schools, having a total of 32,314 students, in the commercial or business course of study. The business course in the greater number of these schools does not differ widely from the business course in the private secondary schools already mentioned. In many of these schools the last year of the course is devoted largely to commercial studies, while in many others such studies are distributed through the whole course of four years. Of the 1,037 public high schools mentioned, there are only 139 having fifty or more commercial students each.

Business High School, Washington.

For years Washington has enjoyed the distinction of having the only business high school in the United States connected with a city system of schools, and wholly supported by public funds. The Business High School was established in 1890, although the Central High School had had a business department since

1882. The report of the Business High School for 1890-91 shows that 310 students (160 males and 150 females) were enrolled the first year, and that the school had nine teachers. The school has had a steady growth to the present time. The report for 1897-98 shows an enrolment of 601. There were eighty-nine graduates, the largest number for any year since the school was established. The number of teachers employed is twenty. The average age of the student entering is 16·7 years. The requirements for admission are the same as for the other high schools of the city, and presuppose the completion of the eighth year course of the elementary schools. The course of study for the Business High School is as follows:—

First year: English grammar and literature, business arithmetic, book-keeping, penmanship, shorthand, typewriting or mechanical drawing.

Second year: English grammar and literature, book-keeping and business practice, commercial law and commercial geography, shorthand, typewriting, advanced mechanical drawing (optional).

Further Examples.

The commercial course of study for the high schools of Boston, adopted by the School Committee, September 24th, 1897, extends through two years, and in addition to the secondary branches usually taught, includes the following, specially relating to commerce: penmanship and commercial forms, commercial arithmetic, book-keeping, phonography and typewriting, elements of mercantile law, commercial geography.

The course of study for the Department of Commerce in the Central High School of Philadelphia covers four years, and in addition to the secondary branches usually taught, includes the following, specially relating to commerce: penmanship and business forms, physical geography, commercial arithmetic, commercial geography, book-keeping, stenography, typewriting, office practice, observation of business methods, industrial and commercial history, industrial chemistry, transport, banking and finance, ethics of business, commercial law, and Philadelphia interests.

The commercial departments of the high schools in other important American cities are organised upon the same general lines as those given, and no particular advantage is gained by multiplying examples.

The Cost of Commercial Education.

It is difficult to obtain an accurate estimate of the cost of commercial education in the public high schools, the separate cost of the schools themselves not being reported except in a few instances. Where these schools belong to city systems of public schools the cost is included in the general financial statement of the system. It may be stated in general that the cost per pupil is from 50 to 100 per cent. greater in the high schools than in the elementary schools. In the city of Washington the cost per pupil in the first four grades of the elementary schools, estimated on average enrolment, was 12 dol. 42 c. for 1897-98; in the next four grades the estimated cost per pupil upon the same basis was 20 dol. 56 c.; while the cost of each high school pupil, estimated on average enrolment, was 42 dol. 89 c. This figure may be taken as the cost per pupil in the Washington Business High School.

THE truth is that men of business are seeking the Philosopher's Stone. They are in quest of knowledge convertible into cash on demand; knowledge moreover of which the value shall be obvious to children, and which children can acquire without toil and pain, because every stage of its acquisition shall be interesting. The quest is vain.—Robert L. Leighton.

MEDICINE AS A CAREER.

PARENTS and guardians frequently consult headmasters as to the steps which have to be taken in order to enter the various professions, and the course of professional training which has subsequently to be followed. In the case of the medical profession, information of this kind is given annually in special numbers of periodicals devoted to the interests of medical men.

The *British Medical Journal* of August 26th is an educational number of this character, and we are indebted to it for the following extracts from two of the valuable articles it contains. The advice given is thus both sound and authoritative; and as much of it has a distinct bearing upon the work of secondary schools, it should be of real interest to many headmasters.

The Medical Curriculum.

The course of professional training through which a student who desires to enter the medical profession must pass is, under the regulations now in force, essentially the same in all cases. The Universities and medical corporations differ from each other only in the severity of the various examinational tests which they impose, but the subjects of study which are laid down by the General Medical Council are broadly the same for all. The minimum period of study after registration as a medical student is five years, whether the curriculum be passed in England, Scotland, or Ireland, and whether the student is seeking a University degree or a college diploma.

Before he can begin his course of medical study, the student must pass one of the recognised Preliminary Examinations in Arts, a complete list of which can be obtained from the Registrar of the General Medical Council (299, Oxford Street, W.), or from the Registrar of the Branch Council in Scotland or Ireland (48, George Square, Edinburgh, or 35, Dawson Street, Dublin). In the case of the student seeking a University degree, he must pass the particular Preliminary Examination laid down by that University. Thus, for example, to pass the Junior Oxford or Cambridge Local Examination in the required subjects will suffice for registration, but will not admit the student to the examinations for the degrees of the University of London, for which the only recognised preliminary is the Matriculation Examination of that University. Immediately after passing the required Preliminary Examination the student should enter at the medical school he has selected, and register his name at the office of the General Medical Council, after which he begins to count the five years of compulsory study.

Regulations of the General Medical Council.

The first thing which confronts the inquirer is that all the course along which the student has to tread has been marked out for him by the regulations of the General Council of Medical Education and Registration. Before he can even register himself as a medical student he must first of all pass a Preliminary Examination approved by the Council, and until he has so registered himself no time spent in study or attending lectures will be allowed to count as part of the five years required by the regulations of the Council to be spent in medical study. The curricula of the hospitals and schools where he is taught must conform to the Council's regulations, and when at length he has obtained a registrable qualification or qualifications, these must be duly recorded by the Council in its *Medical Register* before he is legally qualified to practise his profession.

Universities and Corporations.

Even before the student passes his preliminary examination a decision should be come to as to whether he intends to take a degree (M.B. or M.D.) at a University, or to be content with the less ornamental but perhaps, for general practice, quite as useful, double diploma of the Conjoint Board in London, Scotland, or Dublin, entitling him to write after his name the letters L.R.C.P. and M.R.C.S. in England, L.R.C.P.and S. in Ireland, and L.R.C.P.and S. and L.F.P.S.G. in Scotland. If this decision be delayed, and he should desire after commencing study to go in for the degree of the London University, for instance, he will find himself seriously handicapped by having to take up again his preliminary work, when he ought to be working hard at his strictly medical studies.

Where expense is no object, the advantages of having had a university education at Oxford or Cambridge, Edinburgh or Dublin, are apparent to all. Friendships are formed in all these places, often among those who intend to enter other professions—friendships which are of service to the student in his after-career. Then also, the degree of M.D., which they in common with the Victoria and Durham Universities in England, the other Scotch universities, and the Royal University of Ireland, confer, has a mysterious charm in the eyes of the public which no other combination of letters seems to possess, and it is, moreover, indispensable for those who seek to obtain honorary appointments to hospitals on the medical side, or to practice as consulting physicians. The degrees of the University of London, for which residence is not required, stand on a somewhat different footing from those of the older universities, and maintain their high character by the exceptionally severe nature of their examinations, which render them comparatively difficult to obtain. The licence of the Apothecaries Company in London and Dublin also gives admission to the *Medical Register*, but few students are content, after a course of study as prolonged and, with the exception of the cost of the diploma, as expensive as that for the Conjoint Board, to be able to write after their names merely L.S.A.

For the ordinary run of English students, the great objection to seeking a university degree is the extra year which in practice is so often required, and the fact that unless he happens to reside in a university town, or one in which a college connected with a university exists, his calculations as to cost must be on a higher scale than if he merely design to qualify at the Conjoint Board. At Cambridge, for instance, residence for the university year of about twenty-four weeks can hardly be done much under £200, while at the residential colleges connected with several of the London medical schools, as also at Owens College, Manchester, and the Yorkshire College, Leeds, the charges, varying somewhat in each place and according to the rooms selected, are all very much less than those at Cambridge. Thus at King's College, London, the cost of the academic year for rooms and dinner varies from £50 to £60.

In Ireland the same difficulty of expense in obtaining the degree of M.D. need not arise, since, in addition to old Trinity in Dublin, there are the three colleges of Belfast, Cork and Galway in connection with the Royal University of Ireland, which enable the Irish student to qualify M.D. with as little expense as he would incur to obtain the diplomas of the Conjoint Board. In Scotland the cheapness with which a university degree can be obtained has long been a marvel to Englishmen, and seems to be largely due to the capability of the Scotch student for restricting his personal expenses, both for living and clothing, within such narrow bounds as are rendered necessary by the *res angusta domi*, a practical lesson in self-control and self-denial which stands him in good stead in after-life.

Selection of a Medical School.

The decision whether a university degree is to be sought or not having been made, the next step is to select a medical school. London, Edinburgh and Dublin will always attract large numbers of students, but the parent or guardian may be assured that in many of the great provincial centres his son or charge will receive as good practical teaching, and be as well prepared either for the ordinary diplomas or for the higher degrees as in the metropolitan cities.

As a general rule, the best time for entering at a medical school is May. The student then learns during his first summer session chemistry and chemical physics, also practical chemistry, and passing an examination in them at the end of the session, gets them, so to speak, out of his way before he commences anatomy and physiology in his first winter session. He may also, if he has done practical pharmacy either in the hospital dispensary or with a general practitioner, go in for examination in it, or he may defer this to a later period. By taking practical pharmacy with an outside practitioner the student will gain a useful insight into the usages of private practice, and will be better prepared to undertake the duties of an assistant should this at any time become necessary. With the winter session commence the lectures on anatomy and physiology, the dissections and tutorial classes, with always the prospect of an examination at the end of the session looming in the distance.

The student who loves his work will find the five years spent at a medical school by no means too long to make him thoroughly prepared for practising on his own account. After he has passed his first examination in anatomy and physiology at one of the examining boards he becomes eligible for the offices of clerk or dresser at his hospital, by holding which he is brought at once into close personal contact with the medical and surgical cases of which he is required to take notes; in order that he may be able to do this in a systematic manner he receives instruction from the medical tutor at the hospital on the examination of patients and on notetaking. As clinical clerk to one of the physicians, or dresser to one of the surgeons, he has opportunities of which he should avail himself to the utmost, of cultivating the faculty of accurate observation, of training his eyes, ears, and hands, and of learning the use of various instruments of precision. He will also at this time find occasion for applying the knowledge he has already gained of microscopic and chemical work in the ward and laboratory to the study of disease in the living, and by holding the appointment of clerk in the *post-mortem* room to the morbid appearances after death.

The Cost of a Medical Education.

Most of the London hospital schools arrange that by paying a composition fee of from a little over £100 to £150, either in one sum or by instalments, the student becomes a perpetual student, and is entitled to attend all necessary lectures and hospitals for the double diploma. As cheapness here cannot be considered a special recommendation, we take the larger sum for the purpose of our estimate, and adding to it the necessary expenses for maintenance, clothing, books, anatomical parts, &c., at £100 a year for five years—a rather low estimate for London—we find that the total cost of an ordinary student at a London hospital who qualifies at the Conjoint Board would be from £650 to £700; that of a university graduate would necessarily be greater, and might amount to £1,000. Of course there is always the possibility in either case that rejections at intermediate examinations may prolong the period of studentship by an additional six months or a year, or may even render coaching necessary, and so add to the cost.

A CENTURY'S PROGRESS IN SCIENCE.[1]

I DO not propose to weary you by what in my hands would be the rash effort of attempting a survey of all the scientific results of the nineteenth century. It will be enough if for a little while I dwell on some few of the salient features distinguishing the way in which we nowadays look upon, and during the coming week shall speak of, the works of Nature around us —though those works themselves, save for the slight shifting involved in a secular change, remain exactly the same—from the way in which they were looked upon and might have been spoken of at a gathering of philosophers at Dover in 1799. And I ask your leave to do so.

In the philosophy of the ancients, earth, fire, air and water were called "the elements." It was thought, and rightly thought, that a knowledge of them and of their attributes was a necessary basis of a knowledge of the ways of Nature. Translated into modern language, a knowledge of these "elements" of old means a knowledge of the composition of the atmosphere, of water, and of all the other things which we call matter, as well as a knowledge of the general properties of gases, liquids, and solids, and of the nature and effects of combustion. Of all these things our knowledge to-day is large and exact, and, though ever enlarging, in some respects complete. When did that knowledge begin to become exact?

To-day the children in our schools know that the air which wraps round the globe is not a single thing, but is made up of two things, oxygen and nitrogen,[2] mingled together. They know, again, that water is not a single thing, but the product of two things, oxygen and hydrogen, joined together. They know that when the air makes the fire burn and gives the animal life, it is the oxygen in it which does the work. They know that all round them things are undergoing that union with oxygen which we call oxidation, and that oxidation is the ordinary source of heat and light. Let me ask you to picture to yourselves what confusion there would be to-morrow, not only in the discussions at the sectional meetings of our Association, but in the world at large, if it should happen that in the coming night some destroying touch should wither up certain tender structures in all our brains, and wipe out from our memories all traces of the ideas which cluster in our minds around the verbal tokens, oxygen and oxidation. How could any of us, not the so-called man of science alone, but even the man of business and the man of pleasure, go about his ways lacking those ideas? Yet those ideas were in 1799 lacking to all out a few.

Although in the third quarter of the seventeenth century the light of truth about oxidation and combustion had flashed out in the writings of John Mayow, it came as a flash only, and died away as soon as it had come. For the rest of that century, and for the greater part of the next, philosophers stumbled about in darkness, misled for the most of the time by the phantom conception which they called phlogiston. It was not until the end of the third quarter of the eighteenth century that the new light, which has burned steadily ever since, lit up the minds of the men of science. The light came at nearly the same time from England and from France. Rounding off the sharp corners of controversy, and joining, as we may fitly do to-day, the two countries as twin bearers of a common crown, we may say that we owe the truth to Cavendish, to Lavoisier, and Priestley. If it was Priestley who was the first to demonstrate the existence of what we now call oxygen, it is to Lavoisier we owe the true conception of the nature of oxidation and the clear exposition of the full meaning of Priestley's discovery, while the knowledge of the composition of water, the necessary complement of the knowledge of oxygen, came to us through Cavendish and, we may perhaps add, through Watt.

The date of Priestley's discovery of oxygen is 1774, Lavoisier's classic memoir "On the Nature of the Principle which enters into combination with Metals during Calcination" appeared in 1775, and Cavendish's paper on the Composition of Water did not see the light until 1784.

During the last quarter of the eighteenth century this new idea of oxygen and oxidation was struggling into existence. How new was the idea is illustrated by the fact that Lavoisier himself at first spoke of that which he was afterwards, namely in 1778, led to call oxygen, the name by which it has since been known, as "the principle which enters into combination." What difficulties its acceptance met with is illustrated by the fact that Priestley himself refused to the end of his life to grasp the true bearings of the discovery which he had made. In the year 1799 the knowledge of oxygen, of the nature of water and of air, and indeed the true conception of chemical composition and chemical change, was hardly more than beginning to be, and the century had to pass wholly away before the next great chemical idea, which we know by the name of the Atomic Theory of John Dalton, was made known. We have only to read the scientific literature of the time to recognise that a truth which is now not only woven as a master-thread into all our scientific conceptions, but even enters largely into the every-day talk and thoughts of educated people, was a hundred years ago struggling into existence among the philosophers themselves. It was all but absolutely unknown to the large world outside those select few.

If there be one word of science which is writ large on the life of the present time, it is the word "electricity"; it is, I take it, writ larger than any other word. The knowledge which it denotes has carried its practical results far and wide into our daily life, while the theoretical conceptions which it signifies pierce deep into the nature of things. We are to-day proud, and justly proud, both of the material triumphs and of the intellectual gains which it has brought us, and we are full of even larger hopes of it in the future.

At what time did this bright child of the nineteenth century have its birth?

He who listened to the small group of philosophers of Dover, who in 1799 might have discoursed of natural knowledge, would perhaps have heard much of electric machines, of electric sparks, of the electric fluid, and even of positive and negative electricity; for frictional electricity had long been known and carefully studied. Probably one or more of the group, dwelling on the observations which Galvani, an Italian, had made known some twenty years before, developed views on the connection of electricity with the phenomena of living bodies. Possibly one of them was exciting the rest by telling how he had just heard that a professor at Pavia, one Volta, had discovered that electricity could be produced not only by rubbing together particular bodies, but by the simple contact of two metals, and had thereby explained Galvani's remarkable results. For, indeed, as we shall hear from Professor Fleming, it was in that very year, 1799, that electricity as we now know it took its birth. It was then that Volta brought to light the apparently simple truths out of which so much has sprung. The world, it is true, had to wait for yet some twenty years before both the practical and the theoretic worth of Volta's discovery became truly pregnant, under the fertilising influence of another discovery. The loadstone and magnetic virtues had, like the electrifying power of rubbed amber, long been an old story. But, save for the compass, not much had come from it. And

[1] From the Presidential Address by Sir Michael Foster, K.C.B., F.R.S., to the British Association at Dover on Wednesday, September 13th, 1899.

[2] Some may already know that there is at least a third thing, argon.

even Volta's discovery might have long remained relatively barren had it been left to itself. When, however, in 1819, Oersted made known his remarkable observations on the relations of electricity to magnetism, he made the contact needed for the flow of a new current of ideas. And it is perhaps not too much to say that those ideas, developing during the years of the rest of the century with an ever-accelerating swiftness, have wholly changed man's material relations to the circumstances of life, and at the same time carried him far in his knowledge of the nature of things.

Of all the various branches of science, none perhaps is to-day, none for these many years past has been, so well known to, even if not understanded by, most people as that of geology. Its practical lessons have brought wealth to many; its fairy tales have brought delight to more; and round it hovers the charm of danger, for the conclusions to which it leads touch on the nature of man's beginning.

In 1799, the science of geology, as we now know it, was struggling into birth. In 1783, James Hutton put forward in a brief memoir his "Theory of the Earth," which in 1795, two years before his death, he expanded into a book; but his ideas failed to lay hold of men's minds until the century had passed away, when, in 1802, they found an able expositor in John Playfair. The very same year that Hutton published his theory, Cuvier came to Paris, almost and forthwith began, with Brongniart, his immortal researches into the fossils of Paris and its neighbourhood. And four years later, in the year 1799 itself, William Smith's tabular list of strata and fossils saw the light. It is, I believe, not too much to say that out of these geology, as we now know it, sprang. It was thus in the closing years of the eighteenth century that was begun the work which the nineteenth century has carried forward to such great results. But at that time only the select few had grasped the truth, and even they only the beginning of it. Outside a narrow circle the thoughts, even of the educated, about the history of the globe were bounded by the story of the Deluge—though the story was often told in a strange fashion—or were guided by fantastic views of the plastic forces of a sportive Nature.

In another branch of science, in that which deals with the problems presented by living beings, the thoughts of men in 1799 were also very different from the thoughts of men to-day. It is a very old quest, the quest after the knowledge of the nature of living beings, one of the earliest on which man set out, for it promised to lead him to a knowledge of himself, a promise which perhaps is still before us, but the fulfilment of which is as yet far off. As time has gone on, the pursuit of natural knowledge has seemed to lead man away from himself into the furthermost parts of the universe, and into secret workings of Nature in which he appears to be of little or no account; and his knowledge of the nature of living things, and so of his own nature, has advanced slowly, waiting till the progress of other branches of natural knowledge can bring it aid. Yet in the past hundred years, the biologic sciences, as we now call them, have marched rapidly onward.

We may look upon a living body as a machine doing work in accordance with certain laws, and may seek to trace out the working of the inner wheels, how these raise up the lifeless dust into living matter, and let the living matter fall away again into dust, giving out movement and heat. Or we may look upon the individual life as a link in a long chain, joining something which went before to something about to come, a chain whose beginning lies hid in the farthest past, and may seek to know the ties which bind one life to another. As we call up to view the long series of living forms, living now or flitting like shadows on the screen of the past, we may strive to lay hold of the influences which fashion the garment of life. Whether the problems of life are looked upon from the one point of view or the other, we to-day, not biologists only, but all of us, have gained a knowledge hidden even from the philosophers a hundred years ago.

Of the problems presented by the living body viewed as a machine, some may be spoken of as mechanical, others as physical, and yet others as chemical, while some are, apparently at least, none of these. In the seventeenth century William Harvey, laying hold of the central mechanism of the blood stream, opened up a path of inquiry which his own age and the century which followed trod with marked success. The knowledge of the mechanics of the animal and of the plant advanced apace; but the physical and chemical problems had yet to wait. The eighteenth century, it is true, had its physics and its chemistry; but, in relation at least to the problems of the living being, a chemistry which knew not oxygen and a physics which knew not the electricity of chemical action were of little avail. The philosopher of 1799, when he discussed the functions of the animal or of the plant involving chemical changes, was fain for the most part, as were his predecessors in the century before, to have recourse to such vague terms as "fermentation," and the like; to-day our treatises on physiology are largely made up of precise and exact expositions of the play of physical agencies and chemical bodies in the living organism. He made use of the words "vital force" or "vital principle" not as an occasional, but as a common, explanation of the phenomena of the living body. During the present century, especially during its latter half, the idea embodied in those words has been driven away from one seat after another; if we use it now when we are dealing with the chemical and physical events of life we use it with reluctance, as a *deus ex machina* to be appealed to only when everything else has failed.

Some of the problems—and those, perhaps, the chief problems—of the living body have to be solved neither by physical nor by chemical methods, but by methods of their own. Such are the problems of the nervous system. In respect to these the men of 1799 were on the threshold of a pregnant discovery. During the latter part of the present century, and especially during its last quarter, the analysis of the mysterious processes in the nervous system, and especially in the brain, which issue as feeling, thought, and the power to move, has been pushed forward with a success conspicuous in its practical, and full of promise in its theoretical, gains. That analysis may be briefly described as a following up of threads. We now know that what takes place along a tiny thread which we call a nerve-fibre differs from that which takes place along its fellow-threads, that differing nervous impulses travel along different nerve-fibres, and that nervous and psychical events are the outcome of the clashing of nervous impulses as they sweep along the closely-woven web of living threads of which the brain is made. We have learnt by experiment and by observation that the pattern of the web determines the play of the impulses, and we can already explain many of the obscure problems not only of nervous disease, but of nervous life, by an analysis which is a tracking out the devious and linked paths of nervous threads. The very beginning of this analysis was unknown in 1799. Men knew that nerves were the agents of feeling and of the movements of muscles; they had learnt much about what this part or that part of the brain could do; but they did not know that one nerve-fibre differed from another in the very essence of its work. It was just about the end of the past century, or the beginning of the present one, that an English surgeon began to ponder over a conception which, however, he did not make known until some years later, and which did not gain complete demonstration and full acceptance until still more years had passed away. It was in 1811, in a tiny pamphlet published privately, that Charles Bell put forward his "New Idea" that the nervous system was constructed on the principle that "the

nerves are not single nerves possessing various powers, but bundles of different nerves, whose filaments are united for the convenience of distribution, but which are distinct in office as they are in origin from the brain." Our present knowledge of the nervous system is to a large extent only an exemplification and expansion of Charles Bell's "New Idea," and has its origin in that.

If we pass from the problems of the living organism viewed as a machine to those presented by the varied features of the different creatures who have lived or who still live on the earth, we at once call to mind that the middle years of the present century mark an epoch in biologic thought such as never came before, for it was then that Charles Darwin gave to the world the "Origin of Species." That work, however, with all the far-reaching effects which it has had, could have little or no effect, or, rather, could not have come into existence, had not the earlier half of the century been in travail preparing for its coming. For the germinal idea of Darwin appeals, as to witnesses, to the results of two lines of biologic investigation which were almost unknown to the men of the eighteenth century. To one of these lines I have already referred. Darwin, as we know, appealed to the geological record; and we also know how that record, imperfect as it was then, and imperfect as it must always remain, has since his time yielded the most striking proofs of at least one part of his general conception. In 1799 there was, as we have seen, no geological record at all.

Of the other line I must say a few words.

To-day the merest beginner in biologic study, or even that exemplar of acquaintance without knowledge, the general reader, is aware that every living being, even man himself, begins its independent existence as a tiny ball, of which we can, even acknowledging to the full the limits of the optical analysis at our command, assert with confidence that in structure, using that word in its ordinary sense, it is in all cases absolutely simple. It is equally well known that the features of form which supply the characters of a grown-up living being, all the many and varied features of even the most complex organism, are reached as the goal of a road, at times a long road, of successive changes; that the life of every being, from the ovum to its full estate, is a series of shifting scenes, which come and go, sometimes changing abruptly, sometimes melting the one into the other, like dissolving views, all so ordained that often the final shape with which the creature seems to begin, or is said to begin, its life in the world is the outcome of many shapes, clothed with which it in turn has lived many lives before its seeming birth.

If we wish to measure how far off in biologic thought the end of the last century stands, not only from the end but even from the middle of this one, we may imagine Darwin striving to write the "Origin of Species" in 1799. We may fancy him being told by philosophers explaining how one group of living beings differed from another group because all its members and all their ancestors came into existence at one stroke when the first-born progenitor of the race, within which all the rest were folded up, stood forth as the result of a creative act. We may fancy him listening to a debate between the philosopher who maintained that all the fossils strewn in the earth were the remains of animals or plants churned up in the turmoil of a violent universal flood, and dropped in their places as the waters went away, and him who argued that such were not really the "spoils of living creatures," but the products of some playful plastic power which out of the superabundance of its energy fashioned here and there the lifeless earth into forms which imitated, but only imitated, those of living things. Could he amid such surroundings by any flight of genius have beat his way to the conception for which his name will ever be known?

Here I may well turn away from the past. It is not my purpose, nor, as I have said, am I fitted, nor is this perhaps the place, to tell even in outline the tale of the work of science in the nineteenth century. I am content to have pointed out that the two great sciences of chemistry and geology took their birth, or at least began to stand alone, at the close of the last century, and have grown to be what we know them now within about a hundred years, and that the study of living beings has within the same time been so transformed as to be to-day something wholly different from what it was in 1799. And, indeed, to say more would be to repeat almost the same story about other things. If our present knowledge of electricity is essentially the child of the nineteenth century, so also is our present knowledge of many other branches of physics. And those most ancient forms of exact knowledge, the knowledge of numbers and of the heavens, whose beginning is lost in the remote past, have, with all other kinds of natural knowledge, moved onward during the whole of the hundred years with a speed which is ever increasing. I have said, I trust, enough to justify the statement that in respect to natural knowledge a great gulf lies between 1799 and 1899. The gulf, moreover, is a twofold one: not only has natural knowledge been increased, but men have run to and fro spreading it as they go. Not only have the few driven far back round the full circle of natural knowledge the dark clouds of the unknown which wrapt us all about, but also the many walk in the zone of light thus increasingly gained. If it be true that the few to-day are, in respect to natural knowledge, far removed from the few of those days, it is also true that nearly all which the few alone knew then, and much which they did not know, has now become the common knowledge of the many.

What, however, I may venture to insist upon here is that the difference in respect to natural knowledge, whatever be the case with other differences between then and now, is undoubtedly a difference which means progress. The span between the science of that time and the science of to-day is beyond all question a great stride onwards.

We may say this, but we must say it without boasting. For the very story of the past which tells of the triumphs of science bids the man of science put away from him all thoughts of vainglory. And that by many tokens.

Whoever, working at any scientific problem, has occasion to study the inquiries into the same problem made by some fellow-worker in the years long gone by, comes away from that study humbled by one or other of two different thoughts. On the one hand he may find, when he has translated the language of the past into the phraseology of to-day, how near was his forerunner of old to the conception which he thought, with pride, was all his own, not only so true but so new. On the other hand, if the ideas of the investigator of old, viewed in the light of modern knowledge, are found to be so wide of the mark as to seem absurd, the smile which begins to play upon the lips of the modern is checked by the thought, Will the ideas which I am now putting forth, and which I think explain so clearly, so fully, the problem in hand, seem to some worker in the far future as wrong and as fantastic as do these of my forerunner to me? In either case his personal pride is checked. Further, there is written clearly on each page of the history of science, in characters which cannot be overlooked, the lesson that no scientific truth is born anew, coming by itself and of itself. Each new truth is always the offspring of something which has gone before, becoming in turn the parent of something coming after. In this aspect the man of science is unlike, or seems to be unlike, the poet and the artist. The poet is born, not made; he rises up, no man knowing his beginnings; when he goes away, though men after him may sing his songs for centuries, he himself goes away wholly, having taken with him his

mantle, for this he can give to none other. The man of science is not thus creative; he is created. His work, however great it be, is not wholly his own; it is in part the outcome of the work of men who have gone before. Again and again a conception which has made a name great has come not so much by the man's own effort as out of the fulness of time. Again and again we may read in the words of some man of old the outlines of an idea which in later days has shone forth as a great acknowledged truth. From the mouth of the man of old the idea dropped barren, fruitless; the world was not ready for it, and heeded it not; the concomitant and abutting truths which could give it power to work were wanting. Coming back again in later days, the same idea found the world awaiting it; things were in travail preparing for it; and someone, seizing the right moment to put it forth again, leapt into fame. It is not so much the men of science who make science, as some spirit which, born of the truths already won, drives the man of science onward and uses him to win new truths in turn.

It is because each man of science is not his own master, but one of many obedient servants of an impulse which was at work long before him, and will work long after him, that in science there is no falling back. In respect to other things there may be times of darkness and times of light, there may be risings, decadences, and revivals. In science there is only progress. The path may not be always a straight line, there may be swerving to this side and to that, ideas may seem to return again and again to the same point of the intellectual compass; but it will always be found that they have reached a higher level —they have moved, not in a circle, but in a spiral. Moreover, science is not fashioned as is a house, by putting brick to brick, that which is once put remaining as it was put to the end. The growth of science is that of a living being. As in the embryo phase follows phase, and each member of the body puts on in succession different appearances, though all the while the same member, so a scientific conception of one age seems to differ from that of a following age, though it is the same one in the process of being made; and as the dim outlines of the early embryo become, as the being grows more distinct and sharp, like a picture on a screen brought more and more into focus, so the dim gropings and searchings of the men of science of old are by repeated approximations wrought into the clear and exact conclusions of later times.

The story of natural knowledge, of science, in the nineteenth century, as, indeed, in preceding centuries, is, I repeat, a story of continued progress. There is in it not so much as a hint of falling back, not even of standing still. What is gained by scientific inquiry is gained for ever; it may be added to, it may seem to be covered up, but it can never be taken away. Confident that the progress will go on, we cannot help peering into the years to come and straining our eyes to foresee what science will become and what it will do as they roll on. While we do so, the thought must come to us, Will all the increasing knowledge of Nature avail only to change the ways of man—will it have no effect on man himself?

The material good which mankind has gained and is gaining through the advance of science is so imposing as to be obvious to everyone, and the praises of this aspect of science are to be found in the mouths of all. Beyond all doubt science has greatly lessened and has markedly narrowed hardship and suffering; beyond all doubt science has largely increased and has widely diffused ease and comfort. The appliances of science have, as it were, covered with a soft cushion the rough places of life, and that not for the rich only, but also for the poor. So abundant and so prominent are the material benefits of science that in the eyes of many these seem to be the only benefits which she brings. She is often spoken of as if she were useful and nothing more, as if her work were only to administer to the material wants of man.

Is this so?

We may begin to doubt it when we reflect that the triumphs of science which bring these material advantages are in their very nature intellectual triumphs. The increasing benefits brought by science are the results of man's increasing mastery over Nature, and that mastery is increasingly a mastery of mind; it is an increasing power to use the forces of what we call inanimate nature in place of the force of his own or other creatures' bodies: it is an increasing use of mind in place of muscle.

Is it to be thought that that which has brought the mind so greatly into play has had no effect on the mind itself? Is that part of the mind which works out scientific truths a mere slavish machine producing results it knows not how, having no part in the good which in its working it brings forth?

What are the qualities, the features of that scientific mind which has wrought, and is working, such great changes in man's relation to nature? In seeking an answer to this question we have not to inquire into the attributes of genius. Though much of the progress of science seems to take on the form of a series of great steps, each made by some great man, the distinction in science between the great discoverer and the humble worker is one of degree only, not of kind. As I was urging just now, the greatness of many great names in science is often, in large part, the greatness of occasion, not of absolute power. The qualities which guide one man to a small truth silently taking its place among its fellows, as these go to make up progress, are at bottom the same as those by which another man is led to something of which the whole world rings.

The features of the fruitful scientific mind are in the main three.

In the first place, above all other things, his nature must be one which vibrates in unison with that of which he is in search; the seeker after truth must himself be truthful, truthful with the truthfulness of Nature. For the truthfulness of Nature is not wholly the same as that which man sometimes calls truthfulness. It is far more imperious, far more exacting. Man, unscientific man, is often content with "the nearly" and "the almost." Nature never is. It is not her way to call the same two things which differ, though the difference may be measured by less than the thousandth of a milligramme or of a millimetre, or by any other like standard of minuteness. And the man who, carrying the ways of the world into the domain of science, thinks that he may treat Nature's differences in any other way than she treats them herself, will find that she resents his conduct; if he in carelessness or in disdain overlooks the minute difference which she holds out to him as a signal to guide him in his search, the projecting tip, as it were, of some buried treasure, he is bound to go astray, and the more strenuously he struggles on the farther will he find himself from his true goal.

In the second place, he must be alert of mind. Nature is ever making signs to us, she is ever whispering to us the beginnings of her secrets; the scientific man must be ever on the watch, ready at once to lay hold of Nature's hint however small, to listen to her whisper however low.

In the third place, scientific inquiry, though it be preeminently an intellectual effort, has need of the moral quality of courage—not so much the courage which helps a man to face a sudden difficulty as the courage of steadfast endurance. Almost every inquiry, certainly every prolonged inquiry, sooner or later goes wrong. The path, at first, so straight and clear, grows crooked and gets blocked: the hope and enthusiasm, or even the jaunty ease, with which the inquirer set out, leave him

and he falls into a slough of despond. That is the critical moment calling for courage. Struggling through the slough he will find on the other side the wicket-gate opening up the real path; losing heart he will turn back and add one more stone to the great cairn of the unaccomplished.

But, I hear someone say, these qualities are not the peculiar attributes of the man of science, they may be recognised as belonging to almost everyone who has commanded or deserved success, whatever may have been his walk of life. That is so. That is exactly what I would desire to insist, that the men of science have no peculiar virtues, no special powers. They are ordinary men, their characters are common, even commonplace. Science, as Huxley said, is organised common sense, and men of science are common men, drilled in the ways of common sense.

For their life has this feature. Though in themselves they are no stronger, no better than other men, they possess a strength which, as I just now urged, is not their own, but is that of the science whose servants they are. Even in his apprenticeship, the scientific inquirer, while learning what has been done before his time, if he learns it aright, so learns it that what is known may serve him not only as a vantage-ground whence to push off into the unknown, but also as a compass to guide him in his course. And when fitted for his work he enters on enquiry itself, what a zealous anxious guide, what a strict and, because strict, helpful schoolmistress does Nature make herself to him! Under her care every enquiry, whether it bring the enquirer to a happy issue or seem to end in nought, trains him for the next effort. She so orders her ways that each act of obedience to her makes the next act easier for him, and step by step she leads him on towards that perfect obedience which is complete mastery.

Indeed, when we reflect on the potency of the discipline of scientific inquiry we cease to wonder at the progress of scientific knowledge. The results actually gained seem to fall so far short of what under such guidance might have been expected to have been gathered in that we are fain to conclude that science has called to follow her, for the most part, the poor in intellect and the wayward in spirit. Had she called to her service the many acute minds who have wasted their strength struggling in vain to solve hopeless problems, or who have turned their energies to things other than the increase of knowledge; had she called to her service the many just men who have walked straight without the need of a rod to guide them, how much greater than it has been would have been the progress of science, and how many false teachings would the world have been spared! To men of science themselves, when they consider their favoured lot, the achievements of the past should serve not as a boast, but as a reproach.

If there be any truth in what I have been urging, that the pursuit of scientific enquiry is itself a training of special potency, giving strength to the feeble and keeping in the path those who are inclined to stray, it is obvious that the material gains of science, great as they may be, do not make up all the good which science brings or may bring to man. We especially, perhaps, in these later days, through the rapid development of the physical sciences, are too apt to dwell on the material gains alone. As a child in its infancy looks upon its mother only as a giver of good things, and does not learn till in after days how she was also showing her love by carefully training it in the way it should go, so we, too, have thought too much of the gifts of science, overlooking her power to guide.

Man does not live by bread alone, and science brings him more than bread. It is a great thing to make two blades of grass grow where before one alone grew; but it is no less great a thing to help a man to come to a just conclusion on the questions with which he has to deal. We may claim for science that while she is doing the one she may be so used as to do the other also. The dictum just quoted, that science is organised common sense, may be read as meaning that the common problems of life which common people have to solve are to be solved by the same methods by which the man of science solves his special problems. It follows that the training which does so much for him may be looked to as promising to do much for them. Such aid can come from science on two conditions only. In the first place, this her influence must be acknowledged; she must be duly recognised as a teacher no less than as a hewer of wood and a drawer of water. And the pursuit of science must be followed not by the professional few only, but, at least in such measure as will ensure the influence of example, by the many. But this latter point I need not urge before this great Association, whose chief object during more than half a century has been to bring within the fold of science all who would answer to the call. In the second place, it must be understood that the training to be looked for from science is the outcome not of the accumulation of scientific knowledge, but of the practice of scientific inquiry. Man may have at his fingers' ends all the accomplished results and all the current opinions of any one or of all the branches of science, and yet remain wholly unscientific in mind; but no one can have carried out even the humblest research without the spirit of science in some measure resting upon him. And that spirit may in part be caught even without entering upon an actual investigation in search of a new truth. The learner may be led to old truths, even the oldest, in more ways than one. He may be brought abruptly to a truth in its finished form, coming straight to it like a thief climbing over the wall; and the hurry and press of modern life tempt many to adopt this quicker way. Or he may be more slowly guided along the path by which the truth was reached by him who first laid hold of it. It is by this latter way of learning the truth, and by this alone, that the learner may hope to catch something at least of the spirit of the scientific inquirer.

This is not the place, nor have I the wish, to plunge into the turmoil of controversy; but, if there be any truth in what I have been urging, then they are wrong who think that in the schooling of the young science can be used with profit only to train those for whom science will be the means of earning their bread. It may be that from the point of view of the pedagogic art the experience of generations has fashioned out of the older studies of literature an instrument of discipline of unusual power, and that the teaching of science is as yet but a rough tool in unpractised hands. That, however, is not an adequate reason why scope should not be given for science to show the value which we claim for it as an intellectual training fitted for all sorts and conditions of men. Nor need the studies of humanity and literature fear her presence in the schools, for if her friends maintain that that teaching is one-sided, and therefore misleading, which deals with the doings of man only, and is silent about the works of Nature, in the sight of which he and his doings shrink almost to nothing, she herself would be the first to admit that that teaching is equally wrong which deals only with the works of Nature and says nothing about the doings of man, who is, to us at least, Nature's centre.

Looking back, then, in this last year of the eighteen hundreds, on the century which is drawing to its close, while we may see in the history of scientific inquiry much which, telling the man of science of his shortcomings and his weakness, bids him be humble, we also see much, perhaps more, which gives him hope. Hope is indeed one of the watchwords of science. In the latter-day writings of some who know not science, much may be read which shows that the writer is losing or has lost hope in the future of mankind. There are not a few of these; their repeated utterances make a sign of the times. Seeing in matters lying

outside science few marks of progress and many tokens of decline or of decay, recognising in science its material benefits only, such men have thoughts of despair when they look forward to the times to come. But if there be any truth in what I have attempted to urge to-night, if the intellectual, if the moral influences of science are no less marked than her material benefits, if, moreover, that which she has done is but the earnest of that which she shall do, such men may pluck up courage and gather strength by laying hold of her garment. We men of science at least need not share their views or their fears. Our feet are set, not on the shifting sands of the opinions and of the fancies of the day, but on a solid foundation of verified truth, which by the labours of each succeeding age is made broader and more firm. To us the past is a thing to look back upon, not with regret, not as something which has been lost never to be regained, but with content, as something whose influence is with us still, helping us on our further way. With us, indeed, the past points not to itself, but to the future; the golden age is in front of us, not behind us; that which we do know is a lamp whose brightest beams are shed into the unknown before us, showing us how much there is in front and lighting up the way to reach it. We are confident in the advance because, as each one of us feels that any step forward which he may make is not ordered by himself alone and is not the result of his own sole efforts in the present, but is, and that in large measure, the outcome of the labours of others in the past, so each one of us has the sure and certain hope that as the past has helped him, so his efforts, be they great or be they small, will be a help to those to come.

ITEMS OF INTEREST.

GENERAL.

THE October number of THE SCHOOL WORLD will be published on October 3rd, and all subsequent numbers will appear a few days before the beginning of each month, instead of the middle as heretofore.

THE forms of entry for the Higher, Senior, Junior, and Preliminary Cambridge Local Examinations in December next can now be obtained from the local secretaries at the several centres. The examinations will all commence on Monday, December 11th. The forms of entry for the Senior, Junior, and Preliminary Local Examinations are to be returned to the local secretaries on or before September 30th, those for the Higher Local Examination on or before October 31st. The regulations for the above examinations may be obtained from the local secretaries at the centres of examination, or from Dr. Keynes, Syndicate Buildings, Cambridge.

THE division lists in the Oxford Local Examinations, held last July, show that compared with last year there was an increase of 373 candidates; but the work, as a whole, was not so good, and the number of passes was 6,309, as against 7,071 in 1898. The examinations were held at 192 centres, of which 52 were special local centres where school examinations were combined with the local examinations, and 30 were new centres. The total number of candidates examined in 1899 was 9,442—namely, 3,182 preliminary, 4,371 juniors, and 1,889 seniors. Of these 2,007 preliminary, 3,025 juniors, and 1,277 seniors passed, making a total of 6,309. The total number of candidates and other persons entered for the examinations was 9,652, of whom 210 failed to present themselves for examination.

THE first place in first-class honours of the seniors, in which are 46 candidates, as against 36 last year, is gained by W. Brown, of Horsham Grammar School, and the second place is awarded to G. K. MacBean, of Portsmouth Grammar School. The juniors who have succeeded in gaining first-class honours show a considerable decrease on last year, 74 being included in the list, as compared with 110. P. J. Pearse, King Edward's School, Aston, Birmingham, comes out at the top, and W. F. Schoffield, Liverpool College, Shaw Street, is second. Of the preliminary candidates, Alexander A. R. Speirs, of the Hoe Preparatory School, Plymouth, stands first, A. H. Richards, Stoke Newington Grammar School, second.

THE results of the Irish Intermediate Examinations for 1899, held last June, were published on September 2nd. The total number of boys and girls that presented themselves for examination was 7,768, which is 1,305 less than in 1898. The falling off is chiefly due to the raising by a year of the lower limit of age for entering for the preparatory examination. Of this total, 5,726 were boys (which is 979 fewer than last year), and 2,042 girls (326 fewer than last year). Of the 5,726 boys who presented themselves 3,896 passed. Of the 2,042 girls 1,409 passed, which is a higher percentage than that of the boys. In the Exhibition and Prize List the most marked feature is the extraordinary success of the Roman Catholic boys' schools. Nearly all the gold medals for first place in the various grades and for classics, mathematics, English and modern languages go to Catholic schools, with the immense majority of the exhibitions. Among the girls' schools, the convent schools are not so conspicuous (except in the preparatory grade), the large Protestant schools holding their own strongly. The remarkable successes of the Catholic boys' schools may be partly accounted for by their larger number of pupils, but it also seems to indicate that the teaching in such schools is more adapted to the style of examining in the Intermediate than that of the Protestant schools.

MUCH satisfaction is felt in Dublin that the Government seems at last to be moving in the matter of supplying the Royal College of Science with buildings which will enable it to give more extensive and valuable scientific teaching, and meet the ever-increasing demands for instruction in new scientific methods in agriculture and industry. The present buildings are so small and unsuitable that many subjects much needed, and for some of which Professors have been appointed and are actually being paid, have to be left unattempted, and those undertaken are taught under the greatest disadvantages. The Government have now purchased the ground recommended as the best site by the recent Royal Commission on the subject, that on which Nos. 1, 2, 3, and 4, Upper Merrion Street, are situated, and the space running back to Kildare Place, where there will also be frontage. This situation is central, and the College will be beside the great group of buildings, the National Museum, National Library, National Gallery, School of Art, and the House of the Royal Dublin Society and its new Lecture Theatre, while it is in a beautiful part of the city, with Merrion Square and the Leinster Lawn adjoining. It is hoped that the Government will proceed at once with the building, as the College is urgently needed for the proper working of the new Agricultural and Industries Department to which it should be a central school for scientific research and the equipment of teachers and experts.

THE report of the inquiry held by the Charity Commissioners into the facts of the Grantham Grammar School case, which was explained in a letter by Mr. P. E. Swinstead to the July number of THE SCHOOL WORLD, contains many interesting findings. The Commissioners much regret that an impression should have obtained, among those responsible for the adminis-

tration of the charity, that the engagements of the assistant masters in the school were *ipso facto* terminated by the resignation of the headmaster. As has already been intimated, this impression was without foundation. Upon the review of all the facts of the case, the Commissioners are of opinion that the three assistant masters were dismissed without notice by the late headmaster, by his letters of December 29th and 30th, addressed to the assistant masters, taken in conjunction with previous communications between the parties. They are also of opinion that under the terms of their engagements the assistant masters became by the custom of the profession entitled to one term's salary in lieu of notice, and that these sums are payable out of the funds of the charity.

THE final form taken by Clause 3 of the Board of Education Act should receive the careful attention of all teachers in secondary schools. For the benefit of those who have not yet obtained a copy of the Act we reproduce the clause:—

3.—(1) The Board of Education may by their officers, or, after taking the advice of the Consultative Committee hereinafter mentioned, by any university or other organisation, inspect any school supplying secondary education and desiring to be so inspected, for the purpose of ascertaining the character of the teaching in the school and the nature of the provisions made for the teaching and health of the scholars, and may so inspect the school on such terms as may be fixed by the Board of Education with the consent of the Treasury: Provided that the inspection of schools established by schemes under the Welsh Intermediate Education Act, 1889, shall, subject to regulations made by the Treasury under Section 9 of that Act, be conducted as heretofore by the Central Welsh Board for Intermediate Education, and that the said Board shall be recognised as the proper organisation for the inspection of any such schools as may be desirous of inspection under this section. (2) The Council of any County or County Borough may out of any money applicable for the purposes of technical education pay or contribute to the expenses of inspecting under this section any school within their county or borough.

IT is announced in the new Directory of the Department of Science and Art that "The Lords of the Committee of Council on Education have under consideration the assessment of the efficiency of the instruction in the elementary stage of science and art subjects by inspection only. It is proposed to discontinue examinations, as a test for the purposes of assessing the grant in that stage, after the year 1900. It is proposed that papers shall continue to be set in that stage for students who may desire to be examined and to possess a certificate of having passed the examination; but in those cases a fee should be charged to cover the cost of examination." It will be noticed that the examinations will not be abolished, but the grants to schools and classes will no longer be wholly dependent upon them. For two years or more the Department has made it possible for teachers to obtain grants assessed by attendance or inspection; hence the new proposals are really but the development of a policy which has been pursued for some time.

THE Civil Service Commissioners have announced an open competitive examination for the post of Student Interpreter for the Ottoman Dominions, Persia, Greece and Morocco. The limits of age are 18 and 24. The obligatory subjects are Reading Aloud, Handwriting, Orthography, Arithmetic (including Vulgar and Decimal Fractions), English Composition, French (including French conversation) and Latin. Ancient Greek, Italian, German and Spanish are optional. There are two studentships vacant. The successful candidates are required to proceed to one of the universities for a course of two years' study of Oriental languages, during which period they are allowed a salary of £200 per annum. On leaving the university students are appointed to be Assistants, and the commencing yearly salary is £300. October 17th, 1899, is the date of the examination, and the last day for sending in applications is September 28th.

A VERY useful departure in connection with the Museum of the Whitechapel Free Library deserves to be widely known and adopted in as many towns as possible. During the past two years has been developed a systematic use of the Whitechapel Museum for the practical illustration of object lessons, previously given in the schools. Teachers send in a list of the Natural History Lessons from which the Curator draws up a syllabus of demonstrations to be given weekly in the Museum, the courses usually lasting from four to eight weeks. Nine schools in the Tower Hamlets Division have used the Museum in this way, and some of these have taken two or three courses. No fewer than 3,027 children have thus received instruction.

TWO articles in the September issue of *The Fortnightly Review* should prove of considerable interest to all who are concerned in secondary education. The first, by Mr. John C. Tarver, is on "English Headmasters and their Schools," and the other, much shorter contribution, is by Mr. J. J. Findlay, on the "Genesis of the German Clerk." The German clerk, as we have learnt to know him since 1880, has taken, Mr. Findlay says, about sixty years to produce. He is generally interested in learning, his training and home life have endowed him with such a cultured disposition that he likes to learn things. His success in commercial undertakings of every sort is due more to the good modern education he receives at school than to any later course of commercial education he may obtain.

MR. TARVER'S article is, like all his writing, remarkable for its suggestiveness. Basing his argument on the influence Thring exerted on secondary education, the limitations of this masterful pioneer are insisted upon. An improvement upon Thring's views upon the duties of trustees, the relations of a headmaster with his colleagues, the legitimate province of the Headmasters' Conference, is imperatively necessary if the best results from our public school system are to be obtained. We hope every headmaster, and indeed every educationist, will study what Mr. Tarver has to say on the general attitude towards private schools, the education of Army and Navy officers, and the many other important points raised in this valuable contribution.

IN a suggestive paper on "Practical Hygiene Teaching in Elementary Schools," read by Miss Ravenhill at the last sessional meeting of the Sanitary Institute, and published in the current number of the Society's *Journal*, the fundamentals of elementary instruction in the laws of health are very clearly set forth. We commend the paper to the earnest attention of secondary school teachers. Miss Ravenhill urges the necessity (*a*) for simplicity of treatment, (*b*) for the progressive development of essential principles, and (*c*) for such a treatment of the principles and practice of hygiene that the lessons shall be suitable for both sexes and capable of adaptation in both urban and rural schools. The reprint is accompanied by a detailed syllabus of the whole subject.

WE have already had occasion to call attention to the admirably annotated edition of the "Code for Day Schools" issued from the *School Board Chronicle* offices. The "Code of Regulations for Evening Continuation Schools, 1899-1900," which is before us, is equally well prepared, and should be in the hands of all who are responsible for the management of evening schools in connection with the Education Department.

THE thirteenth issue of "The School Calendar" has now been published. It constitutes an official handbook of examinations, scholarships, and examinations for the school year 1899-1900. An index which has been added to this edition should increase the usefulness of the publication very considerably, and we are of opinion that no headmaster or headmistress can afford to be without a copy. The price is one shilling net, and the publishers are Messrs. Whittaker & Co. and Messrs. Geo. Bell & Sons.

THE private student desirous of matriculating at the London University cannot do better than carefully study the "Matriculation Directory," No. xxvi., June, 1899, published by the University Correspondence College. Every possible difficulty seems to have been thought of by the compilers.

THE University Examination Postal Institution authorities, 27, Southampton Street, W.C., publish a series of small handbooks which should be of great assistance to candidates preparing for the Cambridge Higher Local Examinations. Not the "Guide" alone, with its useful information as to the most suitable text-books to meet the requirements of the different syllabuses, but also the reprints of questions set since 1893 in arithmetic, French and German, should save both teachers and candidates a great deal of labour. The answers to the questions, which can also be obtained, go a long way towards taking the place of a private tutor.

UNDER the general title of "The New Century Library," Messrs. Thomas Nelson & Sons are about to issue Pocket Editions of Standard Novels, printed on their "Royal" India paper. The issue will begin with monthly volumes of Charles Dickens' novels, and the works of Thackeray, Scott, &c., will follow in due course. The complete novels will measure only $4\frac{1}{2} \times 6\frac{1}{2}$ inches, and will be only half an inch thick.

THE number of students receiving instruction in science in schools eligible for the grants of the Department of Science and Art was in 1898 no fewer than 158,370. These students were distributed among 11,723 classes in 2,023 different schools. Scotch schools and students are not included in these figures, the Scotch Education Department having taken over the administration of grants for science and art instruction. There are now 159 schools of science—that is, schools following an organised course of scientific instruction—in which practical work forms an essential part. The number of students in these schools in 1898 was 21,193. This is a considerable increase on the preceding year, when the number of schools of science was 143, with 18,142 students.

FOR the year 1898 the grants made by the Department of Science and Art to science schools in England, Wales and Ireland, exclusive of those made to training colleges, amounted to £169,604 3s. 3d. The sum included (*a*) £85,862 to science schools for attendance grants, and £614 on results of examination (honours only); total, £86,476; (*b*) £82,988 to schools of science, for capitation and attendance grants and grants on results of examination. The figures under (*a*) show an average payment in 1898 of 12s. 7¼d. for each individual student under instruction in science schools, whilst the average payment per student under instruction in schools of science (*b*) was £3 18s. 2d.

REPORTING to the Department of Science and Art, Mr. D. E. Jones, the Inspector in charge of the Welsh division, says that Cardiff offers an excellent example of what may be done towards the general education of pupil teachers by a school board within its own institutions. The pupil-teacher school and the higher grade school (with a well organised school of science) are in contiguous buildings. The board offers to intending pupil-teachers free tuition for two or three years at the higher grade school. From this the pupil-teacher school is largely recruited, and many of the pupils have gone through the school of science course. Both here and in the pupil-teacher school they are able to prepare for the matriculation examinations of the University of London or the University of Wales. Preference is given to candidates who have passed either of these examinations, and they are excused two years of the usual apprenticeship of four years. About a dozen pupils from the pupil-teacher school have matriculated during the past two years. After apprenticeship pupil-teachers spend about half their time (twelve hours per week) in classes at the pupil-teacher school; and these classes are held during the day-time, the evening classes being for assistants only.

COMMENTING upon the serious decline of science teaching in Irish schools during recent years, Dr. Preston, F.R.S., the Inspector of the Department of Science and Art, remarks that no increase in the quantity, or improvement in the quality, of the science teaching can take place until the need of proper instruction in subjects of science is recognised effectively by those who control the primary and the secondary education in Ireland. Generally speaking, all school teaching in Ireland is completely controlled by two educational authorities—the primary schools by the Commissioners of National Education, and the secondary schools by the Commissioners of Intermediate Education. As has been previously pointed out, there is practically no such thing as "local effort," and the majority of the secondary schools are furnished and maintained by the principal, who in many cases is also the owner. The grants earned from the Commissioners of Intermediate Education, combined with fees, form practically the whole of the school income, and it is not to be expected that instruction will be given in science until it is found to pay, or that subjects of science will be taken up by the schools in connection with the Department of Science and Art if such subjects in any way interfere with the grants earned from the Intermediate Board.

FOREIGN.

THE question of commercial education in middle-class schools is now occupying the attention of the Belgian Government. Whilst reforms were being carried out by the Government, private enterprise was equally active, so that at present there exist commercial schools in the principal Belgian cities. In addition to the establishments at Antwerp and at Melle-lez-Gaud, and to the instruction given in the State Universities of Ghent and Liége, complete courses of commercial education are given in the Catholic University at Louvain, where there is a special school of "Sciences Commerciales et Consulaires," and in the free University of Brussels. Commercial education is also given at private schools at La Louvière, Bonn, the Institut S. Louis at Brussels, and at three other institutes at Liége. The course consists of one year at most of these schools.

THERE is no organised system of commercial education in the Netherlands at the present time, but there are two commercial schools, one at Amsterdam and the other at Enschedé. The public Handelschool of Amsterdam is entirely supported by the municipality of that city, who direct and maintain its affairs. To this school there is attached a preparatory school (Hoog Burger School) with a three years' course, for which the same fees are charged as for the Handelschool. The commercial school at Enschedé was founded in 1886. It is supported

by the State and by the community of Enschedé. The annual subsidy of the State amounts to about £1,584, and the rest of the cost, viz., £833, is defrayed by the town of Enschedé itself, the population of which numbers about 22,000.

COMMERCIAL education in Sweden is supplied entirely by private commercial schools, but the State gives support to two of these schools, which up to the present has amounted to £833 6s. 6d. yearly, but which from 1899 will be increased to £1,111 2s. These two schools are situated in Stockholm, which, on December 31, 1897, had 288,602 inhabitants, and in Gothenburg, which on the same date had 120,552 inhabitants. In addition to these schools which have a State subvention, there exist other so-called commercial schools throughout the country, which generally aim at giving short courses in special subjects, according to the pupils' wish. These schools have sometimes a subvention from the commune, or have an income arising from donations. Consequently, their income varies considerably, and, as they are neither under public inspection nor obliged to send in any statistics, any detailed account of their working is very difficult to obtain.

THE commercial schools in Norway are not supported by the State, but are either private or maintained by the municipality. Such schools are to be found in Christiania, Bergen, Stavanger, and Bodö. All are day schools; but evening classes are also held. The municipal technical schools at Christiansand and Skien receive a small annual grant from the Government. Of private schools in Christiania affording a commercial education, there are three, namely, John Schöning's, Otto Treider's, and Ant. Johannessen's commercial schools. The expenses of these schools are entirely defrayed by the school fees, and the courses are of various durations—from one year down to a few months. They would seem to attract a far larger number of pupils than the Municipal Commercial School.

LOOKING through the consular reports to the British Embassy at Washington on the subject of commercial education in the United States we were recently much impressed by the different ways in which the consuls in various centres regarded the subject. Not the least interesting and remarkable was that of Mr. Vice-Consul Sprunt, of Wilmington, N.C., whose report consists only of the following words:—"There are no special commercial schools in Wilmington, but there are a few boys' schools in different parts of this State, the principals of which advertise a special commercial course, but they are not of sufficient importance for special mention. In my own business experience, employing several hundred clerks and accountants, I have found it necessary to undo the work which the so-called commercial colleges have accomplished in their alleged commercial training."

THE *Queensland Educational Journal*, in dealing with the report of the Department of Public Instruction for that colony for the year 1898, gives some figures concerning the cost of secondary education in Queensland. The ten grammar schools provide secondary education for about 800 pupils at a total cost of about £14,500, of which over £10,000 is a State contribution. For this attendance 50 resident and 17 visiting masters are provided. The average total cost of education of each pupil is about £18 per annum, of which the State contributes £12 10s. If the cost of the scholarship pupils be added, the total State aid per head comes to about £14 per annum.

PRACTICAL Schools of Commerce are to be established by recent decrees of the French Minister of Commerce at Cette (Hérault) and at Narbonne (Aude).

THE *Madras Educational Review* for August says the work of providing lodging for students has been taken up with hearty good-will by the Mysore Government. The result is that the Mysore Province, in this respect, will compare most favourably with any other part of India, while the particular hostels in Bangalore and Mysore city have scarcely their equals, at least in South India. Students' Homes have been recently opened in Mysore city, Shimoga, Hassan and Tumkur. The hostel attached to the Central College at Bangalore is on the point of completion; and there is not a district in the province the headquarters of which has not its Students' Home.

THE Russian Minister of Education, considering the cultivation of friendly relations between professors and students to be of great importance, recommends, according to Reuter's correspondent of St. Petersburg, the organisation of practical and useful employments for the students under the direction of the professors, and also the establishment of literary and scientific students' clubs under the immediate supervision and direction of high-school teachers. As a further means to that end, the Minister proposes the erection of residential quarters for the students, for which the Government intends to make substantial grants. By command of the Emperor, a lump sum of 3,262,000 roubles is to be assigned from the Imperial Treasury for establishing such homes at the Imperial universities, and an annual contribution of 32,400 roubles is to be made for the organisation of practical employments.

CURRENT HISTORY.

IT used to be a saying, *àpropos* of French politics, that "nothing happens but the unexpected," and those of us who are old enough to remember 1870 know that for many years the existence of the "Third Republic" was daily a standing wonder. What may have happened in that country before these lines reach our readers no man may know. But now (September 1st) the Dreyfus trial is still developing new discoveries, and "Fort Chabrol" is still holding out in Paris. What does it all mean? Is there a new revolution at hand? Is it "clerical," "Jesuitical," dynastic? The intelligent newspaper reader should now look up, if possible, the more modern history of France, and even look through some short history of the events of 1789-95 which have been called *the* French Revolution.

HOW rapidly events marched in those six eventful years! So quickly that to the popular mind they become like distant stars, blurred into one mass, which are supposed to be simple, not complex. The social changes of 1789, the constitutional changes of 1790-2, with their revolutions in the mutual relationships of king, "sovereign people," clergy and representative assemblies, the international revolution of 1792 when the Austrian alliance was broken after forty years of waning life, and France renewed her secular war with the House of Hapsburg—all these are confused together, and thus the key is lost to later changes. The whole movement of those years led to a military despotism which gratified France for a time with "glory," and ended by leaving her with diminished territories.

FRANCE has ever since been in a state of revolution. To Napoleon, with his varying ideals, succeeded Louis XVIII. and the "Restoration," followed by Charles X. and Reaction. When the country was tired of this, Louis Philippe came in with his "bourgeois" Kingdom *of the French*. Another revolution brought in the short-lived "Second Republic" and the second Napoleonic rule. All these revolutions have been unforeseen and have been made by force. How differently we manage things in Great Britain! We have just brought peacefully to an end our annual revolution season. The Salisbury-

Chamberlain Government has survived another six months of legally organised rebellion, and is now secure against overthrow till next spring.

THE King of Prussia has been checked by the Prussian Diet. He wanted the sanction of the Diet to certain canal schemes which were intended to develop the resources of the country, and which will probably—for they will be made some day—achieve that object. But the Diet did not approve the scheme, and it has been temporarily shelved. That is an incident which cannot happen among ourselves. The Queen-Empress has ideas on politics, and even works towards her ends, but not in a parliamentary way. Her grandfather told the House of Lords when he did not like a bill—even *he* never introduced one—and expected their lordships to reject it. But for all parliamentary business, since the days of Charles II., our monarch possesses a detachable minister, which, like certain low organisms in the animal world, he promptly detaches when the will of the Government and the Parliament are in opposition.

THE SCHOOL PULPIT.

NOTABLE PASSAGES FROM SERMONS PREACHED IN PUBLIC SCHOOLS.

The Use of the Past.[1]

"This one thing I do, forgetting those things which are behind, and reaching forth unto those things which are before, I press toward the mark for the prize of the high calling of God in Christ Jesus."

—*Phil.* iii. 13, 14.

THIS one thing I do, says St. Paul. I forget all that is passed, I reach forth unto what is still before.

He is speaking of himself as an individual man striving to live up to his lights, and he tells us that even he, with such a past as few men can look back on, of toils and successes, of churches founded, and converts loyal to him all over the West, yet even he must forget what is behind, and must press on. And if he must do so, assuredly you and I must do the same. His words are a lesson on the right use of the past. Let us try and study it.

First, we are not to regard the past with complacency, "as though we had already attained." How well we know the fatal time that comes to so many of us when progress seems to stop. I watch a boy or young man of some promise. He grows in knowledge, in self-control, in dignity. His aims in life rise as his horizon extends; and there are indications, too, that with all this there is a growth in humility, in love of God and man; that there is a growth in grace, the gift of God's Holy Spirit in answer to prayer. Such a one is honoured and loved: his friends praise him; he is welcomed everywhere; all the world speaks well of him; and the subtle incense of praise overpowers him. He thinks he has already attained. He looks back on his past with complacency; and then his progress stops. Instead of forgetting the things which are behind, he is always reminding himself of them.

I do most earnestly advise you, and not I, but St. Paul, beware of this dangerous misuse of the past. If it feeds vanity, if it disposes you to rest, or to compare yourself with others, then be well assured you have not yet learnt the right use of your own past—you must learn it from St. Paul. Look in your past for guidance, for hope, for humiliation, for deep sorrow and shame, but never for materials for self-satisfied ease.

This is a danger of some among us, and especially of the abler and more promising, and there is no age at which we are free from it. You are exposed to it at sixteen, and you are not out of reach of it at sixty. There are more deadly snares that await you as you grow older, and pass from boyhood to manhood—rocks on which your shipwreck may be more complete and more manifest in the sight of all men, but indeed there is nothing which so often and so disappointingly terminates hopeful careers as this wrong complacent use of the past which St. Paul deprecates.

And there is another misuse of the past which is quite as common. It is a mistake rather than a fault. It is to use the past as a ground and justification for despondency. It is very natural so to use the past: to argue, "I cannot do this, I have always failed in that; and therefore I suppose that I shall always fail,"—this is to forget that your powers of mind grow by use. What was an insuperable difficulty even to your best and most vigorous efforts a year ago may perhaps now be readily overcome if you will only attack it hopefully, and not with the predetermination to fail. This is a fact in every man's experience of his own intellectual growth, but one that we are slow to learn. Each morning you start afresh, with new powers and new capabilities: forget the past, and do not be hampered with its failures. This, then, is another application of St. Paul's advice to forget the things which are behind, and reach forth to what is before.

It is a still more serious and important application of the words to moral growth and spiritual progress; for it is an even more common and more fatal mistake to suppose that we are so tied and bound with the chains of our sins that not even the pitifulness of God's mercy can loose us. It is true, indeed, that the consequences and penalties of past sins do cling to us. There are natural consequences, natural penalties, of sin which never permit us entirely to forget the past. Idleness brings its penalties, and a man is rarely allowed to forget that he was idle as a boy. Vanity brings its penalties, and though we may have long lost our vanity, yet it will have left a stamp on us that we shall not easily efface. And there are graver sins than these, the penalties of which are so certain that we shall never forget that we once were guilty. All this is true; and yet there is a sense in which we can and we ought to forget the past. We ought not to suppose that because the consequences of past sins remain, yet that their power over us remains also. There is no habit of sin from which, by God's grace, we cannot entirely recover. Part of its power over us is obtained from our exaggerated estimate of its power. We yield sooner than we need because we think we cannot resist. The remembrance of past sin rises, and our weak remonstrances are silenced in despair. When we are so fascinated by the past, then how hopefully and cheerfully St. Paul's words sound in our ears, to forget those things that are behind, and to reach forth to what is before. Some of you may be thus disheartened by failure to conquer a fault. You may even be so mistaken as to believe that past failures are an excuse for present failures—to justify yourself for doing wrong by saying that you always have done wrong. St. Paul is speaking to you, and tells you to forget the past, and start ever afresh.

And it is a lesson to us in dealing with others. We are far too incredulous as to the power which others, and especially the young, have of recovery. "The world will not believe a man repents," but we who believe in the power of prayer, we who have ourselves repented, surely in this respect we are not of the world, and we may believe in the repentance of others. Let us show sometimes a wise forgetfulness of their past. At any rate, we can forget it as long as they remember it.

These are, I think, the lessons St. Paul teaches us in this enthusiastic outburst: to let the past make us neither conceited nor despondent; but, accepting its results, to press forward unceasingly, and hopefully and modestly.

[1] From a sermon preached in Clifton College Chapel by the Venerable J. M. Wilson, M.A., Archdeacon of Manchester, when Headmaster of Clifton College.

JUNIOR CAMBRIDGE LOCAL EXAMINATION, DECEMBER, 1899.

Monthly Test Papers.—No. 1.

ARRANGEMENTS have been made for three sets of test-papers in each of the subjects dealt with below. Heads of schools who would care to avail themselves of the scheme outlined in our last issue—by which the standard of knowledge attained in those of their forms preparing for the Junior Cambridge Local Examination can be tested by outside Examiners — should communicate with us at once. If there is a sufficient demand we shall also be glad to supply at a small cost copies of the following papers in a form suitable for distribution in class. If necessary, future papers can be supplied before their appearance in THE SCHOOL WORLD.

History of England—449-1509.

(449-1154 *A.D.*)

(1) Correct the following statement, giving reasons for your corrections:—

"Fifty years after the Romish evacuation of England, the island was conquered by the Saxons under Hengest and Horsa."

(2) Tell the story of *one* of the following events:—

(*a*) The conversion of the English to Christianity.

(*b*) The struggle between Mercia and Northumbria in the days of King Penda.

(*c*) The warfare between the Danes and the English during the first twenty years of the eleventh century.

(*d*) The Norman Conquest of England.

(3) Write an account of *two* of the following persons, choosing *one* from (*a*) and *one* from (*b*):—

(*a*) Anselm, Augustine, Bede, Lanfranc.

(*b*) Æthelflaeda, Ecgberht, Godwin, Offa.

(4) Explain carefully the importance of the battles fought at Brunanburh, Chester, Deorham, Northallerton, Stamford Bridge —mentioning briefly the date, circumstances, and locality of each.

(5) Write short explanatory notes on the following terms: *Bretwalda*, *Danelagh*, *Domesday Book*, *Investiture*, *Witenagemot*.

(6) What do you mean by the "Feudal System"? How far is it correct to say that it was introduced into England at the Conquest?

NOTE.—This paper includes two narrative (2, 3), two explanatory (4, 5), and two critical (1, 6), questions. It is suggested that teachers using this test-paper should notice carefully in which of these three points the class is weakest. If a class be instructed to do "any five questions," the teacher will easily discover which questions are most generally avoided, and which are least satisfactorily answered. After some drilling on the weak points, a fresh paper covering those points, *in a different form*, may advantageously be set.

Geography.

(*Great Britain and Ireland.*)

(1) Where are the following, and in what respects are they noteworthy?—Shap Fell, The Casquets, The Manacles, The Falls of Foyer, Bisley, Moville, Whippingham, Chalfont St. Giles, Lerwick, Youghal.

(2) Where are the chief districts in which the people earn their living by (*a*) wool weaving, (*b*) hop picking, (*c*) dairy farming (*d*), copper smelting, (*e*) slate quarrying, (*f*) fishing, (*g*) lace making?

(3) Draw a map of one of the following river basins, inserting the chief towns, tributaries, and counties:—

(*a*) The Trent.

(*b*) The Clyde.

(*c*) The Shannon.

(4) Describe the canal system of England, and discuss the relative advantages of water and rail transport in this country.

(5) Draw a map of the Irish Sea, shewing the principal routes.

(6) Where are the chief health resorts in the United Kingdom?

Latin.

CÆSAR.—BOOK IV. (Ch. I.-XX.)

(1) Translate:

(*a*) Ch. II. Mercatoribus est aditus . . . . efficiunt.

(*b*) Ch. V. Est enim . . . . ficta respondeant.

(*c*) Ch. XII. At hostes . . . agminis nostri venissent.

(*d*) Ch. XIX. Cæsar paucos dies . . . . decertare constituisse.

(2) Explain the construction of the words in italics:

(*a*) Ex quibus *quot annis* singula milia *armatorum* bellandi causa ex finibus educunt.

(*b*) Mittit qui *nuntiarent* ne hostes proelio *lacesserent*.

(*c*) . . . . reliquum quidem in terris esse neminem, quem non superare *possint*.

(*d*) Qui omnibus rebus subito perterriti . . . . neque *consilii habendi* neque arma capiendi *spatio dato* perturbantur copiasne adversus hostem ducere, an castra defendere an fuga salutem petere *praestaret*.

(*e*) *Diebus decem*, quibus materia *coepta erat* comportari exercitus traducitur.

(3) Draw an outline map and put in the Teneteri, Suebi, Ubii, Usipetes, Rhenus, Mosa, Mons Vosegus.

(4) State the reasons which induced Cæsar to cross the Rhine, and give as exact a description of the bridge as you can.

VERGIL'S ÆNEID.—BOOK II. (Ll. 1-249.)

(1) Translate:

(*a*) Ll. 29-39. Hic Dolopum manus . . . in contraria volgus.

(*b*) Ll. 101-106. Sed quid ego . . . . artisque Pelasgæ.

(*c*) Ll. 134-144. Eripui, fateor . . . . non digna ferentis.

(*d*) Ll. 213-224. Et primum parva . . . . cervice securim.

(2) Translate, and explain the construction of the words in italics:

(*a*) Infandum, Regina, iubes renovare dolorem
Troianas ut opes et lamentabile regnum
Eruerint Danai.

(*b*) Et, si fata deum, si mens non læva fuisset
Impulerat ferro Argolicas foedare latebras.

(*c*) Hortamur fari, quo sanguine cretus
Quidve *ferat; memoret* quae sit fiducia capto.

(*d*) Obstipuere animis, gelidusque per ima cucurrit
Ossa tremor, cui fata *parent*, quem poscat Apollo.

(*e*) scelus expendisse merentem
Laocoonta ferunt, sacrum qui cuspide robur *laeserit*.

(3) What do the following words mean and what cases do they govern? Quote, if you can, the lines in which they occur—cassum, indignabar, fidens, carere, dives, instar.

(4) What is the Historic Infinitive? Quote any example of it from that portion of the book which you have been studying.

(5) Quote either Laocoon's speech to the Trojans who were discussing what to do with the wooden horse, *or* the oracle's reply to Eurypylus.

French.

(1) Translate into English:—

Aussitôt que l'ordre de marcher en avant *nous* eut été donné, mon capitaine me regarda avec une attention qui m'*obligea* à passer deux ou trois fois la main sur ma jeune moustache d'un air aussi dégagé qu'il me fut possible. Au reste, je n'avais pas peur, et la seule crainte que j'*éprouvasse*, c'était que l'on ne s'imaginât que j'avais peur. Ces boulets *inoffensifs* contribuèrent encore à me maintenir dans mon calme héroïque. Mon amour-propre me disait que je *courais* un danger réel puisque enfin j'étais sous le feu d'une batterie. J'étais enchanté d'être si à mon aise, et je songeai au plaisir de raconter la prise de la redoute de Cheverino, dans le salon de Madame de B——, rue de Provence.

(2) Parse the words in italics in the above extract.

(3) Give the feminines of—vieux, tiers, grec, sec, bénin; and the plurals of—forêt, noix, vitrail, corps.

(4) Write the French for—½, 80, 84, 20th, and 25th December, 1899.

(5) Correct the following sentences where necessary, giving reasons for your corrections :—

(*a*) Je n'ai pas du papier mais Charles en a beaucoup.

(*b*) Mon père, ma mère et mes soeurs sont allé au théâtre.

(*c*) Ne le donnez pas à lui.

(6) Write in full—the future of *s'arrêter*, the preterite of *être*, and the present indicative of *aller*.

(7) Translate into French :—

Paris, the capital of France, is the largest and finest city on the Continent. Of all the cities in the world London is the only one that has a greater population. The French capital is situated on both banks of the Seine and was in the first place built on a small island in the middle of the river, but it now extends for several miles along both banks, and the island forms the centre of the city.

(8) For those only who offer "La Fortune de D'Artagnan" (chaps. i.-iv.)

(*a*) Translate : (1) p. 4, ll. 1-13 ; (2) p. 17, ll. 9-18 ; (3) p. 35, ll. 8-17.

(*b*) Explain : adossé à la grille ; je connais cet Italien de longue main ; en nage ; jour maigre ; piqua des deux.

(9) For those only who offer "Charlotte Corday" (ll. 1-808).

(*a*) Translate : (1) ll. 179-192 ; (2) ll. 429-434 ; (3) ll. 775-782.

(*b*) Explain : Septembrisent ; nous n'en sommes plus là ; l'heure ne sied pas à ; il me tarde de voir.

NOTE.—The references above are to the Pitt Press editions of the set books.

Mathematics.

ARITHMETIC.

(Up to and including Vulgar and Decimal Fractions.)

(1) Divide six million five hundred and fifty nine thousand one hundred and seventy by three hundred and seventy nine. Express the answer in words.

(2) Find all the prime factors of 30,030 and 58,968 ; thence find their Greatest Common Factor.

(3) Find the value of 4 lbs. 7 oz. 17 dwts. 16 grs. of gold and silver alloy at £3 15s. per lb.

(4) Simplify

(i.) $\frac{15\frac{3}{4}+13\frac{1}{4}}{\frac{5}{8}\text{ of }\frac{7}{15}-\frac{5}{36}}$; (ii.) $\frac{2}{9}$ of 12 half crowns + $\frac{3}{7}$ of 2 guineas ;

(iii.) 4·275 × ·0048 ÷ 27.

(5) What is the distance in kilometres between Paris and Bordeaux, if it takes a train 10 hours to accomplish the journey, supposing the train to move uniformly at the rate of 2,480 metres in every 3 minutes?

(6) (i.) $\frac{9}{11}$ths of a plank of wood are sawn off, and the remainder is divided into 25 pieces ; if 20 of these pieces measure 7 feet, what is the length of the plank?

(ii.) Add together 4·37$\dot{1}$, 2·41$\dot{6}$, ·03$\dot{4}\dot{5}$ and ·$\dot{9}$57320.

(7) How many times is 39 per. 3¾ yds. contained in 13 ac. 1 ro. 30 per. 27½ yds. ?

(8) Divide £83 3s. 9d. among 3 people so that the second may receive two-thirds of what the first receives, and the third a quarter of what the second receives.

Answers :

(1) 17306 + 196. (2) 2·3·7·13 = 546. (3) £17 9s. 3¼d. (4) (i.) 189 ; (ii.) £1 4s. 8d. ; (iii.) ·00076. (5) 496 kilom. (6) (i.) 16 ft. 3 in. ; (ii.) 7·78. (7) 55. (8) £45 7s. 6d., £30 5s., £7 11s. 3d.

ALGEBRA.

(Including Simultaneous Equations, Highest Common Factor, Lowest Common Multiple and Fractions.)

(1) Define a product, a factor, a quotient.

Simplify $2x-(y+z)-[4x-\{2y-(3z-y)-x\}]$

$-[2x-\{4z-(3y-2z+4x)\}]$

(2) When $a=-1$, $b=2$ and $3c=-1$,

find the value of $\frac{c}{a-b}+\frac{a}{b-c}+\frac{b}{c-a}$.

(3) Divide $a^3+b^3-c^3+3abc$ by $a+b-c$.

(4) Factorise the followfng expressions : x^2-3x+2, x^3-8 and x^3-2x^2+x-2. Find also their Highest Common Factor and Lowest Common Multiple.

(5) Simplify

(i.) $\frac{1}{1-x}+\frac{3x}{(1-x)^2}-\frac{1-2x}{1-x^2}$;

(ii.) $\frac{ab+2bx}{a^2-3ax+2x^2}\times\frac{ab-2bx}{a^2+3ax+2x^2}\div\frac{b^2}{a^2-x^2}$

(6) Show that the sum of the squares of three consecutive numbers always exceeds by three the sum of their products taken two at a time.

(7) Solve the equations :

(i.) $\frac{2x-7}{5}-\frac{3x-8}{10}=\frac{x+1}{3}$;

(ii.) $3x=4(y+2)$ $\quad 5x-7y=12$;

(iii.) $x+y=a-b$ $\quad ax-by=\frac{1}{2}(a-b)^2$

(8) At a recent election there were two candidates ; one of the candidates was defeated by 930 votes, but if a twelfth of the supporters of the successful candidate had voted the other way, he would only have had a majority of 12 ; how many voted and how were the votes divided?

Answers :

(1) $-x-y+2z$. (2) $2\frac{4}{63}$. (3) $a^2+b^2+c^2-ab+bc+ca$.

(4) $(x-1)$ $(x-2)$, $(x-2)$ (x^2+2x+4), $(x-2)$ (x^2+1) ; H.C.F.$(x-2)$; L.C.M.$(x-1)$ (x^2+1) (x^3-8).

(5) (i.) $\frac{6x}{(1-x)^2(1+x)}$; (ii.) 1. (7) (i.) −4 ; (ii.) $x=8$, $y=4$; (iii.) $x=y=\frac{a-b}{2}$; (8) 10086 ; 5508 for, 4578 agst.

EUCLID.

(Book I. to prop. 34.)

(1) Define a straight line, a semi-circle, a square.

(2) If two triangles have two sides of the one equal to two sides of the other each to each, and the angles included by these sides, equal, then shall the triangles be equal in all respects.

(3) If one straight line stand upon another straight line, the adjacent angles so formed are either two right angles or together equal to two right angles.

(4) If two triangles which have two sides of the one equal to two sides of the other, each to each, have the included angle of the one greater than the included angle of the other, the base of that which has the greater angle is greater than the base of the other.

(5) In a triangle the exterior angle formed by producing one of the sides is equal to the sum of the two interior and opposite angles ; and the three interior angles are together equal to two right angles.

(6) Construct a triangle such that one of its sides may be double, and the other side three times as great as the base.

(7) ABCD is a quadrilateral in which the diagonal BD bisects the angle ABC ; if also AB equals BC, show that BD bisects AC at right angles.

(8) ABC is an isosceles triangle in which each of the angles B and C is double of the third angle A ; if the angle B be bisected by the straight line BD cutting AC in D, and through D, DE be drawn parallel to CB to meet AB in E, then DE and BC together equal either AB or AC.

Theoretical Chemistry.

(1) What reasons have we for saying that hydrochloric acid contains hydrogen united with another gas? State how this second gas may be obtained from the acid.

(2) What compound is obtained by neutralising nitric acid with a solution of ammonia gas in water? Some of the pure compound so obtained is gently heated in a clean dry flask when a gas is given off. What is its name and what do you know about it?

(3) Describe what occurs when moderately dilute nitric acid is acted upon by copper. Give as many of the properties of the new compounds formed as you can.

(4) Chlorine gas is led into a solution of ammonia in water. What changes, if any, occur?

(5) What do you mean by allotropic forms of an element? Give three elements which have allotropic forms, at the same time naming such forms.

(6) How much oxygen by weight is there in 500 grams of nitric acid? (N = 14 ; O = 16).

(7) How would you distinguish between a mixture of two volumes of nitrogen and one volume of oxygen and a compound of these two gases in exactly the same proportions?

LABORATORY ARRANGEMENTS.

IN view of the increasing amount of attention now given to experimental methods of teaching science in secondary schools, the following suggested laboratory arrangements for practical work in physics and in various branches of natural history, reprinted from the new "Science and Art Directory" (1899), should be of interest :

For Practical Work in Physics.

The laboratory should be a well-lighted room, fairly lofty and with adequate ventilation. It should be situated preferably on the lowest floor of the building, in order to secure freedom from vibration. There should be sufficient space between the benches to allow of easy passage.

The lighting might conveniently be from two adjacent sides of the room, leaving abundant wall space for blackboard, diagrams, cupboard space, and certain experiments with pendulums, levers, &c., needing blank wall.

Arrangements should be made for providing a dark room for photometric or other measurements requiring artificial illumination. This may be done either by fitting dark blinds to the windows of the laboratory or by screening off a portion of the darker side of the room with thick baize curtains.

The working benches recommended should be in the nature of plain strongly-framed tables, about 2 ft. 9 in. high, placed as far as possible in the middle of the room, and stone benches built into two side walls or wooden ones strongly fastened. The tops of the benches should be of hard well-seasoned wood and unpolished. The benches should be suitably equipped for the experiments to be performed on them—a permanent place should be assigned to apparatus whose accuracy may be impaired by moving it. A mercury table is a useful adjunct.

Gas should be laid on to each bench.

An over-head rail for suspension, fitted with hooks and clamps, is a useful addition to at least some of the benches.

At least two large sinks with water supply and waste should be provided in a laboratory for twenty students.

It will be necessary to provide considerable cupboard space, also lockers, both for the sets of apparatus supplied to each student, and for apparatus to be distributed when required.

The apparatus supplied to each student must vary in accordance with the nature of the practical course. It is not expedient to place too much apparatus in the student's hands in the first instance; the bulk of what is needed should be reserved for special distribution.

For Practical Work in Biological Subjects.

A moderately well-equipped laboratory should be provided with fittings, as follows :—

The laboratory should be a well-lighted room and should if possible be capable of being darkened, by means of dark blinds, for simple experiments on light and vision.

Strongly-made tables with tops of well-seasoned wood, unpolished. They may be made so as to allow of a space of at least 4 ft. × 2 ft. for each working place.

Gas or electric light should be laid on to each bench, and it should be so arranged that a stand lamp for each working place can be attached, for work at night or on dark days.

Sinks with water supply and waste should be placed in convenient positions. At least two should be supplied in a laboratory for twenty-four or twenty-five students; one of them being a large one for washing-up purposes, &c. Instead, however, of one small sink in addition to the large one, it will be found preferable to have a number of small sinks fitted into the working benches as in a chemical laboratory, one for each two working places.

Adequate cupboard space should be provided for storing apparatus, and a large zinc-lined box in which to keep dissected specimens will be useful.

The following apparatus should also be provided, in addition to that required for the theoretical instruction :—

Dissecting instruments and trays, one set for each student.

Microscopes (compound), one for each working place.

A sufficient stock of chemical apparatus for all the students to work at experiments in respiration, digestion, circulation of blood, &c.

Some simple form of freezing microtome.

RECENT SCHOOL BOOKS.

Modern Languages.

Songs of Béranger. By G. H. Ely, B.A. 67 pp. (Blackie.) 1*s.*—Mr. Ely has written a pleasant introduction, in which he gives a good account of Béranger's life, calculated almost to reconcile us to the appearance of some of his *chansons* in a school edition. Almost, not altogether; for they are irredeemably vulgar, and painfully like the music-hall verse of the present day. Tawdry sentiment of this kind can do our children little good. The notes are short and good; the vocabulary is tolerably complete.

Italian Self-Taught. By C. A. Thimm, F.R.G.S. 96 pp. (Marlborough.) 1*s.*, cloth 1*s.* 6*d.*—The remarks about the pronunciation and the transcription (*e.g.*, *oh-chee-dain'tay*) are as unscientific as in the other volumes of this series; the general arrangement also is similar. First vocabularies, with the English, Italian, and the "pronunciation" in parallel columns; then an elementary grammar, drawn up with some skill; and then a number of "useful and necessary idiomatic expressions and phrases," again in three columns; lastly, a list of musical terms. The book is carefully printed.

About. Le Roi des Montagnes. By Ernest Weekley, M.A. xvii.+177 pp. (Macmillan.) 2*s.* 6*d.*—Granting that there was any call for another edition of this book (and it may well be doubted), it certainly could not have been entrusted to a better editor. Professor Weekley's experience enables him to write notes which give just what is essential, and no more. His renderings are always successful; his grammatical notes are clear, when the commendable desire for brevity has not been carried too far, as is sometimes the case. The appendices (on the same lines as in the other volumes of Mr. Siepmann's rapidly growing series) of sentences and passages for translation into French should have been looked through by an Englishman; they contain a good deal that has a foreign ring about it. Appendix iv. (on the formation of adjectives) is well put together.

Hossfeld's New Practical Method for Learning the German Language. By C. Brenkmann; revised by L. A. Happé. xvi.+383+36 pp. (Hirschfeld.) 3*s.*—This is a new edition of a book written quite on the old "grammatical" lines. The additions are: a chapter on German construction; thirty short vocabularies, each containing twenty words in daily use; selections of German poetry; an English-German vocabulary of all the words needed for the translation of the exercises.

A Historical French Grammar. By A. Darmesteter, E. Muret, and L. Sudre. Authorised English Edition by A. Hartog. xlviii.+936 pp. (Macmillan.) 12*s.* 6*d.*—The French original is probably on the shelves of most teachers of French Philology, and there is no need to enlarge on its merits. Great commendation is due to M. Hartog for the very conscientious

way in which he has carried out his task; indeed, we are justified in saying that the book has gained by translation, a very exceptional case. There is probably no better book for a student wishing to take an Honours degree in French. The printing is quite excellent; the selection of types is such as to give much help in the study of the difficult subject. The publishers deserve the gratitude of teachers and students alike for their enterprise.

Nelson's First German Reader. By J. J. Trotter, M.A. viii.+131 pp. (Nelson.) 2*s.*—Mr. Trotter's new book is far more satisfactory than his "Object Lessons in German," which were in the main an adaptation of M. Cran's French book. The Reader consists of a very good selection of carefully graded passages of the most varied kind: anecdotes, letters, fairy tales, poems and so on. There are no notes; but Mr. Trotter has supplied a list of the irregular verbs, and an excellent German-English vocabulary. The type is very good, but the binding is such that it is impossible to open the book out flat.

Carnoy. Les Deux Bossus. By E. B. Le François. 64 pp. (Blackie.) 1*s.*—A very short fairy tale (only 28 pages of large type), containing a very great number of words, which would make it rather slow reading for beginners, especially as there is little action. Notes and vocabulary are satisfactory; an appendix of irregular verbs is also supplied.

Edited Books.

The Adventures of Beowulf. Translated and adapted by Clara Thomson. (New English Series.) 95 pp. (Horace Marshall.) 9*d.*— Miss Thomson apologises for her work on the score of its being meant mainly to arouse the interest of children in a very old and valuable poem. It is true that from a scholar's point of view this apology might seem to be reasonably offered; from the point of view of the practical teacher it is quite unnecessary. The story as an adaptation is a great success. It is told in simple vivid English, and those parts in which the necessities of the art of adapting great works to immature intelligences are most visible are not sufficient to throw the more important episodes into false proportions. As a reading book for junior forms this is certain to be a favourite. It is simplicity itself, put to the service of a story which never fails to charm those who once come under the spell of the ancient literatures of Northern Europe.

History.

The Study of History in Schools. ix.+267 pp. (Macmillan.) 2*s.*—This is the "Report to the American Historical Association by the Committee of Seven" appointed in 1896 to consider the subject of history in the secondary schools and to draw up a scheme of college entrance requirements in history. It will be interesting to the British readers for the contrast which it draws necessarily between the schemes of instruction followed in France, Germany and the United States of America, and the chaotic condition of English schools. Let our readers peruse and perpend!

Geography.

Britain on and beyond the Sea. By C. H. Crofts, M.A., 116 pp. (W. and A. K. Johnston.) 1*s.* 6*d.*—The Navy League has issued a Map of the World, and this work is intended as a handbook to it. It consists of two parts; the former is a sketch of Naval History, the latter deals with the Foreign Possessions of Great Britain. The information is accurate and useful, and the absence of special pleading—Jingoism—is commendable. The value of the book is increased by a good Map of the World with statistical tables.

From the same publishers we have a *Geographical Handbook of South Africa* (3*d.*) and a *Wall Map of South Africa* (12*s.*)—The handbook contains, in about 30 pages, all the information that an examinee may be expected to know—and much more besides. The Map, scale 24 miles to 1 inch, is quite up to date, and is clear and satisfactory. Railways, Electoral Divisions, Boundaries, &c., are all clearly marked and defined. The Map should find a place on the walls of every school.

Mathematics.

An Elementary Treatise on Practical Mathematics for Technical Colleges and Schools. By J. Graham, B.A., B.E., viii.+276 pp. (Arnold.) 3*s.* 6*d.*—This book, comprising the elements of algebra and plane trigonometry, is one of very unequal merit. The algebra is a mere bundle of recipes, the scraps of theory attempted being generally imperfect or wrong. For instance, the proof of the binomial theorem, even for an integral exponent, is a mere pretence; and we have such surprising statements as "Similarly -2×-3 means that -3 is to be taken -2 times, thus:—$(-3)-(-3)=3+3=6$." The grammar, too, is occasionally very quaint: thus, "The differences of the squares of any two quantities are equal to the product of their sum and difference." On the other hand, the trigonometry is not bad, except the chapter on de Moivre's theorem: there are a good many practical examples likely to interest technical students; and useful tables and mensuration formulæ have been inserted. The chapter on plotting curves is disfigured by a set of very inaccurate diagrams. It is impossible to recommend the book to students who have to work by themselves; a competent teacher might perhaps extract some good from it.

Science and Technology.

Progressive Lessons in Science. By A. Abbott, M.A. (Oxon.) and Arthur Key, M.A. (Oxon.) xi.+320 pp. (Blackie.) 3*s.* 6*d.*—The two parts into which this clearly printed volume is divided are very different in scope and treatment. The first hundred and fourteen pages from Mr. Abbott's pen comprise about a hundred and twenty graduated experiments in non-metallic chemistry. These practical exercises are simply explained, and can be performed with a minimum of apparatus, but they cover the same ground as many other books previously published. The latter and larger section is by Mr. Key, and is of a much more novel type. Mr. Rooper, the well-known advocate of practical science teaching in elementary schools, says, in a preface he has written to these lessons, "The book forms an introduction to the practical application of chemistry to the affairs of daily life as distinguished from industry, and aims at helping those whose work lies at home, near the inglenook, in the way that many handbooks aid those whose occupation lies beneath the tall factory chimney." It is consequently interesting to enquire how Mr. Key proceeds to carry out this very desirable object. The learner is first given the average proportions of all the constituents in 1,000 parts of blood, and to begin with his attention is directed to the presence of 0·05 per cent of the compounds of iron. He is then set "to trace this constituent of the blood backwards from the animal, through the vegetable to the mineral kingdom." To make this possible, the tests for the presence of iron when in solution are given, but we are afraid that, since nothing has been previously learnt of the chemistry of iron compounds, this stage in the piece of detective work will seem to an ordinary boy or girl a veritable piece of conjuring. Armed with the "sulpho-cyanide" and "ferro-cyanide" tests for iron, the next stage is to prove the presence of this metal in blood. But "since the blood of all animals contains iron, and as some animals—sheep, for instance—feed exclusively on vegetable matter, it is to be presumed that vegetables contain iron," and the next step is to prove the presence of iron in grass. "Grass and green vegetables grow almost universally, it follows that wherever green

vegetation thrives, iron must be a constituent of the soil," and fertile soils are next proved to contain iron. Making a boy take on the *rôle* of a scientific Sherlock Holmes will doubtless interest him; we are doubtful whether it will in this instance endow him with the scientific spirit. Several more steps are necessary to establish the conclusions which Mr. Key's experiments suggest, and the teacher who presents the argument, as here stated, to a class of sharp boys will very soon be persuaded that they are able to spot the weakness of the train of reasoning.

Laboratory Manual. Experiments to illustrate the Elementary Principles of Chemistry. By H. W. Hillyer, Ph.D. vi. + 200 pp. (New York, The Macmillan Company.) 4*s.* net. —The first part of this volume, by the Assistant Professor of Organic Chemistry in the University of Wisconsin, consists of 144 Experiments, to be performed by students in a chemical laboratory, arranged to exemplify the more important preparations and properties of the commonly occurring elements and their compounds. The second part, which is much shorter, deals with the verification of the quantitative laws of chemical science. A short section, concerned with simple feats of manipulation with which it is necessary to be familiar before the experiments can be performed, forms a useful introduction to a carefully arranged course of elementary practical chemistry. The odd pages of the book are left blank and are presumably intended for the student's notes. Most English pupils would, we imagine, hesitate very much before defacing so beautifully printed a text-book with their own notes. We have discovered no very novel characteristics in Dr. Hillyer's course. Many other books on the subject which have previously come before our notice accomplish the same end in an equally satisfactory manner, but we should advise teachers of the subject who are selecting a laboratory manual for use by senior students to examine this one before deciding.

An Introduction to the Study of Zoology. By B. Lindsay. xix. + 353 pp. (Swan Sonnenschein.) 6*s.*—This is the second impression of a book published four years ago. It aims at supplying a simple outline of the animal kingdom so as to enable the reader to intelligently locate his own particular branch of zoological study in the general scheme of biological knowledge. Miss Lindsay writes clearly and interestingly, and her book should become more and more popular among the steadily increasing class of amateur workers who have a practical regard for the wonders of this department of natural treasures. The facts are judiciously chosen, simply arranged and illustrated with discretion. We confidently recommend the volume as a correct and pleasing introduction to the study of systematic zoology. Since it is neither over-loaded with information nor deficient in its exposition of broad fundamental principles, it should prove eminently suitable for those students who propose later to present themselves for the Higher Local or London University Science Examinations.

Lessons in Domestic Science. Part III. By Ethel R. Lush. viii. + 85 pp. (Macmillan.) 6*d.*—This is the last of three little books for girls in elementary schools, designed to meet the requirements of classes taking the new subject "domestic science," whether as a "class-subject" or as a "specific." Too much importance cannot be given to the teaching of the simple laws of health here dealt with.

Miscellaneous.

First Guide to Elementary Practical Book-keeping; First Guide to Commercial Correspondence; First Guide to Office Work. (Longmans.)—These are three members of a series edited by Mr. J. A. Jenkins, of Cardiff University College. Each contains about 60 pages, and costs a shilling. They are intended for youths who are just entering upon a commercial career, and for use in commercial schools. The volume on Book-keeping is by W. J. A. Brown; it is not the explanation of any particular system, but of the general principles of book-keeping. The distinction between debit and credit is lucidly explained and illustrated from various "books," and the usual forms of invoices, receipts, orders, &c., are given. Apart from Tots and Bills of Parcels there are no exercises, and we are of the opinion that the book suffers in consequence. The study of elementary book-keeping without exercises appeals to boys as little as chemistry without experiments. The other books are written by the editor. The *Commercial Correspondence* is intended to assist a youth to become something more than a clerk whose daily work must ever be the same, because his skill is purely mechanical. Among its contents are:—Hints on Composition, Common Errors, Information Helpful to Letter-Writing, Specimens of Letters and Circulars, &c. The book is a companion to the *Office Work*, which is, perhaps, the most useful of the three. It contains notes on office requisites, letters, postal regulations, indexing, copying, filing, and other duties of a boy clerk. A feature of this volume is its illustrations, some of which appear to us to be quite unnecessary, *e.g.*, the Date Case on p. 14, the Waste Paper Basket on p. 21, the Paper Fasteners on p. 18. Yet it is difficult to know where to draw the line—we have heard of more than one boy who knew but one meaning of "file" before entering an office. Viewing the series as a whole, we confess to a feeling of slight disappointment, and are unable to point to any special features of it that might call for extended notice.

An Apology for the Intermediates [for boys]. By Maurice C. Hime, M.A., LL.D. xvi. + 113 pp. (Simpkin, Marshall.) 1*s.* 6*d.* net.—Dr. Hime's "Apology" was published last April while the Commission concerned with Intermediate Education in Ireland was still deliberating. His views were consequently in time to come before the notice of the Commissioners. Dr. Hime, with his eighteen years' intimate knowledge of the Intermediate System, thoroughly believes in the examinations which have been held in boys' schools. More than this, Dr. Hime has succeeded in making out an excellent case. Judicious and temperate throughout, we are sure this "Apology" cannot fail to have had great weight with the Commissioners.

PRIZE COMPETITION.

No. 7.—Answers to History Questions.

WE offer, this month, two prizes of books, each of the published value of half-a-guinea, to be chosen from the catalogues of Messrs. Macmillan & Co., Ltd., for the two best sets of answers to the Junior Cambridge Local History Test Paper on p. 354.

One prize will be awarded to the best set of answers amongst the papers sent in by girls, and one for the best paper amongst the replies received from boys. The rules for the competition are as follows:—

(i.) The instructions printed with the questions must be carried out.

(ii.) Every paper sent in must be accompanied by a coupon (p. xvi.)

(iii.) No paper received *after* October 10th, 1899, will be considered.

(iv.) The decision of the Editors is final, and will be published in the November number.

(v.) Every paper sent in must be endorsed by the form master or mistress certifying it to be the unaided work of a boy

or girl under sixteen, written in class time, without consulting text-books.

(vi.) Replies should be addressed to the Editors, THE SCHOOL WORLD, St. Martin's Street, London, W.C.

If in the opinion of the Examiner who looks over the papers the prize answers are of sufficient merit, they will be printed in the November number.

We hope teachers will co-operate in this attempt to develop an interest in history on the part of candidates for the Junior Cambridge Local Examination. They can do this by setting the test paper as a class exercise for those of their forms preparing for the examination, and afterwards sending the best set of answers for the purposes of this competition.

OUR CHESS COLUMN.

No. 9.

LAST month's prize-winner is :—

J. T. W. Savage,
Boys' School,
Hoyland Common,
Barnsley.

Correct solutions were also received from :—

N. J. Chignell ; N. B. Dick ; A. V. Poyser ; A. D. Punchard ; N. P. Wood.

The answer is :—If KxB ; 8 R—KKtsq, Q—R6 ; 9 Kt—Kt5 ch and Black loses his Queen, or he might play 8 QxR and lose the exchange.

The leaders in the monthly competitions are :—

N. P. Wood, 6½ ; N. B. Dick, 6 ; A. V. Poyser, 6 ; A. D. Punchard, 6.

By the time this number of THE SCHOOL WORLD appears, most schools will have reassembled after the summer holidays, and the regular chess season in schools will have begun. Our Inter-School Correspondence Tourney will be well on its way again before the end of the month, and we may shortly expect to hear of more games being finished. I hope to be able to bring about some matches between schools this season,—I mean personal encounters. As far as I know, none such have ever been engaged in, but I can think of no reason for this. There is a football club in nearly every school, and there ought to be a chess club. Headmasters should see to this ; a taste for chess is one of the best safeguards against certain questionable attractions of town life that a young fellow, just leaving school, can have—and, nowadays, such a taste can be easily and cheaply gratified.

During the ensuing season—September to March inclusive—our competitions will go on as usual, but I want more entries. Secretaries of clubs can help me in this respect. Let them set up the position at one of the weekly meetings of the club and get as many members as they can to work out the solution. To the school sending in the most correct solutions (minimum six) during the month I will give one of Messrs. De La Rue's pocket chessboards, which may be disposed of as is thought best ; I would suggest that it be competed for amongst the successful members. There is one condition :—*each solver must declare in his own handwriting that he has received no assistance ;* if necessary, however, he may get the secretary to record his moves for him.—I find that several boys do not understand this part of chess. All the solutions may be sent in one envelope on unstamped postcards. This prize will be awarded to no school more than once during the season.

There will be the usual monthly prize in addition. Here is the game :—

WHITE.	BLACK.
1. P—K4.	1. P—K4.
2. P—KB4.	2. P—Q4.
3. P x QP.	3. P—K5.
4. B—Kt5 (ch.)	4. P—QB3.
5. P x P.	5. P x P.
6. B—R4.	6. Q—Q5.
7. P—QB3.	7. Q—Q3.
8. Kt—K2.	8. B—Kt5.
9. Castles.	9. Q—Q6.
10. R—Ksq.	10. B—QB4 (ch.)
11. K—Bsq.	11. Mate in two.

Send in solutions before the 30th inst.

RULES.

I.—Write on postcards only.
II.—Give name, date, and school address.
III.—Address all communications to
The Chess Editor,
THE SCHOOL WORLD,
St. Martin's Street,
London, W.C.

CORRESPONDENCE.

The Editors do not hold themselves responsible for the opinions expressed in letters which appear in these columns. As a rule, a letter criticising any article or review printed in THE SCHOOL WORLD *will be submitted to the contributor before publication, so that the criticism and reply may appear together.*

Leisure Hour Pursuits.

THE commencement of another winter term will bring home to the minds of many masters and mistresses in boarding schools the importance of a problem which, though somewhat in the background during the months of summer, becomes with the shortening of the days and the more frequent occurrence of wet or otherwise bad weather a subject requiring very earnest thought ; a problem which has, morever, as far as I have been able to learn, been only very partially solved.

The question which has for many years presented itself to me during the Christmas and early months of the Easter term is—how best to fill up the leisure hours of our boarders on such very wet days when football, hockey and lacrosse are either impossible for all, or suitable only for the more robust ?

It is not simply a matter of saving ourselves trouble by simply preventing disorder or destruction of school property. These are, of course, points requiring attention ; but to all of us, in those moments when we most clearly perceive our duty towards the boys or girls we have to prepare for the duties and temptations of life, the inculcation of habits for the right use of leisure hours which are bound to present themselves, though with varying frequency, to every man and woman, becomes a matter of real gravity. We have all learnt to believe that it is the idle hands for which Satan finds mischief. In other words, idle hands and minds do not agree with youth at all events, and unless we can manage to usefully employ both thoughts and bodily activities, results painful to ourselves and disastrous to our pupils are bound to follow.

It has consequently occurred to me that an exchange of opinion on this all-important subject in the columns of THE SCHOOL WORLD would be of the greatest assistance to every teacher whose work lies in the boarding school. I am quite sure that many teachers will have evolved novel plans for the useful and educative employment of hours spent outside the class-room, a knowledge of which would prove a positive boon in schools where the teachers are possibly less ingenious or the scholars more lacking in initiative.

Speaking personally, a few of the points on which I should like assistance are: (*a*) Is it possible to get boys and girls, through the agency of a debating society, reading circle, or other means, voluntarily to study English literature, so that an acquaintance with and love for good books may grow up in their minds? How ought one to set to work so as to prevent the idea becoming prevalent that it is a thin disguise for an extra lesson? (*b*) How are the best results got out of the chess club? (*c*) What can one do with very young pupils to prevent a frequent comparison of school with home to the great disparagement of the former? (*d*) Finally, speaking as a headmaster, how can one ensure the hearty co-operation of one's colleagues; how get them to regard the matter not as a question of time-absorbing duty, but rather as one of the most effective means of educating in the highest sense the children placed in their charge?

Will any of your readers give me some of the results of their experience?

September 2nd, 1899. HEADMASTER.

[Our monthly Chess column should do something towards answering question (*b*).—EDITORS, "SCHOOL WORLD."]

The Identification of Insects.

I AM very anxious to know where I can get a book on "Insecta," explaining the most approved full classification of their families, genera, &c., and, if possible, having an analytical key with which I may be able to classify my insects with more precision. Can you recommend one?

ROBERT CHAMBERS.

Bardezag, Ismid,
Turkey in Asia,
July 29th.

[Mr. Chambers's letter is one of many which have reached us from distant parts of the earth. As the subject to which it refers may interest other readers of THE SCHOOL WORLD, we asked Mr. W. F. Kirby if he could furnish the information required, and he has kindly replied as follows:—"The best book is Dr. Sharp's "Insects," in the Cambridge Natural History (2 vols., 17s. each). Smaller books which he would find useful are Kirby's "Elementary Text-Book of Entomology" (Sonnenschein, 1892, 2nd edition; 10s. 6d., I think), and Carpenter's "Insects" (Dent, 1899), 4s. 6d. There are upwards of 12,000 species of insects in England, but no book sufficiently detailed to enable *species* to be named apart from books devoted to the separate orders; though, if Mr. Chambers reads German, Korsch's "Insektenwelt" (2nd ed., Leipzig, 1883), price about 6s. (there is probably a later edition), would be very useful to him."—EDITORS, "SCHOOL WORLD."]

CALENDAR.

[*Items for the October Calendar should be sent in by September 20th.*]

September, 1899.

Friday, 15th.—Dundee University College Exam. for Bute Bursary.

Saturday, 16th.—Return forms for Durham College of Science Matriculation and Exhibition Exams.

Monday, 18th.—Owens College, Manchester, Entrance Exams.

Tuesday, 19th.—Llandovery College, Entrance Schol. Exam.; Bangor and Aberystwyth University Colleges, Entrance Schol. exams. begin; Schol. Exams. begin at London Central Technical College and Finsbury Technical College.

September, 1899.

Wednesday, 20th.—Schol. Exams. at King William's College, Isle of Man.

Friday, 22nd.—(7 p.m.) First of Lectures on "The Teacher and the Class," by P. A. Barnett, Esq., at College of Preceptors.

Saturday, 23rd.—Return forms for Preliminary Exams. of Royal Colleges of Physicians and Surgeons, Edinburgh.

Tuesday, 26th.—Oxford University Exams. for Women. Responsions begin.
Return forms for Preliminary Exams. of Pharmaceutical Society.
Matriculation and First University Exam. begin at Royal University of Ireland.

Wednesday, 27th.—Return forms for Schol. Exam., St. David's College, Lampeter.

Thursday, 28th.—Last day for sending in applications to Civil Service Commissioners for Exam. for Student Interpreterships.
Corpus Christi College, Cambridge, Exam for Sizarships.
Preliminary Exams. begin at Royal Colleges of Physicians and Surgeons, Edinburgh.

Friday, 29th.—St. John's College, Cambridge, Exam. for Sizarships.

Saturday, 30th.—Last day for returning forms for Cambridge Locals.
Admission Exams. at Durham University and Mason College, Birmingham.
Scholarship Exam., St. Andrew's University.

October.

Monday, 2nd.—Return forms for (*a*) Entrance Exams. at Sheffield University College; (*b*) admission to Training Colleges (Scotch Educ. Dept.); (*c*) Woolwich and Sandhurst Army Exams. (last day); (*d*) Army Commissions for Militia Officers Exam.
Apply for permission to sit for Scholarship Exams. at Training Colleges (Educ. Dept.)
General Exam. for Bursaries at Glasgow University.
Cambridge University Previous Exam. begins.

The October number of THE SCHOOL WORLD will be published on Tuesday, October 3rd.

The School World.

A Monthly Magazine of Educational Work and Progress.

EDITORIAL AND PUBLISHING OFFICES:

ST. MARTIN'S STREET, LONDON, W.C.

Contributions and General Correspondence should be sent to the Editors.

Business Letters and Advertisements should be addressed to the Publishers.

THE SCHOOL WORLD *is published at the beginning of each month. The price of a single copy is sixpence. Annual subscription, including postage, eight shillings.*

The Editors will be glad to consider suitable articles, which, if not accepted, will be returned when the postage is prepaid.

All contributions must be accompanied by the name and address of the author, though not necessarily for publication.

The School World

A Monthly Magazine of Educational Work and Progress.

No. 10. OCTOBER, 1899. SIXPENCE.

THE POSITION AND TEACHING OF GERMAN.

By E. L. MILNER-BARRY, M.A.

Mill Hill School; Examiner in German to the University of London.

I.

AMONG the many duties which our Consuls from time to time are called upon to perform is the drawing up of reports respecting the trade of the countries in which they are domiciled. These reports might with advantage be widely circulated among our educational bodies. Their perusal would, I believe, tend to accelerate the reforms which must ere long take place in the position and study of modern languages in this country. I content myself with one quotation. It is from a recent report of our Consul-General Serabuch, in Berlin: "It would be absurd self-deception to assume that the German export trade is standing still, or that it is an inconsiderable competitor to British commerce. Such ideas can only have disastrous results for British trade. As I said last year, it is not only the ingenuity and energy of the German manufacturers which has caused this competition, but *the better knowledge of the German clerk, and his knowledge of foreign languages*, the capability of the German workman, and the better discipline which prevails in factories," &c., &c.

It would be easy to adduce further evidence—were any needed—of the keen competition under which English trade suffers, and it is notorious that many foreigners occupy important positions in English mercantile houses—positions which should be the birthright of the English, and which may yet be won back if the whole question of modern-language teaching in this country be made a national question, as it has been very largely in Germany in recent years. The Schoolmaster has many conflicting interests to reconcile, and it behoves him to safeguard his profession against the obtrusion of the many would-be counsellors by whom he is beset; but if the question at issue assumes a wider and more national aspect, he will not be slow to give effect to the voice of the public.

It is not, however, the commercial side of the question which alone appeals to us; the utilitarian must not be placed in front of the educational: it no longer requires demonstration that modern languages, if properly handled, afford, no less than classical languages, valuable and adequate mental training. If, then, we claim for them additional consideration on the grounds of utility and practical value, we have a further argument in favour of developing the subject in our schools.

GERMAN OF EQUAL VALUE WITH FRENCH.

It is imperative in the first instance that German as an educational subject should be placed on the same footing as French, that equal time should be afforded for its study, and that where only one modern language can be studied (as in the case of pupils studying the classical languages), time tables should be arranged in such a manner that French and German should be studied at different stages of a pupil s career. The fact that a working knowledge of German, as well as French, is very important for those on the classical side of a school admits of no contradiction.

The first step towards reform, then, must be to adjust the balance between French and German. The urgent need of this may be seen from the following figures. In the last Cambridge Local Examinations (Preliminary, Junior, and Senior), the number of candidates taking French amounted to 13,784, while only 1,694 took German; in the Welsh Central Board Examinations for the same year the number of papers returned was 3,414 and 84 respectively; in the London Matriculation Examination in June, 1898, the figures were, French 1,981, German 85; in January, 1899, French 706, German 43.

French still maintains the pride of position by tradition, but so far as we are aware the argument has not yet been advanced that it occupies that position owing to its being the better educational subject. Let us by all means preserve a place for French in our time tables, but let it cease to be *the* modern language for educational purposes, and let us endeavour to adjust our modern education to the needs of the hour.

TREATMENT OF THE SUBJECT.

The treatment of the subject must be looked at from two different points of view: (*a*) when modern languages are primary subjects, *i.e.*, in the case of boys intended to read modern languages

at the Universities, and on the modern and commercial sides of schools; (*b*) when they are secondary subjects—receiving two or three hours a week in the case of boys who are likely to proceed to the Universities.

Whichever point of view we consider, it cannot be too strongly insisted upon that in this country we are wont to commence the teaching of languages too early, and that pupils are too often wrestling with the elements of three or four languages at one and the same time, and are engaged in an unequal struggle from which they cannot emerge triumphantly.

It would be folly to attempt to teach a child of, say ten years old, two sciences concurrently, yet it seems to be a common practice to commence French and Latin at the same time, with the result that one language frequently suffers at the hands of the other, and that the earlier instruction in one of the languages (usually French) is labour lost.

Surely the mere fact that the study of Greek is not commenced with Latin is an argument in favour of postponing the beginning of either French or Latin till a later stage, and it may not be out of place to mention that recent experiments in Germany have shown that the postponement of the study of Latin till after the elements of French have been acquired is not only a possible, but a very desirable reform, as far as that country is concerned.[1]

It does not, however, seem to us that the experiment would be justified in this country, the correct acquirement of German by German pupils being a far greater preliminary effort in linguistic training than the acquirement of English by English boys; but it does seem to us desirable in the interests of all language teaching, whether ancient or modern, that we should reform our time table, in order to lighten the burden of the earlier years of school life.

Which Language should follow English?

Latin, French, Greek, or German? Surely the last named, the language which is nearest akin to English, and the language which lends itself most readily to parallel treatment. This will no doubt be hailed as a new heresy, as the dream of a faddist; yet I have the consolation of knowing that the opinion is shared by others who are competent to speak on the subject.[2] The experiment, at any rate, is worth trying, and where our methods in dealing with modern languages are manifestly imperfect, it behoves us to use every effort to produce the best results, not in one language alone, but in all. Let us start with English, proceed to German, from German to Latin, and from Latin to French *or* Greek.

Some such arrangement as this would carry with it the additional advantage that pupils on the classical side of the school would be enabled to receive instruction in two modern languages.

When to Commence a Modern Language.

But leaving aside, for the present, the question of how far it may be possible to introduce the teaching of German as the earlier modern language to be acquired, what we are most concerned to insist upon at present is that the most fitting time should be chosen for the commencement of *any* and *every* modern language, and that whether we consider German as a classical, modern, or commercial subject, it is imperative that the earlier instruction in it should be imparted daily, and that it should not be hampered by competition with the earlier instruction in other languages, a state of things which, to my mind, has contributed largely to bring about our present non-success.

By postponing the teaching of languages to a later stage, the time table is left in a far more open condition in the earlier years of school life, and those subjects which, later, will perforce give way to the study of modern languages could be more thoroughly taught.

English would then receive a larger amount of attention than it does at present: in too many cases gradual pressure tends to relegate it more and more to the background, to make way for other subjects, and the effect of this is seen in the number of pupils whose knowledge of grammar and composition, to say nothing of spelling, is in a very backward condition at the age of twelve, and not likely to improve subsequently. Let the earlier years be given to the mastering of our own language; let the two hours a week at present devoted to a modern language between the ages of ten and twelve be given to English grammar, composition, &c. (not historical grammar), then let the modern languages follow.

Let the Modern side boy start either French or German at 12, dropping part of his English, and let him proceed a year later to his second modern foreign language, and the educational gain will be patent. Part of the non-success of our present system may certainly be attributed to inadequate methods of arranging the time table. We may complacently put on one side the theory that a language must be learnt while the pupil is young, that the nursery is the training-ground for future linguists. Plenty of evidence can be produced of pupils who have taken up a modern language when their education in the ordinary sense is supposed to have been completed, and who have acquired proficiency in the language by normal methods, and the few crumbs of French and German which a child picks up in the nursery may be regarded as a negligeable quantity in the larger question of school instruction. To sum up:—

(1) The starting of modern languages should be deferred till the pupil has gained a solid foundation in English subjects.

(2) A period of not less than one year should

[1] Compare on this subject Mr. Pollard's address to the Modern Language Association, reprinted in the *Modern Quarterly*, April, 1899, and an article by Mr. Shaw Jeffrey, in the same periodical, August, 1899.

[2] Compare Mr. Pollard in the address quoted above, and Professor Rippmann, in his "Hints on Teaching German" (Dent & Co.).

then elapse before the pupil is taught the second modern language.

(3) In the early stages of instruction in a language, whether the language is to be a main or a secondary subject, not less than three-quarters of an hour per day should be assigned initially to the study of the language.

Time necessary for Modern Languages.

The further study of the languages, and the time to be apportioned to them, will of necessity depend on the part, if any, which they are destined to play in the pupil's future career. The following time-tables of the Prussian Secondary Schools show what has proved itself a successful distribution of subjects :—

Time Tables of the Four most important Types of Prussian Secondary Schools.[1]

A.—With a Nine Years' Course.

1. Gymnasium.

	VI.	V.	IV.	IIIb.	IIIa.	IIb.	IIa.	Ib.	Ia.
Religion	3	2	2	2	2	2	2	2	2
German	4	3	3	2	2	3	3	3	3
Latin	8	8	7	7	7	7	6	6	6
Greek	—	—	—	6	6	6	6	6	6
French	—	—	4	3	3	3	2	2	2
History	1	1	2	2	2	2	} 3	3	3
Geography	1	1	2	1	1	1			
Mathematics	4	4	4	3	3	4	4	4	4
Natural Hist'ry.	2	2	2	2	—	—	—	—	—
Chemistry and Physics	—	—	—	—	2	2	2	2	2
Writing	2	2	—	—	—	—	—	—	—
Drawing	—	2	2	2	2	—	—	—	—
Singing			2				2		
Gymnastics	3	3	3	3	3	3	3	3	3
	30	30	33	35	35	35	33	33	33

2. Realgymnasium.

	VI.	V.	IV.	IIIb.	IIIa.	IIb.	IIa.	Ib.	Ia.
Religion	3	2	2	2	2	2	2	2	2
German	4	3	3	3	3	3	3	3	3
Latin	8	8	7	4	4	3	3	3	3
English	—	—	—	3	3	3	3	3	3
French	—	—	5	5	5	4	4	4	4
History	—	—	2	2	2	2	} 3	3	3
Geography	2	2	2	2	2	1			
Mathematics	4	4	4	5	5	5	5	5	5
Natural Hist'ry	2	2	2	2	2	2	—	—	—
Physics	—	—	—	—	—	3	3	3	3
Chemistry	—	—	—	—	—	—	2	2	2
Writing	2	2	—	—	—	—	—	—	—
Drawing	—	2	2	2	2	2	2	2	2
Singing			2				2		
Gymnastics	3	3	3	3	3	3	3	3	3
	30	20	34	35	35	35	35	35	35

[1] Reprinted by permission from Mr. Brown's lecture quoted below. N.B.—VI. is the lowest form in German schools

3. Oberrealschule.

	Corresponding Classes of Realschule.								
	VI.	V.	IV.	III.	II.	I.			
	VI.	V.	IV.	IIIb.	IIIa.	IIb.	IIa.	Ib.	Ia
Religion	3	2	2	2	2	2	2	2	2
German	5	4	4	3	3	3	4	4	4
English	—	—	—	5	4	4	4	4	4
French	6	6	6	6	6	5	4	4	4
History and Geography	2	2	4	4	4	3	3	3	3
Mathematics	5	5	6	6	5	5	5	5	5
Physics	—	—	—	—	2	2	3	3	3
Chemistry and Mineralogy	—	—	—	—	—	2	3	3	3
Natural History	2	2	2	2	2	2	—	—	—
Writing	2	2	2	—	—	—	—	—	—
Drawing	—	2	2	2	2	2	2	2	2
Singing			2				2		
Gymnastics	3	3	3	3	3	3	3	3	3
	30	30	33	35	35	35	35	35	35

B.—With a Six Years' Course.

Realschule.

	VI.	V.	IV.	III.	II.	I.
Religion	3	2	2	2	2	2
German and National History	6	6	4	4	3	3
English	—	—	—	—	6	6
French	—	—	8	8	6	6
History and Geography	3	4	4	4	3	3
Mathematics	6	6	6	6	5	5
Chemistry and Physics	—	—	—	2	2	4
Natural History	2	2	2	2	2	—
Writing	3	3	—	—	—	—
Freehand Drawing	2	2	2	2	1	1
Geometrical do.	—	—	—	—	2	2
Singing	2	2	2	2	2	2
Gymnastics	3	3	3	3	3	3
	30	30	33	35	37	37

Method.

At the present juncture I fear that it is impossible to advocate with any degree of success the complete introduction of the new method (*Die Neuere Richtung*), which has been used with such striking results on the Continent.[1] Before such a method is possible, except in isolated cases, two great reforms will have to be made :—

(1) The whole Modern Language Examination system will have to be re-modelled.

(2) The supply of Modern Language teachers must be largely increased, and they must be specially trained, for it will be necessary that the whole modern language staff throughout a school

[1] For a statement of the new method compare *Brebner*, "The Method of Teaching Modern Languages in Germany" (Cambridge University Press); *Brown*, "The Teaching of Modern Languages in German Schools," *Educational Times*, March, 1899; *Professor Walter Rippmann's* papers on the teaching of French in this journal, numbers 1 and following.

shall be competent to instruct according to this method.

Granted these two conditions, the experiment might be made,[2] but for the present, at any rate, we must content ourselves with such modifications of the old methods as the example of our continental colleagues and our experience suggest.

(To be continued.)

ON THE TEACHING OF PROPORTION FOR USE IN GEOMETRY.

By M. J. M. Hill, M.A., D.Sc., F.R.S.
Professor of Mathematics at University College, London.

(Concluded from p. 324.)

X. *Introduction of the idea of Ratio.*—The idea of Ratio, complex as it is, is formed by everyone at a very early age. As soon as a child can recognise an object from a drawing of it, he has formed the idea of similar figures, and therefore he is able to see that the ratio of two of the dimensions of the object is the same as that of the corresponding dimensions of the drawing. He has thus acquired the idea that the ratio of A to B is the same as that of 2A to 2B; that the ratio of 2N to 3N is the same as that of 2 to 3, and so on.

In connection with these ideas regarding ratio may be noted some deductions from the conditions for the sameness of two scales.

(1) The relative multiple scale of A,B is the same as that of nA, nB. Euc. V. 15. (Here A,B are magnitudes and n an integer.)

(2) The relative multiple scale of a,b is the same as that of aN, bN. Euc. X. 5. (Here a,b are integers, N a magnitude.)

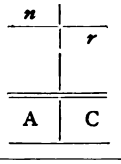
Returning now to the acquisition of the idea of ratio, it is to be observed that the child after some time takes another step. Suppose that a drawing of an object be made, then if one of the dimensions of the drawing be too large in comparison with the others, the child would say that the drawing was bad. He has then formed the idea of unequal ratios.

In connection with this may be noted the simplest proposition in the theory of differing relative multiple scales, viz.: that if A,B,C are magnitudes of the same kind and A greater than B, then the scale of A,C is not the same as that of B,C. This is proved as follows:—

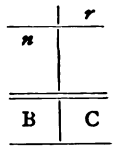
I have already proved in section iv. that integers n and r exist, such that

$$nA > rC > nB.$$

Hence in the scale of A,C there is the figure



But in the scale of B,C there is the figure



Hence the scale of A,C is not the same as that of B,C.

The propositions stated in this section suggest (*but do not prove*) the general conclusion that if the scale of A,B is the same as that of C,D then the ratio of A to B is the same as that of C to D. They are, however, sufficient to account for the form which Euclid gave to his Fifth Definition.

We are, therefore, able when making further applications of the conditions for the sameness of two scales, to state the results in terms either of scales or of ratios.

XI. *Propositions in the Theory of Scales.*—These propositions fall into two groups:—

(1) Those which may be conveniently proved by the use of the first form of the conditions for the sameness of two scales.

The most important of those not already mentioned are Euc. V. 7, 9, 11, 12, 18, and the proposition marked B by Simson; Euc. VI. 1, 33, and the following proposition which includes the first part of Euc. VI. 2:—"If two straight lines are cut by the parallel straight lines AB, CD, EF, GH, then the scale of AC, EG is the same as that of BD, FH. The less important are Euc. V. 4, 17, 19, 25.

(2) Those which are more conveniently proved by the use of the second form of the conditions for the sameness of two scales. These are Euc. V. 16, 22, 23.

The only remaining proposition is Euc. V. 24.[1] Its deduction from either form of the conditions for the sameness of two scales is so long that I am in the habit of giving Euclid's proof; but its artificiality stands out in remarkable contrast to the sameness and directness of the proofs of the other propositions, of which I proceed to give examples.

As an example of the first class of applications take the proposition marked Euc. V.B by Simson, which expressed in terms of scales is:—

If the scale of A,B is the same as that of C,D, then the scale of B,A is the same as that of D,C.

The two scales to be proved the same are those of B,A and D,C.

Take either of these, say the scale of B,A, and take any integer r in the first column and any integer s in the second column. There are always three alternatives expressed by the figures[2]

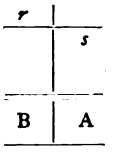


Fig. 1.

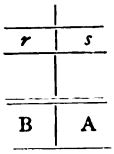


Fig. 2.

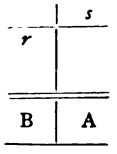


Fig. 3.

[1] Signs are not wanting that Examination Boards are willing and ready to introduce reforms—*e.g.*, the introduction of an oral test (compulsory) in the University of London Intermediate and Final B.A. examinations; the oral test in Modern Languages in the Central Welsh Board Examinations; a voluntary oral test in the Cambridge Higher Local Examination; lastly, the creation of a New Oral Examination in Modern Languages for modern language students in the University of Cambridge.

[1] Propositions 8, 10 and 13 are not required to prove any property of equal ratios. Proposition 14 is a particular case of 16, 20 of 22, 21 of 23, and the only reason for which Euclid introduces them is to prove Props. 16, 22 and 23 respectively.

[2] Figures 1, 4, 7 and 10 belong to the first alternative.
" 2, 5, 8 " 11 " second "
" 3, 6, 9 " 12 " third "

Consequently in the scale of A,B there are the figures

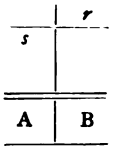


FIG. 4.

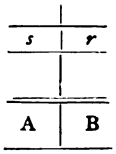


FIG. 5.

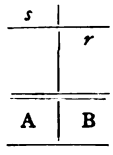


FIG. 6.

Since the scale of A,B is the same as that of C,D it follows that in the scale of C,D there are the figures

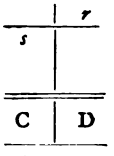


FIG. 7.

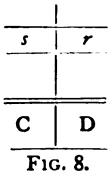


FIG. 8.

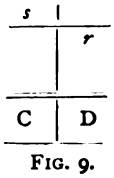


FIG. 9.

Hence in the scale of D,C there are the figures

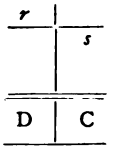


FIG. 10.

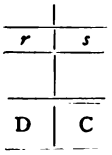


FIG. 11.

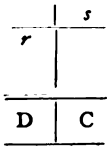


FIG. 12.

Comparing Fig. 1 with Fig. 10,
" " 2 " 11,
" " 3 " 12,
it is seen that the scale of B,A is the same as the scale of D,C.

As an example of the second class of applications take Euc. V. 16, which is equivalent to following:—

If A,B,C,D are four magnitudes of the same kind, and if the scale of A,B is the same as that of C,D, then the scale of A,C is the same as that of B,D.

The two scales to be proved the same are those of A,C and B,D.

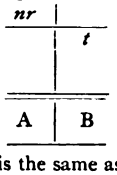
Take either of these, say the scale of A,C; and take any integer r in the first column, and any integer s in the second column.

There are three alternatives:—
(i.) $rA > sC$, (ii.) $rA = sC$,[1] (iii.) $rA < sC$.

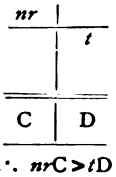
(i.) If $rA > sC$,
then rA, sC and B are magnitudes of the same kind, and therefore by the earlier part of Euc. V. 8 (see Section IV. above), integers n and t exist such that

$$nrA > tB > nsC.$$

The statement $nrA > tB$ gives in the scale of A,B the figure



Since the scale of A,B is the same as that of C,D there is in the scale of C,D the figure



$\therefore nrC > tD$
we have also $tB > nsC$.

[1] This alternative might be considered, but it requires an artificial and therefore difficult proof to show that in this case $rB = sD$

(The rest of the work consists in drawing a conclusion from these two statements by eliminating the magnitude C which occurs in both).

From the first $snrC > stD$,
" second $rtB > rnsC$,
Now $snrC = rnsC$,[1]
$\therefore rtB > stD$
$\therefore t(rB) > t(sD)$
$\therefore rB > sD$.

Hence if $rA > sC$, then $rB > sD$. (1)
In like manner if $rA < sC$, then $rB < sD$. (2)
" " $rB > sD$, " $rA > sC$. (3)
" " $rB < sD$, " $rA < sC$. (4)

From (1), (2), (3), (4) by means of the second form for the conditions for the sameness of two scales (see section IX. above) it follows that the scale of A,C is the same as that of B,D.

XII. *The Measurement of Ratio.*—There was no necessity arising out of the nature of the subject for introducing the idea of Ratio into any portion of the preceding argument. Everything might have been stated conveniently and with absolute clearness in the language of scales.

But further progress is no longer possible without it. For this we require the Fundamental Proposition in the Theory of Relative Multiple Scales, on which it is possible to base a system for measuring ratio. It is required also for the Theory of Compounding Ratio, and was assumed by Euclid in the second proposition of the Twelfth Book. It is the single important proposition in the elements of the subject which Euclid did not prove. In fact, it is only recent progress in analysis that has rendered it possible to obtain a proof, which depends upon the principle of continuity. If no use be made of that principle, this proposition must be treated as an axiom. The proposition is as follows:—If A,B are two magnitudes of the same kind, and D any magnitude of any kind, then there exists one and only one magnitude C, of the same kind as D, such that the scale of A,B is the same as that of C,D.

Unfortunately, the proof of it, except in the special case where A,B,D are segments of straight lines when C may be shown to exist by Euc. VI. 12, is too difficult to be included amongst the subjects of secondary education. Those who are interested in it will find a proof in an article on the Fifth Book of Euclid's Elements in the "Cambridge Philosophical Transactions," vol. xvi., part iv.

Assuming the truth of the fundamental proposition stated above, suppose that D is taken to be the unit of number, then C is a magnitude of the same kind as the unit of number, and may therefore be properly called a real number.

If D be denoted by 1, let C be denoted by ρ, then the scale of A,B is the same as the scale of ρ,1.

Now let the real number ρ be defined to be the measure of the ratio ρ:1. Then ρ is determined

[1] By the substitute for Euc. V. 3, see section II. above.

by the scale of A,B. For this reason ρ is taken to be the measure of the ratio of A to B. It appears, therefore, that a ratio can be measured by a real number. Now a magnitude is regarded as known when we can show how to measure it, and this has been accomplished in regard to ratio.

Two ratios are said to be the same when their measures are the same.

Let ρ be the measure of the ratio A:B and also of the ratio C:D.

Then the scale of A,B is the same as that of ρ, 1.
And the scale of C,D ,, ,, ,, ρ, 1.
$\therefore$ the scale of A,B ,, ,, ,, C,D.

Thus the Fundamental Proposition in the Theory of Scales enables us to establish the connection between scales and ratios.

XIII. *The Compounding of Ratios.* — The next matter for consideration is the subject of the compounding of ratio, which is explained in the Definition marked A by Simson.[1] It falls naturally into four stages.

(i.) *The general idea at the root of the process.*—If we have to compare two magnitudes A and C, we may proceed to do this indirectly by comparing each with a third magnitude B. Compare A with another magnitude B, and then B with C. This gives the idea that the ratio of A to B and the ratio of B to C determine together *in some way* the ratio of A to C.

(ii.) *Particular definition of the process.*—To render the above idea quite precise, Euclid gives the following definition:—

The ratio of A to C is said to be compounded of the ratio of A to B and the ratio of B to C.

(iii.) *General definition of the process.*—The definition just given enables us to compound two ratios, A to B and B to C, in which the second term of the first ratio is the same as the first term of the second ratio.

The question immediately arises:—How are two ratios, in which the second term of the first ratio is not the same as the first term of the second ratio, to be compounded?

This question is answered thus:—

Let P:Q and R:S be the two ratios to be compounded.

Take *any* magnitude A.

Then find a magnitude B such that P:Q is the same as A:B; and a magnitude C such that R:S is the same as B:C.

Then P:Q compounded with R:S is the same as A:B compounded with B:C, and is therefore A:C.

(iv.) *Justification of the process.*—The word "any" italicised in the last stage suggests this question:—

If, instead of the magnitude A, another magnitude A′ had been taken, and the process completed in the same manner, would the resulting ratio have been equal to A:C?

If this question cannot be answered in the affirmative, then by taking different magnitudes for A, the process would lead to different values for the ratio compounded from the same ratios, and would therefore be quite useless.

Find, therefore, B′ so that P:Q is the same as A′:B′; and then find C′ so that R:S is the same as B′:C′.

Then A:B is the same as A′:B′,
and B:C ,, ,, B′:C′;
$\therefore$ by Euc. V. 22
A:C is the same as A′:C′.

The question, therefore, at the beginning of this stage is answered in the affirmative, and this answer is the justification of the process defined in the preceding stage, inasmuch as it shows that it must always lead to consistent results.

XIV. *Duplicate Ratio.*—Let us consider next Euclid's Tenth Definition, viz.: that of Duplicate Ratio.

The duplicate ratio of A:B should be defined as the ratio compounded of A:B and A:B.

In this case the directions given above for compounding ratios reduce to the following:—

Find a magnitude C such that A:B is the same as B:C, then A:B compounded with A:B is the same as A:B compounded with B:C, and is therefore the same as A:C.

Hence if A:B :: B:C,
Then A:C is the duplicate ratio of A:B.

This is Euclid's Definition.

XV. *Euclid's Test for Distinguishing the Greater of Two Unequal Ratios from the Smaller.*—We come now to Euclid's Seventh Definition, which has been left to the last as being of least importance for secondary education.

Let the measure of the ratio A:B be ρ and let the measure of the ratio C:D be σ.

Then A:B is said to be greater than C:D, if ρ is greater than σ.

From this definition the conditions of Euclid's Seventh Definition may be deduced as follows:—

Since ρ and σ are real numbers, and ρ is greater than σ,
therefore $\rho - \sigma$ is a real number;
,, an integer n exists such that $n(\rho - \sigma) > 1$.
$\therefore$ $n\rho > n\sigma + 1$.

Hence some integer t, or as it is more convenient to express it here $t(1)$, exists such that

$$n\rho > t(1) > n\sigma.$$

Since the scale of A,B is the same as that of ρ,1; and since

$$n\rho > t(1);$$
$$\therefore\ n\mathrm{A} > t\mathrm{B}.$$

Since the scale of C,D is the same as that of σ,1; and since

$$n\sigma < t(1);$$
$$\therefore\ n\mathrm{C} < t\mathrm{D}.$$

Hence if A:B > C:D,
then integers n, t exist such that

$$n\mathrm{A} > t\mathrm{B},\ n\mathrm{C} < t\mathrm{D}.$$

Conversely, it can be shown that if integers n,t exist such that

$$n\mathrm{A} > t\mathrm{B}, \text{ but } n\mathrm{C} < t\mathrm{D},$$

then the measure of A:B is greater than that of C:D, which may be expressed shortly, A:B is greater than C:D.

This result is equivalent to, but not quite the

[1] This definition does not appear in Euclid's text. The essential portion of it is, however, correctly quoted in Euc. VI., 23; the definition was therefore placed amongst the definitions of the Fifth Book by Simson, who ascribed it to Euclid.

same in form as Euclid's Seventh Definition. For a proof of this last statement I must refer to the article quoted above.

It appears, therefore, that the conditions of Euclid's Seventh Definition need not be laid down as a part of the foundation on which the structure of the Fifth Book is to be erected; but, on the contrary, they may be deduced from ideas of a simpler order.

Having regard to the fact that Euclid was not in possession of the proof of the Fundamental Proposition in the Theory of Scales, it is interesting to speculate on the way in which he obtained the conditions stated in this Seventh Definition; but I must leave this to my readers with the observation that the Eighth, Tenth, and Thirteenth Propositions of the Fifth Book, which are the only ones necessarily depending on that Definition, express ideas far simpler to grasp than that contained in the Seventh Definition; and that Euclid was probably in possession of the results of the last-named propositions before he arrived at the conditions of his Seventh Definition.

CHAPTERS IN SCHOOL HYGIENE.

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V.—School Punishments.

WHILE it is true, within certain limits, that the management of a school may be fairly tested by the extent to which the maintenance of disciplipne is secured without resort to punishment, the fact remains—human nature being what it is—that punishment in some form or another cannot be absolutely eliminated from the poly-phase conditions which go to make up the total of school life. Essentially, the word signifies the infliction of pain as a penalty for wrong done; and having regard to this practical definition of the term, it is fair to insist that, while the penalty exacted shall not be disproportionate to the offence, neither shall it be of such a nature or so inflicted to impose any kind of permanent disability—physical or mental—upon the offender. This will scarcely be regarded as an unreasonable standard by which to examine the various forms of punishment usually practised in schools; and yet there is a large number of punishments—including many of those often regarded as the less severe in their nature—which would be placed out of court by any such test dispassionately applied.

Preliminary Considerations.

Before proceeding to fuller details, some preliminary considerations may be useful in clearing the ground, especially as much loose talk and not a little false sentiment is apt to encumber the popular estimation of the subject. There are some who aver that—under what they regard as the proper system of training—the infliction of punishment is never required; and others, again, who hold that punishment is necessarily degrading (in the more evil sense of that word) both to him who inflicts and to him who suffers it. The former may be reminded that even grown-up people make mistakes and—as the world goes—have to suffer thereby; by which they, unless hopeless fools, learn wisdom for the future; that the young also make mistakes, not only through carelessness and ignorance, but also wilfully and in the face of direct prohibition; and that any system of education could not fail to ensure a disastrous future for its victims, did it nurture them on the false doctrine that they were exempt from the universal rule that indulgence in folly, vice, and lawlessness entails inevitable retribution. To the latter class it may be replied that, while the deliberate commission of an offence necessarily implies degradation on the part of the offender—in at least the sense that he thereby falls short of the moral standard of perfection—there is nothing necessarily degrading in suffering the penalty of the offence: indeed, courage and resolution in bearing the consequent penalty may go far to redeem his character and to reinforce the virtues which had temporarily lapsed; while the imposition or infliction of punishment, when this is really necessary and is properly apportioned, is not brutalising—unless, indeed, the element of vindictiveness is concerned, as ought never to be the case.

Punishments to be Avoided.

It may be granted that, whatever the punishment inflicted, it should never assume a form which entails on its victim deprivation of the food, the fresh air, the exercise, or the sleep which is necessary to his health. To deprive a pupil of a portion of his meal, or of the time—seldom too protracted—normally allowed for its consumption, or to keep him standing instead of sitting while he eats it, is to import an element of cruelty equally foolish and unnecessary. If the meal, as taken under the usual conditions, is requisite to his physical welfare, then to limit him to only a part of his needed food, and to compel this to be eaten hurriedly and under circumstances distinctly unfavourable to its proper digestion, is indeed by so much to "degrade" his bodily powers, and to render him proportionately unfitted to perform his tale of mental labour; and to impose on him extra work which can only be accomplished after the hour at which he should have retired to rest and sleep is also to sin against the spirit of true education. The good master who is also a good disciplinarian can achieve all that such misdirected methods of correction are supposed to aim at, without maiming, as such methods do, the capacity of the offender. The like objections apply to most of those forms of punishment known as "keeping in." If these are so arranged and carried out as to substitute some hours' confinement in a more or less close room for the period of exercise in the

open air, and especially if this fill the interval between the end of the school lessons and the succeeding meal time, real harm may easily result in the shape of mischief not the less serious because its inception is hardly appreciable and its growth insidious.

Written Impositions.

The different forms of written imposition are open to the like objection; and of them, what are known as "lines" are the worst of all. This form of punishment still has a vogue—due probably to certain advantages which it superficially presents—to the master's point of view at all events: thus, it is easily exacted, appears definite in character, can be more or less accurately apportioned to the offence, does not—on a passing view—seem to involve any element of cruelty, and is sometimes fondly believed to furnish a means of impressing knowledge, by a sort of *non vi sed sæpe cadendo* principle, while it is sufficiently disagreeable in its execution to exert an appreciable deterrent effect. Yet it is extremely doubtful whether one man in a hundred could be found honestly to aver that he had ever thus learned anything of interest or value to him by the execution of a task undertaken in a spirit of uncongeniál drudgery, hurried through with the minimum of attention and the maximum of haste compatible with a tolerable approach to legibility—one, too, which could often be accomplished to a large extent vicariously (given a sufficient resemblance of handwriting), in virtue of some system of schoolboy barter and exchange. On the other hand, it must be admitted that it is, in hardly any sense, an intellectual or informing exercise; that, like all such writing against time, it may induce weariness of body and of brain, but that it can hardly pretend to secure any equivalent of mental or moral gain; that it too commonly substitutes a time and habit of cramped and undesirable postures within doors for healthy exercise in the open air; and that it fosters a crabbed and illeligible cheirography. If written impositions must be insisted on at all—and it is difficult to see how they can altogether be abolished—there is only one form which is open to the minimum of the objections raised above: the careful execution of a limited, reasonable number of copybook exercises, in round and running hand, suitably varied, would imply far more intelligent work of both brain and hand than is secured under other circumstances, while it would do something to stimulate and exercise the æsthetic sense of form, and at the same time would achieve something towards mitigating the reproaches which are now too often and too justly levelled against both the spelling and the handwriting of the modern schoolboy.

The Use and Abuse of Sarcasm.

Again, while the form of punishment selected in any case should be adequate to the offence, and properly adjusted, both in its nature and in degree, not merely to the offence but also to the individual character and capacity of the offender, it should not (save perhaps in the most exceptional circumstances) be markedly distinguished by an element of ridicule, contumely, or contempt. Ridicule, sarcasm and irony are powerful weapons, to which the child mind is generally specially susceptible. For this reason they have their value in suitable cases— a value which is in direct proportion to the rarity and the appropriateness with which they are employed. They may be properly applied to a consideration of the offence which it is desired to distinguish, for example, as a contemptible one. But they are apt to defeat the end in view when combined with the punishment, suggesting a spirit of vindictiveness in its infliction, embittering the memory of the penalty rather than that of the misdeed, and thus tending to make the latter appear the less serious of the two; inducing the culprit to feel that he has paid his debts with usury, and chilling the spirit which might otherwise have helped him to rise on the stepping stone of his offence to a higher plane of rectitude.

Dulness Often Due to Abnormalities.

Every schoolmaster worthy of the position finds that the need for inflicting punishment becomes less frequent in proportion as he studies and learns the individuality of his pupils. He realises, too, that inattention and stupidity are not the natural characteristics of normal childhood; and that, in the vast majority of cases, the apparently stupid or inattentive child is really one who suffers from some form of physical disability which, so long as it is unrelieved, places him at a relative disadvantage in comparison with his fellows. In every such case, all care should be promptly taken to ascertain, by skilled examination, whether there be not some abnormality of vision or of hearing; and whether the child be not the subject of adenoid growths in the post-nasal cavity. These last are far more common than most people are ready and willing to believe; and even when present in such comparatively small amount or in such situations as to exert no obvious interference with respiration, are nevertheless apt to be responsible for a considerable degree of mental dulness, and to interfere to a quite disproportionate extent with physical as well as with mental development. In all such cases their effectual removal is attended with the happiest results; and the improvement in general growth and vigour—to say nothing of attendant advantages both mental and moral—is nothing short of astonishing to those who are unfamiliar with such cases.

Promptness Necessary in Punishing.

But the schoolmaster has also to reckon with that more obstreperous element in the vitality of youth whose quality it is to deny or to ignore restrictions however necessary and wholesome—that element of lawlessness which, in early life indeed often stands only for the unpruned, and as yet untrained, vigour of the really capable man. Then there arrives the need for some form of

punishment appropriate to the offence, and often something beyond those milder forms of punishment which have been already noted as reasonable in their methods and effects. While not administered in anger—which would rob it of much of its moral effect—it must not be so delayed as to give it any character of vindictiveness; but should be so prompt as to seem the natural result—the natural recoil, as it were—of the offence; sharp enough in its immediate effects to produce appreciable discomfort without lasting disability of any kind; and not so prolonged as to obscure and overweigh the offence which has called for it.

Personal Chastisement.

There is nothing which, in such cases, fulfils these conditions so well as a suitable form of personal chastisement, properly administered. Under such circumstances, it does not merit the term "degrading." And those who may demur to such an assertion would at least do well to consider which is the more capable of "degrading" the nature of the sufferer: submission to a few moments of sharp physical pain, as the prompt but short-lived penalty for illdoing; or the infliction of some (so-called) milder form of punishment which wearies body and brain alike, dulls the intellect, and sours the temper, and which is more apt to induce sulky resentment at the punishment than regret for the offence. But there is at least one form of physical chastisement which must be tabooed at the outset. Boxing the ears is, fortunately, far less often resorted to nowadays, but it is not obselete. A box on the ears is commonly given on the spur of the moment, *i.e.* in anger, without much attempt at gauging the weight of the blow, and often by a strong grown man to a half-grown child. In such cases, the mere concussion of the brain resulting from the blow may be serious: other and more lasting effects are still more common: no small number of the cases of ear-disease, with consequent deafness and discharge, sometimes ultimately leading to complete loss of hearing, and even—by extension of the suppuration to the almost contiguous brain—to actual death, are directly traceable to "a box on the ear" sustained in childhood.

The Use of the Birch.

There is indeed a far more excellent way: the cane—better still, perhaps, the birch—can, in judicious hands, be made to inflict all the pain that is necessary, without any risk of permanent disablement. But this instrument must be used only with discrimination. Caning on the hands, for instance, may, more easily than is supposed, produce injury to the sheaths of the tendons resulting in more or less lasting deformity to the fingers. Caning on or about the head is, of course, wholly inadmissible, and caning on the back and shoulders may produce damage out of all proportion to the operator's intentions. There is, moreover, as the late Dr. Bristowe once remarked, a part of the human body "which seems made for punishment"; and, in place of such dangerous sites as head, ears, hands and shoulders, the cane or birch may, when necessary, be applied with safety to that portion of the human frame which is sufficiently sensitive to satisfy the sterner demands of justice, while it is at the same time so constructed as to bear with impunity violence which cannot without grave risk be administered elsewhere.

Military Drill.

Much, however, may be done, as experience shows, to lessen the need of a resort to punishment by cultivating those habits of mind and body which make for self-respect and self-control. Foremost amongst these may be placed the regular practice of military drill. It does good physically, by teaching an upright carriage and a firm gait, and by correcting the round shoulders and slouching habit which the undrilled growing lad so easily acquires; properly carried out and supervised, it is not too severe for the most delicate child; and it can be usefully combined with various forms of physical exercise which—especially when carried out in the open air, as should always be the case—conduce markedly to his physical welfare. It does good mentally; for it begets a sense of discipline, fosters the habit of instant obedience to command, and awakes the idea of personal responsibility. And it does good morally; for it strengthens *esprit de corps* and fortifies self-respect. And the lad who values his respect for himself is apt, if only at the instigation of that relatively inferior motive, to strive after a record somewhat above the average.

THE TEACHING OF ENGLISH LITERATURE.

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King Richard II.

II.—Character Study.

In the character-study of this play we shall, to a certain extent, be traversing the ground over which we have already gone in taking a general view of the plot. I have said that the personal interest of the play lies in the evolution of Richard's character through the different stages of arrogant security, of alarm and uncertainty, of subsequent struggle against superior power, and of final humiliation. *The characters of Richard II. and of Bolingbroke are elaborated in detail.* The business of the play being entirely political, most of the other personages of it only show one side of their character. The test which tries them is *the necessity to balance the claims of allegiance against the claims of justice or selfishness.*

Character of Richard.

I have said that the first thing to look for in Richard's character is *the essential fault which makes him a failure as a king.* In "Henry IV.," a play of a later period, Henry moralises to his son on Richard's fall, and gives his own interpretation of

it. "The skipping king, he ambled up and down with shallow jesters . . . Mingled his royalty with capering fools . . . Grew a companion to the common streets." This scarcely represents Shakespeare's conception here. Richard is neither destitute of dignity nor ability. The circumstance which brought him to ruin was his want of money, caused by reckless extravagance. This led him to farm out the kingdom, by doing which he incensed both the old nobility and the commons, and to seize Bolingbroke's inheritance, thus provoking rebellion. The weakness which ruined him lay deeper than in a mere spendthrift inclination. This weakness will best appear by considering his conduct in all the changes of fortune which he experiences.

First, in the challenge scene between Mowbray and Bolingbroke, where Richard's position is apparently assured, he is kingly and resolute. In Act I., Scene IV., the hatred and suspicion of Bolingbroke which he shares with his courtiers encourages them to a certain degree of familiarity. It may be noted that during this conversation no one addresses Richard with any title of respect, and Aumerle's rejoinder, "I brought high Hereford, *if you call him so*," is (unintentionally) discourteous. In Act II., Scene I., Richard appears at his worst. Distrust of Bolingbroke and greed of money, with the consciousness of being unjust, have made him, for the moment, tyrannical, brutal, and even coarse. Yet he endures without resentment reproaches from York, partly because he thinks York an honest friend, partly in good-humoured contempt. In Act III., Scenes II. and III., Richard is in a state of agitation and uncertainty. Sometimes he is confident in his divine right, and unreasonably sanguine, and then with a sudden revulsion he throws away all hope. *It should be noticed that Aumerle and Richard's other followers treat him with much greater deference in adversity than in good fortune.* In the deposition scene (Act IV., Scene I.), Richard is haughty and defiant to his enemy Northumberland, and throws out ironical insinuations against Bolingbroke. He is personally free from fear, but he is driven this way and that by emotional impulses. *His active imagination makes him pity his own misfortune.* After the deposition, Richard lives still more in a world of fancy. This element in his nature may be specially marked in the farewell scene with the queen (Act V., Scene I.), the apostrophe beginning, "In winter's tedious nights sit by the fire with good old folks," being instinct with imaginative self-pity, and in the long soliloquy of the imprisoned king in Scene V. Finally, when Richard is face to face with death, he bears himself so as to extort the admiration of his murderer—"As full of valour as of royal blood."

Thus we see that Richard is a brave man, not without many kingly qualities, *but so impulsive and of such exuberance of emotion as to be unable to cope with hard practical men* like Bolingbroke and Northumberland. His impulsiveness and imagination drew him to run riot in youthful pleasures. While he was borne on the full tide of luxury he could not understand the melancholy freaks of the imagination in unhappiness. When he hears John of Gaunt finding a fanciful signification in his own name, he exclaims, "Can sick men play so nicely with their names?" But when troubles overwhelmed him, his extreme sensibility was apt to learn how "misery makes sport to mock itself."

Character of Bolingbroke.

Bolingbroke is the very antithesis of Richard. Richard's is the most emotional and imaginative character in the play. Bolingbroke is absolutely practical and unemotional. The absence of flights of fancy or imaginative comparisons is conspicuous in all he says. In the opening scenes Bolingbroke speaks with hyperbole and swelling words, but he displays none of Mowbray's chivalrous sentiment. His passions are always under control. Whether he professes loyalty, or laments his banishment, or, on his return, exchanges high-flown compliments with Northumberland, there is a suggestion of artificiality in all alike. He is incapable of any feelings but ambition and the warrior's ardour. When he hears of plots and the deeds of his enemies, he only once shows any passionate anger, and then but for a moment. (Act V., Scene III., ll. 59-63.) During the ceremony of abdication his impassiveness, and curt, common-sense answers irritate Richard, who apostrophises him as "Silent King!" (Act IV., Scene I., l. 290.) Again, when the Duchess of York implores him to pardon Aumerle, the coldness of his nature appears in the dry repetition of the same formula—"Rise up, good aunt" . . . "Good aunt, stand up" . . . "Good aunt, stand up"—and the carelessness and indifference with which he at last grants her request.

Mowbray.

Mowbray appears strongly contrasted with Bolingbroke in the opening scenes. When the king bids both throw down their gages, Bolingbroke answers with furious rodomontade, but Mowbray's expostulation breathes the accents of a lofty chivalry. "My dear, dear lord, the purest treasure mortal times afford is spotless reputation" . . . "Take honour from me, and my life is done." As the rivals are about to enter the lists, Bolingbroke's bravado serves as a foil to Mowbray's secure confidence. "As gentle and as jocund as to jest go I to fight: truth hath a quiet breast." Again, when a sentence of banishment is pronounced on both, Mowbray's pathetic and beautiful complaint has a sincerity of feeling which seems wanting in Bolingbroke's logic-chopping answers to old Gaunt's consolation. Little as we have seen of him, we feel the truth of the Bishop of Carlisle's epitaph on Mowbray. (Act IV., Scene I., ll. 91-100.)

York and Gaunt.

York is a worthy, commonplace, old man, who means well and usually fails to carry out his purpose. It should be noted that he is first introduced trying to persuade old Gaunt not to remonstrate with Richard on his evil courses, though he admits all, and more than all, that Gaunt urges against them. *In his attempt to appease*

Richard's anger against Gaunt, he is so maladroit as to bring in the hated name of Harry of Hereford. I have called attention in my first paper to York's confusion and helplessness when the news of revolt arrives. (Act II., Scene II.) When York encounters Bolingbroke his vacillation of purpose becomes flagrant. He first blusters, then concedes that Bolingbroke has been wronged, and then declares that, as he cannot resist, he will remain neuter, but in the very same breath offers to receive Bolingbroke into Berkeley castle. Finally, he consents, hesitatingly, to join himself to Bolingbroke's forces. Afterwards, when he rebukes Northumberland for disrespect to Richard, he is snubbed by Bolingbroke. (Act III., Scene III.) He is full of regret and compunction, yet in the abdication scene he speaks somewhat scornfully of "plume-plucked Richard." In the character of a "Roman father," he is ridiculous. When his duchess implores Henry to pardon their son, he combats the prayer with buffoonery—"Say it in French, king, say, pardonnez-moi." In short, *he is a worthy creature, of no great force of intellect or character, shrinking alike from great crime and great heroism.*

The rigid and obsolete patriotism of Gaunt is opposed, on the one hand, to the yielding, conventional character of York, and, on the other, to the self-seeking and time-serving of a younger generation.

Northumberland and Aumerle.

Northumberland is *the villain of the piece.* When he first opens his plans to Ross and Willoughby, it is only of the wrongs affecting his own caste that he thinks and speaks. (Act II., Scene I., ll. 241-245.) *He would never fight for a cause, only for his own interests.* His flattery of Bolingbroke is forced and unnatural. (Act II., Scene III.) In the abdication scene it is against him that Richard gives vent to the wildest rage—"No lord of thine, thou haught, insulting man"—"Fiend, thou torment'st me ere I come to hell." We feel that Richard is a true prophet in foretelling that Northumberland and Bolingbroke will soon be at war. One kingdom has not room for two such ruthless men of iron.

Aumerle appears at first in an unpleasant light, dissimulating to Bolingbroke, whom he hates. He is, however, loyal and sympathetic to Richard in misfortune, and shows a gallant front to the defiance of Bolingbroke's followers. It should be remarked that it is only at the instance of his mother that he decides to beg forgiveness from Bolingbroke, and that, in Shakespeare's representation, he does not betray his associates. He could not prevent their names being discovered in the document which York took from him.

It is not necessary to discuss the lesser characters. The queen is the type of a true, affectionate wife. Carlisle is the flower of militant churchmen, more like a Bayard than an ecclesiastic. It should be possible to discriminate clearly the true, if misguided, favourites, Bushy and Green, from the traitor Bagot.

VERGIL'S ÆNEID—BOOK II.

One of the set Subjects for the Cambridge Local Examinations, 1899.

By J. H. Haydon, M.A. (Cantab. and Lond.)
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It was Vergil's lot to be exalted to a pinnacle of renown both in his own times and all down the Middle Ages. For the latter period indeed we have only to look at our Dante to learn that no other poet was then reckoned worthy to be mentioned in the same breath with Vergil. Yet of late years it has almost become a fashion to decry his merits and put him on a far lower platform. It is therefore only right and proper that a master whose duty it is to take his form through a book of the Æneid should endeavour to get a true appreciation of an author whose modern critics have been ranged in hostile camps. However, uneven as the whole work may be (though is there any author of whom the same cannot be said ?), the second book is so full of life and variety that it may well be taken as typical of Vergil's best efforts. In fact, Voltaire claimed that the second, fourth and sixth book were superior to the finest productions of Greek poetry.

The student of Vergil will find Conington's edition indispensable. The introductory matter is most helpful and suggestive, but the notes are a perfect treasure-house of quotations and parallel passages to illustrate the text. If the larger edition is not procurable, the School Edition will certainly be of the greatest service, though its contents, of course, are not so complete. The translation included in Conington's Miscellaneous Writings will be a revelation to those not acquainted with it hitherto. Its faithful accuracy and vigorous English set it upon a level far above ordinary prose translations of Vergil. In one point only must care be exercised when handling Conington's notes. The advance made in Latin syntax, due to the progress of comparative grammar as a whole, renders it advisable to alter his categories and nomenclature of case and mood usages to bring them up to date. Reference to a good modern Latin grammar is all that is necessary.

Kennedy's edition will also be of much assistance. It contains most valuable matter in its notes, though these are often too brief, and it is supplied with useful lists of one sort and another, in addition to capital maps. Much profit will also be derived from a study of Sidgwick's introduction to his edition of Book II. As is only to be expected, this is characterised by the ripest scholarship and fine literary perception. The notes are full and very helpful through their acute judgment and sound balance.

An essay of F. W. H. Myers (in his volume entitled "Essays: Classical") will be read with the keenest enjoyment and to great advantage. He draws a most attractive picture of this "rustic of genius," born and nurtured in the woody country near the Mincio and preserving all through his life the fondest yearning for the scenes of his early

life. The luxury and pleasures of the capital had little fascination for him, and he would have found the fullest satisfaction of his heart "far from the madding crowd," in retirement where he could grapple with the high task he had set himself to execute. As an indication of the light in which his countrymen regarded the Æneid, Myers mentions the name by which it was frequently known, viz., *Gesta Populi Romani*. In passing, it is interesting to note that he tells us that line 772 of this book

Infelix simulacrum atque ipsius umbra Creusae

is quoted by Augustine as "typical in its majestic rhythm of all the pathos and the glory of pagan art, from which the Christian was bound to flee."

The last work that need be mentioned here is Professor Sellar's monumental work entitled "Vergil." The whole book is packed with valuable matter from beginning to end, and it would be impossible in a few lines to do more than call attention to one or two points. We have here a vivid account of the life and friendships of the literary man of Augustus' court. It is shown that the patronage of a cultured Prime Minister, as we may style Mæcenas, was in those particular circumstances as much an incentive to Vergil's genius as was that of the Duke of Weimar to Goethe in another age. The deification of Augustus by Vergil is often criticised as marring the work by its so-called grovelling flattery: but Sellar points out that, repugnant as the idea may be to modern ideas, in reality the Emperor was more or less closely identified with Rome herself. To deify the *Fortuna Urbis* sounds very different in our ears. Again, in answer to a half-hearted champion like Conington, who thought the task essayed was beyond Vergil's powers, and still more in answer to critics of the type of Mommsen, who contemptuously classes the Æneid with poorer works of the calibre of the *Henriade*, the author points out that a comparison with Homer is not a fair one unless made with due discrimination. Just as the ethical feeling and sober argument of Cicero's philosophical works have passed into the very being of the educated world all down the centuries, so Vergil's language has inspired the culture of Europe through impressions implanted in our early years. Homer's language is characterised by "direct force," whereas Vergil's chief features are "unfailing propriety," "well-tempered beauty," "dignity and melody."

But so far as introductory matter goes, such questions of style will concern the teacher rather than the taught, as hinted above. For the class we may well begin with a few words on the life of the poet himself, interspersed with a reference or two to the Eclogues, to illustrate the episode of his loss of his farm and its subsequent restitution. This may lead to a brief account of the political situation from the death of Julius Cæsar in B.C. 44 to the time of the commencement of the Æneid. The more so that, side by side with the patriotic purpose that Vergil had in view in selecting a theme for the glorification of his city, there was another of profound importance, called forth by the dangers of every such period of transition. In the clash of conflict religion and morality were fast losing their hold upon those later Romans; and Augustus, once arrived at supreme power, devoted all his energies to the re-establishment of the ancient religious sentiment and worship. In this endeavour he was ably supported by Vergil, who keeps in the foreground of his epic the destiny of the city as guided from all antiquity by the powers above.

The account of the events detailed in Æneid II. may well be prefaced by the story of Troy, the capture of which forms the major part of the eight hundred verses it contains. The book itself so constantly makes reference to the earlier details of this story that it will be nothing but pure gain for the class to have a clear conception of the leading events of the war. (Jebb's "Homer" is invaluable for reference.) Then, after a rapid survey of the book, it will be most advisable to run over the wanderings of Æneas in order to explain to whom and where he is relating his narrative. The class will thus not miss a fair idea of the Æneid as a whole while studying this particular portion of it thoroughly.

The practice is adopted at some schools, it is said, of either leaving the task of scansion till the period of revision or even of omitting it altogether. But quite apart from the great advantage to be gained by having the lines read aloud, it is certain that our pupils are assisted considerably in their regular work of ferreting out the grammatical structure of a sentence if they habitually scan the lines as they proceed. The value of accurate scansion is shown by such a fact as the following: In the first thirty lines as many as ten or twelve words occur which end in *a*, and several of these might and will be blundered over by the average boy, who will confuse a nominative in *ă* with an ablative in *ā*, or *vice versa*, and will thus make nonsense of a passage.

Besides a constant use of the classical atlas by the class, it is to be hoped that the boys' interest in their work will be fostered by a liberal use of a dictionary of antiquities. Such words, for instance, as *aries*, *currus*, *galea*, *testudo*, get thoroughly impressed upon the class if illustrated by something pictorial. By connecting classical names with some brief story, it will be found that the attention is arrested and the effort to retain them in the memory will be appreciably lightened. Thus the name *Mycenæ* will call for some repetition of the story of Agamemnon, and the mention of the *Myrmidones* will require a few more words on Achilles. Each of the names forming one pair should call up the other when occurring, whether once or oftener.

A good scheme of subjunctive usages is most essential. The only reasonable leading division is that into subjunctives employed in main and in dependent clauses. The subdivisions can be classified from any good grammar. It may be well, however, to say little or nothing about the harder usages till the period of revision, *e.g*, such as are found in *vv.* 75, 231, 599-600, 800.

ON THE TEACHING OF HISTORY.

By A. JOHNSON EVANS, M.A.

VII. THE END OF THE MIDDLE AGES.

THE 14th and 15th centuries illustrate better perhaps than any other period the desirability of treating matters topically rather than chronologically. Both in English history alone and in European history in general the chronological method results in a series of stories apparently meaningless and without any connection. "Here, surely, history is a matter of mere memory and reduces itself to a string of dates!" But take events topically, and the aspects of things are transformed into light and interest.

I. The Catholic Church, and in special the Papacy, is drifting into that condition which made the "Reformation" of the 16th century an unavoidable necessity. At the beginning of the 14th century that drama occurred which transferred the seat of the Papacy to Avignon and made the headship of the Catholic Church for seventy years a French institution. Hence, and only hence, arise the differences between the English State and the Papacy which were expressed in the first Statutes of Provisors and Præmunire (How many of our readers know exactly the force of these two Acts?) and the anti-Papalism of Wiclif. In 1378 an attempt was made to restore the Papacy to Rome, an attempt which led directly to the Great Schism, the existence of two rival lines of Popes, one at Rome, the other at Avignon, which was at the same time the scandal and despair of Christendom. To end the schism, the institution of "General Councils" was revived, and at last, about 1420, the unity of the Church was restored. It is only in connection with these events that we understand the later Statutes of Provisors and Præmunire and the higher aims of Henry V.

Meanwhile, the other offices of the Christian Church had hardened into established institutions, conservative, even rigidly so, and had become the object of ambition for purely worldly-minded men. Bishops, monks, friars, all, with few exceptions here and there, lost sight of the spiritual meaning of the Church, and as the Latin proverb expresses it, *Corruptio optimi pessima*—"When it fell, it fell like Lucifer."

Finally, there were revealed in the 15th century two new worlds to which men, weary of the apparently vain attempts at reform, naturally turned—worlds in which they could breathe freely without allegiance to the Church or the Papacy. In 1453 the Turks captured Constantinople, and, for some years before that event, Greek scholars fleeing westward had begun to familiarise western Europe with the Greek language and all that it contained. In 1492 Columbus opened up to the men of action the boundless possibilities of the far West. The Papacy, outworn, oppressive, irremediable, now became obviously smaller, of less importance, than when, as in Dante's time, it embraced heaven and earth. The way was prepared for new things.

II. The **wars with France** form a subject that should be treated as a whole, and in which our ordinary text-books want supplementing and correcting. They should be regarded rather as a state of hostile feeling which was stirred into activity by occasions which otherwise would have been neglected or peaceably arranged. These occasions may be grouped, specially in the 14th century, geographically as well as chronologically, from the Flemish phase with which the war began, on through the Breton phase, the phase of direct attack through Normandy, to the Spanish phase, and the desultory Channel warfare of Richard II.'s reign. They may be connected with the Papal story by remarking the Statutes to which we have already referred, and by remembering that English troops frightened the Pope from Avignon, and so weakened France that he could get away.

III. The French wars led directly to the **"Wars of the Roses."** To correct the common idea that these "lasted for thirty years," note the dates of the chief battles. Except those of St. Albans (first) and Bosworth, they took place either in the years 1459-64 or 1470-1. They were not originally dynastic. They did not involve the people as a whole, being fought out mainly between the various party cliques among the nobles, who hired their troops or raised them among their liveried and other servants. But naturally, this brutal, chivalric warfare, or rather high-handed disorder, interfered sadly with trade, and the town merchants regarded it to a large extent as a **disastrous outbreak of barbarism.** When the nobility had been sufficiently weeded out, the Tudor "despotism" restored civilisation.

IV. The changes which may be called politico-social, and which are so difficult to watch, because there are no "events," require some notice. The "Black Death" of 1348 and the "Peasants' Revolt" of 1381 are still in want of thorough explanation, though there are now workers in that field of research, and we know a little more than formerly. Villeinage was dying of economic causes. The "profit of the fleece" was becoming gradually more than the "profit of the plow," and "enclosures" were beginning to be made. The government of the towns was becoming more oligarchic, and the gilds were beginning to harden into that conservatism which led to their decay in the 16th and 17th centuries. The teacher should read "The Vision of Piers Plowman," the anonymous work of Edward III. and Richard II.'s reigns, edited in various editions by Professor Skeat. It will tell more of social life than several modern volumes.

The tendency of the age is towards **law and monarchy.** The Papacy escaped the danger of General Councils because Christendom was too large and had interests too diversified to be represented in a parliament quietly enough for discussion. Such States require a monarch. The city republics of Italy were beginning to fall under the "despot" dynasties of Medici, Sforza, and the like; France, after the troubles of the Armagnac-Burgundian strife and the disasters of the English invasion,

was becoming centralised under Louis XI.; Spain was becoming united in more senses than one under the rule of Ferdinand and Isabella. Only in Germany kingship failed, because there the nobles were strengthening themselves against the King-Emperor, and were preparing themselves unknowingly to rise still higher by means of the "Reformation."

England is like the rest of Europe. Through the dynastic troubles which began when Richard II. banished Hereford and Norfolk, we can see monarchy gradually becoming more important, and in the end more useful than the Parliament. In the Houses of Lords and Commons, all is swayed by the rivalries of noble factions; attainders and impeachments are the weapons of the various cliques successively in power. In the end the cry is for "good government"; the house of Lancaster fell "for want of governance," and the Tudor comes and stays because he is prepared to supply that much-needed commodity.

HOW TO MAKE LANTERN SLIDES.

By H. E. Hadley B.Sc. (Lond.), A.R.C.Sc. (Lond.),
Headmaster of Kidderminster School of Science.

A BLACK-BOARD is almost essential to class-teaching, though not an ideal appliance in all cases; *e.g.*, a teacher often finds that a diagram, or a written statement on the black-board, will be required for a subsequent class, but that the board will certainly be cleansed in the interval. This difficulty has been overcome to some extent by the tedious process of making large diagrams on canvas-backed paper, in which sentences are stencilled in black letters, and diagrams sketched with stencil-pens; processes which involve a serious expenditure of time on the part of the teacher. Moreover, although such diagrams are doubtless advisable in some cases, the inconvenience of handling such bulky articles, and the storage space they require, are difficulties which soon become very serious.

In this article it is proposed to offer a few suggestions as to how time and space may be economised by substituting lantern-slides of various types for ordinary wall-diagrams, and how such lantern-slides may be prepared in the simplest possible manner.

It may be said, in favour of lantern slides, that the subject of class-demonstration must necessarily be influenced largely by the question as to what will appeal most actively to the mind of the average student, and there is no doubt but that he is more fully attracted by anything projected on to a screen by optical methods than by an ordinary diagram in black lines and stencilled letters; and his attention is still more successfully obtained if the handwriting and draughtsmanship of the teacher is evident on the screen.

The following hints as to the methods of preparing lantern slides are grouped under four headings:—(i.) Statements or important data written in ink on glass; (ii.) Diagrams sketched on glass; (iii.) Diagrams sketched in pencil, and (iv.) Book-illustrations reproduced photographically.

Writing in Ink on Glass.

Three methods are described the relative merits of which depend upon the materials to hand. Method (*c*) will usually prove more satisfactory than the other methods.

(*a*) Cut[1] some thin clear glass (free from scratches) into squares of the same size as lantern plates (3¼ inches square)—spoilt negatives or lantern slides from which the gelatine film has been removed are suitable for the purpose. Remove all grease from the surface by washing the glass thoroughly in soap and water, or, better still, by immersing it in hot dilute caustic soda, then rinse under the tap, immerse in dilute sulphuric acid, again rinse under the tap, and dry it thoroughly. Ensure thorough dryness by holding the glass in front of a fire or over a gas flame until it is fairly warm. Select a pen with an extremely fine point (such as a mapping-pen). Ordinary writing-ink will be found to spread unevenly over the glass, and it is much too transparent; the simplest form of ink is a good thick copying-ink, but even this may be found to spread over the glass; this difficulty may be overcome, however, by dissolving some ordinary sugar in the copying-ink, adding the sugar until the requisite thickness is obtained. (It may be found necessary to add as much as 30 to 40 per cent of sugar.) Lay the glass on a sheet of foolscap paper, the lines of which will serve as guides in writing on the glass. After completing the slide, dry the ink thoroughly over a gas-flame, and mount the slide with a lantern mask and backing plate in the usual manner.

(*b*) The liability of the ink to spread over the surface of the glass may be still further reduced by licking the surface of the glass with the tongue, and allowing the thin coating of saliva to completely dry before the glass is written upon. It will be found that a wider pen-nib may be used and that the writing may be made much smaller if the glass is treated in this manner.

(*c*) The finished slide is more satisfactory if it is possible to use the nib which is in daily use instead of an extremely fine-pointed nib. A thin layer of solid gelatine spread over the surface of the glass will enable any type of nib to be used. The plates may be prepared in the following manner:—Weigh out a small quantity of clear gelatine and add sufficient water to make a solution containing about 3 per cent. gelatine. Allow to stand a few hours until the gelatine is softened; melt thoroughly by immersing the vessel in hot water. If the solution is not quite clear filter it through a piece of fine muslin. Thoroughly clean several pieces of glass. Hold one of the pieces horizontally and pour some of the gelatine solution on to the middle

[1] A steel-wheel glass cutter can be obtained from retail tool merchants, at a cost of 6d. to 1s.

of the plate, tilting the plate slightly to enable the solution to spread uniformly; pour off the excess of solution from a corner of the plate so as to leave only a thin layer of the solution. Place the plate horizontally in a fairly warm atmosphere, and protect it as much as possible from dust; in a few hours it will be ready for use. Several other plates may be made in the same manner.

The amateur photographer will find it simpler to make use of any unused photographic negatives or lantern plates which are stale or otherwise unfit for use; the silver salts contained in the gelatine film

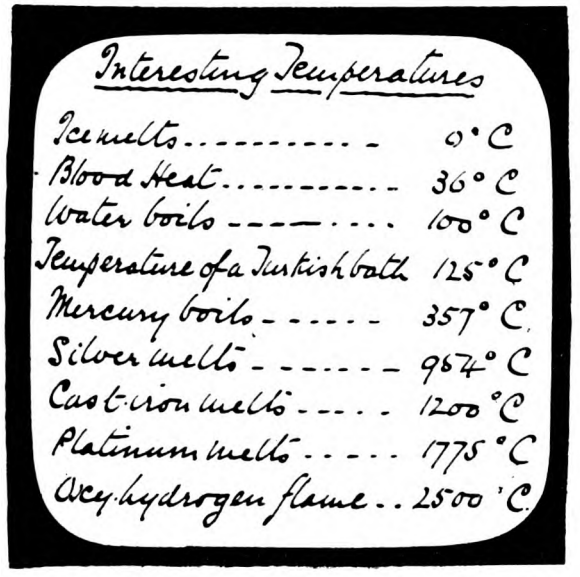


Fig. 1.—Slide prepared by writing in ink on glass coated with gelatine.

may be removed by soaking the negatives in a 40 per cent. solution of sodium hyposulphite until the gelatine is quite clear; the plates should then be washed in running water for an hour, and then thoroughly dried. An ordinary pen-nib and copying-ink may be used on a plate prepared in this manner (Fig. 1).

Diagrams Sketched in Ink.

If diagrams are to be sketched on the glass it is better to prepare the surface by methods (*b*) or (*c*), as the ink is then not so liable to spread. Draw the diagram on paper to the same dimensions as required on the slide. Lay the slide over the sketch and trace it through on to the glass with a fine pen and copying-ink. The sketch may be improved by using various coloured inks which can be readily prepared by adding aniline colours to a solution of sugar (containing 30 to 40 cent. sugar), the amount of dye stuff being varied in each case according to the depth of tint required. Magenta, soluble blue, and picric acid are suitable colours for making red, blue, and yellow inks. The effectiveness of the slide is often increased by painting in these colours with a brush.

Diagrams Sketched in Pencil.

A neater and more accurate diagram can be obtained by Dr. Dallinger's method, in which the diagram is drawn in pencil on matt glass. The matt surface may be prepared by grinding two pieces of glass together, the grinding material being the *finest* emery powder made into a cream with water; this process is distinctly tedious, and it is better to order a number of the glasses through a local glazier (emphasising the fact that the surface must have the finest possible grain). Other necessary items are (i) three lead pencils (HHHH, HHH, and HB) and a fine-pointed stump; (ii.) Canada balsam diluted with benzine to the consistency of milk, or a similar preparation may be purchased from the larger photographic dealers (usually under the name of *ground glass varnish*).

The slide is prepared in the following manner:—On a piece of paper make a careful outline drawing of the diagram to the same scale as that required in the slide. Thoroughly clean the matt glass with soap and water. Lay the glass, with its matt surface uppermost, on the paper and over the drawing. Sharpen the HHHH pencil, and keep the point in condition by filing it at frequent intervals on a spare piece of matt glass. Mark with dots the chief points of the diagram, and carefully insert all the straight lines with the aid of a straight edge. If any circles are required they may be put in by the aid of compasses; but, since the metal point is liable to slip over the glass, it is advisable to place a fragment of sheet-rubber between the point and the glass. Darken, with a softer pencil, the more important lines. Use the HB pencil for any shading, and soften it down with the stump. It may be desirable to colour portions of the diagrams, for which purpose the coloured inks, previously described, are suitable. Carefully dry the slide, if colours have been used. Now hold the glass horizontally, and pour some of the Canada balsam varnish on to the middle of the plate; tilt the glass so that the varnish spreads uniformly over the whole surface, and pour back from one of the corners any excess of varnish which remains. Place the plate in a horizontal position, protected from dust, and allow it to remain until quite dry. The plate is now ready for the mask and backing-plate. A finished slide is shown in Fig. 2.

Photographic Slides from Book Illustrations.

Much more complicated apparatus is required for the reproduction of a book illustration, and the appliances are so varied in character and cost that it is impossible to do more than offer a few suggestions. One of the chief difficulties is the preparation of a successful negative from which the lantern slide is to be obtained, and this difficulty is largely due to the want of a proper support for the illustration, since it is most important that this should be quite flat and parallel to the negative in the camera. The writer can strongly recommend the *Lantern Slide Making Apparatus*,[1] designed by

[1] Messrs Reynolds & Branson, Leeds; cost £10.

Professors Barr and Stroud, which includes a ¼-plate camera together with an admirable arrangement for adjusting the relative positions of the illustration and the camera; coal gas is used as an illuminant. If a camera is already to hand, the same firm issue a special apparatus[1] for supporting

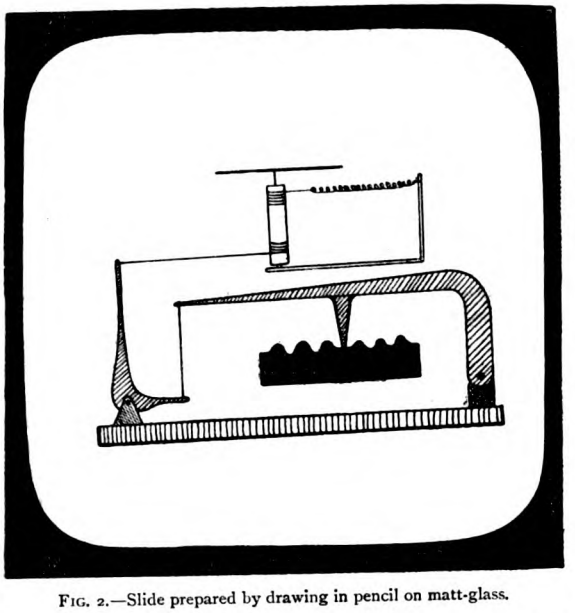


Fig. 2.—Slide prepared by drawing in pencil on matt-glass.

the illustration (cost 27/6); or, a simple method is shown in Fig. 3. A B represents one edge of a drawing board, along one side of which several screws have been inserted at equal distances apart; exactly opposite to these, an equal number of screws are inserted in the opposite edge. Support the open book in such a manner that the page P, which is to be photographed, is perfectly flat. Fix the book in position by tightly joining opposite screws with separate pieces of fairly thick copper wire. Support the board in an upright position (*e.g.*, on an easel) and proceed with the photograph.

The exposure and development of the negative should be so conducted as to obtain as *black and*

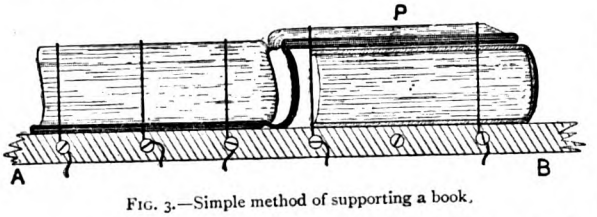


Fig. 3.—Simple method of supporting a book.

white a negative as possible. This result can be obtained with most brands of plates, but it is especially easy with Ilford chromatic plates (developed with pyro-soda developer containing an excess of pyrogallic acid). In a room which is fairly well lit by day-light an exposure of 15 to 40 seconds (with *f*/16) will be found sufficient, the exposure depending upon the character of the light and of the illustration.

[1] The "Phœnix" Portable Copying Apparatus.

The simplest method of obtaining a lantern-slide from a negative is by the *contact process*, in which the negative and slide are placed film to film in a printing frame and held at a given distance from a fishtail burner, for a given interval of time. Full instructions are usually given with each brand of plates, but it will usually be found that a correct exposure can only be obtained by making two or three preliminary trials. The Ilford *Alpha* lantern-plate has the advantage of simplicity in manipulation, and gives variety of tone (from red to blue, according to the exposure given), which may be utilised according to the subject of the slide. A stock of paper masks, backing-plates and binding strips can always be obtained from any photographic dealer.

THE GROWTH OF A SCHOOL SOCIETY.

By A Headmaster.

OUR School Society is an integral part of our organisation, although the prospectus contains no declaration to that effect. Its origin and growth were determined by considerations affecting the condition and progress of the school. Accordingly the narrative now before you deals in one sense with an artificial and highly utilitarian agency devised and fostered with the object of strengthening the curriculum, and thereby making directly for "success," as the world has it. From another standpoint, however, it may be contended that the spontaneity and naturalness which have marked every stage in its history, the very large element of self-government which has always been present, and the entire absence of pedagogic authority, have given our Society all the characteristics of a free institution, working out its own life and usefulness in a tentative way, and in the process affording a wealth of opportunity for inducing in the best boys habits of self-respect and self-control. These two points of view, though far apart in essence, are not necessarily conflicting. Nay, it is not improbable that the necessity for looking at the Society as an instrument for advancing the prospects of the school may prove, after all, the main source of its stability and the surest safeguard of its lasting usefulness to the boys themselves.

The origin of the Society was somewhat as follows. A senior boy who had been bitten by amateur journalism discovered that there was an opening for a school magazine and that he was just the man to run it. He was a youth possessing ability, imagination, tenacity of purpose and a sweet, persuasive tongue; and so was launched the first number of the monthly printed magazine which has now reached its eighth volume, and pays its way though issued at one penny, handing over each year a handsome surplus to the sports fund. It may be added in passing that our first editor, after a distinguished career at the uni-

versity, has adopted journalism as his profession and that his colleagues on the editorial staff have made their marks in other lines of life.

This reference to the magazine is necessary because its columns contain a full record of the steps towards the School Society and of the doings of the Society since its formation. Even the first issue conveyed an indication of the future. In the second number appeared a letter to the editor arguing for the establishing of a Debating Society. Some more letters, a good deal of pondering and perusing, and finally the boys of the three highest forms met and elected by ballot a president, a vice-president, a committee, a secretary and a treasurer. The headmaster appears to have been present at this first meeting, for he is reported in the magazine to have said that "as the object of the Society was to afford opportunities for self-discipline and an arena for self-exercise, it would be advisable to elect the acting officials from their own number. The teaching staff would gladly give any help they could, but their connection with the Society should be purely honorary," and he added that while the Society would have the use of the lecture-room and hold its meetings *within school hours*, he desired to say that in his opinion the members would receive no real benefit unless they managed to transact their business without any reference whatever to external control. During the long period of eight sessions the headmaster and his colleagues have found no occasion for regretting this advice. Discussing the first business meeting, the editor remarked playfully but pointedly on the various advantages to be looked for. "The spectacle of a man standing up to make a speech, stuttering, saying in his nervousness what he did not mean to say, and filling up embarrassing pauses with —er,—ah,—hem, etc., is too common." It laid stress on the exercise of "forming an opinion," of "giving an opinion," and of "supporting an opinion with arguments." Finally, it touched upon the encouragement of *esprit de corps*.

The first meeting for ordinary work was most successful. The president accepted as the watchword of the Society, "Culture, control, comradeship," and as a motto those noble lines of Tennyson :—

> Self-reference, self-knowledge, self-control,
> These three alone lead life to sovereign power.
> Yet not for power (power of herself
> Would come uncalled-for), but to live by law,
> Acting the law we live by without fear,
> And because right is right to follow right
> Were wisdom in the scorn of consequence.

The editor of the monthly followed with an essay on "Amateur Journalism," and one of the committee treated of "Theatres Past and Present." The next meeting opened with a stirring debate on the question, "Does the present parliament satisfy the minds of the people?" What says the reporter?

> The speech of the member for Midlothian was full of good, sound arguments, and he received a hearty round of applause.
>
> Mr. Balfour defended the Government, but his speech lost a little in power through a somewhat indistinct and hurried articulation.
>
> Mr. Morley summing-up for the Opposition, asked in indignant terms, "Who dares to say that India is well governed?" and there arose from the depths of the Government benches an ungrammatical but forcible "Me!"
>
> On the division there voted :—
>
> For the Government 57
> For the Opposition 51

This debate is interesting not merely as a first effort, but from the fact that the leader of the Opposition is now a Science Lecturer in an English College. Mr. "Balfour" has gone to the North-West Provinces as first man in the India Civil Service Final Examination, and Mr. "Morley" was afterwards Medallist in English Literature in the University.

The succeeding meetings of the first session were devoted to "Literature," "Astronomy," "Sports," and terminated with a concert. Among its many undertakings the Society also organised a committee on athletics and a cycling club.

The second president who took office was later on the only Scotch Whitworth Scholar of his year. Under his sway the Society continued growing in efficiency. The debate of the session was concerned with the desirability of making early closing compulsory. What the issue was is of no consequence, but it is significant that while the affirmative was taken by a youth who four years later was first man in Lord Kelvin's Honours class, the negative was maintained by the President-elect of the Students' Union.

The third session saw the Society in full activity. The president, now a man of mark in the University, controlled and stimulated the members with tact and power. The syllabus of work is worth considering: "Julius Cæsar," "Japan," "Elizabethan Period," "Study of Character," "Co-operation," "Gymnastics," "Science in our Century," "British Orators," "America as a Manufacturing Rival," "French Revolution," "Locomotion," "Lord Clive," "In the Land of the Trevori," "American Humorists," "Fall of Rome," three debates and two concerts.

Glancing through the reports, one discovers that each essay receives criticism, and that every meeting brings out some new speakers. One ingenious device for curing inattention or carelessness of behaviour has been attributed to the president for this year. If, during the progress of an essay, a member should have permitted himself to indulge in unbecoming conduct, the president at the finish of the paper made a point of inviting him to speak, and as the code of the Society made it imperative on a member to accept such invitations from the chair, it will be admitted that a smart chairman wielded a disciplinary appliance of some consequence. If, as is said to have been done in the case of this particular president, certain selected members of committee find means of advising the chair concerning objectionable irregularities, the possibility of having really well conducted meetings is at once realised. The extent to which this

method has been pushed is of course known only to the presidents, but from the relatively exemplary nature of the meetings it may be inferred that the administration of this rule commands respect.

Although it might be not uninteresting to look at the manner in which the various subjects were placed before the members, it is perhaps more profitable to glance at the official report of the most important debate of the session. The question under discussion was "Free Trade," and the monthly thus describes the discussion:

Preliminary business having been transacted, the chairman called on Mr. R., who in an able speech championed the cause of Protection. He attempted to show that Protection was a necessity for the advance of the industries of a country, especially if that country were a young one; and in the course of his remarks he made the sweeping statement that the prosperity of Britain was in no way, not even directly, due to her Free Trade policy.

The leader for Free Trade . . . examined the theoretical ground on which a policy of unrestricted commerce was advocated, and argued that the imposition of restrictions on imports recoiled to the detriment of the country which sought to advance its industry by that means. He showed that any tax imposed on foreign goods ultimately came from the people of the protected country in the form of high prices. Finally, he stated that the maxim of Free Trade was that goods should be produced where they could be produced most easily, and showed the effect of Free Trade was in the main the same as that of machinery, and that therefore "to support the one and despise the other was unreasonable."

In support of these views the "editor" examined the argument that, under a Protection policy, the rate of wages was high, and pointed to the diminished purchasing power through increase of rents and prices. He averred that trade was not a natural monopoly but an international interest, and that the people of any one country ought not to be restricted from purchasing their goods in the cheapest market in the world.

And so goes on the report, describing in the most serious way the progress of this momentous debate. The only hint of violence is in the words "After a short sharp fight the Chairman stepped in and Mr. C. was allowed to resume." The Free-traders, we learn, lost by a small majority, but note the sequel. A fortnight later, "Mr. S. presented a petition from the manufacturers of typewriters, pianos, iron girders, &c., praying the Society to petition Government for a prohibitive tariff on these commodities, and he moved that the prayer be granted. . . . A large number of speakers took part in this discussion, and on a division the negative was carried by a large majority."

The foregoing references and extracts may suffice to give some notion of the method and effects of our Society. Each successive volume of the monthly provides evidence that the state of things here indicated has been continuously maintained. Eighty senior boys are thus linked in a comradeship in which the individual asserts himself and develops his personality. But the influence does not stop here, for the operations of the Society, as has been said, touch the whole school. The magazine staff find a means of getting at every class, and no issue appears without contributions from the preparatory boys and the middle school, and when concerts are arranged every available seat is allotted to the juniors. But the most striking function of the Society is carried out by its Sports' Committee, who have on eight occasions organised annual athletic meetings, to the great delight of their fellow pupils, and with the sympathy and approbation of all who are connected with the school. No better proof of the activity, resourcefulness and tact of the enthusiastic sports' promoters can be got than the presence every year of a large body of spectators, last year's gate exceeding 3,000. It is needless to say that the Society receives the warmest encouragement from the teaching staff, and it may safely be inferred that the Headmaster is to be found behind the organisation. This influence, however, must not be overtly exerted. There is needed only a touch here, a suggestion there, now a kindly enquiry that carries an instruction, and again a word of hearty approval involving some definite advice, not in the spirit of a director, but as from a deeply interested well-disposed onlooker, whose experience and knowledge boys are eager to get in a friendly way. These words may not convey fully the nature of the control which the head of a school must exercise over its societies, but they seem at least to suit the circumstances before us.

TEL MAÎTRE, TEL VALET.

Original French Play in One Act.

By Mrs. J. G. Frazer (Lilly Grove).

Le Dr. Lamart	Chirurgien.
Jules Delhomme	Proprietaire.
M. Noirelle	Ministre des Finances.
Jean	Domestique.
Elise (nièce de Jules Delhomme)	
Madeleine	Servante.

La Scène se passe à Paris de nos jours.

Le Docteur Lamart, vêtu à la dernière mode est assis dans un cabinet fort élégant: la pièce est ornée de beaux tableaux et de jolies draperies; beaucoup de bustes sur les consoles. A droite un secrétaire en chêne sculpte au dessus duquel on voit un appareil téléphonique avec sonnerie, tuyaux, &c. Porte au fond; deux portes latérales. Le Docteur Lamart écrit.

Scène I.

Jean (entrant doucement).—Pardon, monsieur.

Le Docteur.—Jean, je vous avais défendu de m'interrompre!

Jean.—Je demande pardon à monsieur, il y a là quelqu'un qui demande monsieur.

Le Docteur.—Eh bien, qu'il attende; vous savez parfaitement que je fais toujours attendre.

Jean.—Mais, monsieur . . .

Le Docteur.—Il n'y a pas de *mais* qui tienne; donnez lui son numéro et faites le passer du petit salon dans le grand salon, du grand salon dans la salle à manger, de la salle à manger dans a serre et ainsi de suite. Dites lui que je suis occupé . . .

du reste, depuis deux ans que vous êtes à mon service vous connaissez la formule aussi bien que moi.

Jean.—Bien monsieur (*il sort.*).

SCÈNE II.

Le Docteur.—Règle première et générale : les malades doivent attendre.—(*Il écrit.*)—(*Parlé.*) Il faut absolument que je finisse mon article pour la *Revue Multicolore* qui paraît cette quinzaine. Il me semble que le titre de ma thèse fait bien : "Influence des couleurs sur le système nerveux." Allons, je vais bâcler cela dans une petite heure et quand j'aurai fini j'ausculterai mon patient ; les stations prolongées dans mes appartements font partie de ma méthode pathologique.

SCÈNE III.

Jules Delhomme (*dans la coulisse*).—Je vous dis, grand escogriffe, que vous êtes, que je passerai, que j'entrerai, que je verrai le Docteur, et me voici ! (*Il entre bruyamment suivi de Jean.*)

Jean (*au Docteur, parlant bas*).—Monsieur, prenez garde, il me semble que nous avons affaire à un fou.

Le Docteur (*à Jean*).—C'est bien, laissez nous. (*Jean sort en grommelant.*)

SCÈNE IV.

(*Le Docteur salue correctement, Jules lui frappe sur l'épaule.*)

Jules.—Eh bien, tu ne me reconnais donc pas? Tu as oublié ton vieux copain de Ste. Barbe ?

Le Docteur.—C'est toi, Jules ! (*il lui serre la main.*)—Je ne te remettais pas du tout ; tu es changé, mon ami, avec tes favoris, et tu as engraissé, rajeuni. (*Il lui serre les deux mains.*) Enchanté, enchanté. Et quel bon vent t'amène ?

Jules (*se renverse dans un fauteuil.*)—Une affaire personnelle m'a arraché à mes choux et à mes potirons et je n'ai pas voulu traverser Paris sans dire bonjour à mon ancien camarade dont la grande renommée a pénétré jusque dans mon vallon.

Le Docteur.—Je t'en suis fort reconnaissant ; cela me fait plaisir de voir ta bonne figure réjouie.

Jules.—Tu es donc devenu conspirateur? Il faut prendre ton bureau à l'assaut comme si c'était une fortresse ! J'ai dû bousculer ton brave homme de domestique pour forcer la porte.

Le Docteur.—Jean est un excellent serviteur ; il connaît toutes mes habitudes, à la rigueur il pourrait me remplacer auprès de mes malades.

Jules (*riant*).—Allons donc ! (*il examine le cabinet.*) Ma foi, tu es bien installé, mon cher. On dirait un atelier plutôt qu'un bureau. Tiens, tu es donc collectionneur de bustes. (*Il examine les bustes sur les consoles.*)

Le Docteur.—Fais attention, mon ami ! je vais t'expliquer. . . . . (*Une sonnerie s'agite dans le buste de Shakespeare.*) Pardon, Jules, un instant. (*Le Docteur applique son oreille sur le menton de Shakespeare. On entend des murmures et des plaintes.*)

Jules.—Ah çà ! es-tu devenu prestidigitateur à présent ?

Le Docteur fait signe à Jules de se taire, et prenant le tuyau du téléphone il l'attache à l'oreille gauche du buste, tandis qu'il parle dans l'oreille droite. Parlé. Bonjour, M. Lenormand, jevons souhaite le bonjour ! Parlez un peu plus fort s'il vous plaît. Vous dites que vous avez une extinction de voix ? J'en suis fâché, mais parlez toujours ; rien n'est salutaire comme de faire un effort. Criez !—là—c'est déjà unprogrès. J'ai fait le diagnostic long et soigné de votre cas ce matin et je vous prédis une prompte guérison.

Jules se lève et veut parler, le Docteur lui fait signe de rester assis et de se taire. Parlant au menton de Shakespeare.) M. Lenormand, quelle robe de chambre portez-vous aujourd'hui? Vous dites, une robe de chambre grise ? Mais c'est très imprudent ! Le gris vous est nuisible ; le gris n'est pas une couleur nervine ; mettez-moi vite une robe de chambre vert pomme ; je dis : vert pomme. Demain matin j'enverrai mon appareil prendre de vos nouvelles (*il coupe la communication*).

Jules.—Ah ! (*imitant le ton du Docteur*) "demain matin j'enverrai mon appareil prendre de vos nouvelles" ! C'est un appareil qui soigne tes malades? tu prescris par téléphone? (*il se frappe le genou. . . .*)

Le Docteur.—Oui, mon cher, et je diagnostique d'après les sons du phonographe ; dans chacun des bustes que tu vois là il y a un petit appareil phonographique.

Jules.—C'est épatant ! cela tient du prodige ! Mais, mon cher, malgré cela, vois-tu si j'étais sérieusement malade . . .

Le Docteur.—Eh, bien ?

Jules.—Je crois que je préférerais la vieille méthode de médication.

Le Docteur.—Mon système est fort simple. Tous les matins Jean prend mon coupé et promène chez chaque client le buste qui lui est spécialement réservé.

Jules.—Ah ! chaque malade a son buste spécial ?

Le Docteur.—Sans doute, sinon il pourrait y avoir confusion. Ainsi voilà Démosthène (*il montre le buste*). C'est lui qui écoute les plaintes d'un notaire enrhumé.

Jules.—Et Gladstone le grand politicien Anglais ? (*il touche le buste.*)

Le Docteur.—Je l'envoie en ce moment chez un député néphrétique.

Jules.—A qui réserves-tu Alexandre le Grand ? (*il retourne le buste.*)

Le Docteur.—Prends garde de toucher, mon cher ! le mécanisme est très délicat. Je réserve Alexandre à un officier en retraite qui souffre de la goutte.

Jules.—C'est fort intéressant ! Voyons Shakespeare, qui a parlé tantôt et auquel tu veux fourrer une robe de chambre vert pomme ?

Le Docteur.—C'est lui qui entend les murmures d'un comédien enroué ; Jean, quand il a fini sa tournée me rapporte ici toutes ces têtes et j'écoute tranquillement chez moi les plaintes de mes malades comme un négociant dépouillerait son courrier chez lui. Ensuite je prescris par la même voie.

Jules.—Et tu ne vas jamais chez tes clients ?

Le Docteur.—Rarement, à moins de mort subite ; mais beaucoup de malades viennent se faire soigner ici ; ils me prennent tout ma matinée ; ne sortant pas de chez moi (sauf pour mon plaisir, bien entendu), je fais une immense économie de temps, de travail, et surtout d'émotion.

Jules.—Je ne saisis pas encore tout à fait ?

Le Docteur.—Voilà, mon cher. Quand ces bustes sont remis à leur place ici je les relie au téléphone, ce qui permet à mes malades de me parler à n'importe quelle heure et à moi de leur répondre.

Jules.—Alors tu es exposé à être dérangé jour et nuit ?

Le Docteur.—Pas si sot, mon cher ! Quand les malades m'embètent par trop de leurs doléances, je coupe la communication et tout est dit !

Jules.—Je n'en reviens pas . . . (*on entend une sonnette électrique*).

Le Docteur.—Tu verras—ou plutôt—tu entendras.

Une voix sort du buste d'Alexandre le grand: Docteur, docteur.

Le Docteur.—(*il applique son oreille contre le front d'Alexandre*).

La voix.—J'ai mal dans tout le corps ; surtout à la jambe droite et encore plus à la jambe gauche. Aïe ! c'est dans la main droite que cela me prend maintenant ! Baptiste courez chez le Docteur Lamart. Enlevez moi cette bête de tête d'Alexandre ! Je me moque d'Alexandre ! Je veux voir le docteur lui-même, tu entends ? et non son bête d'appareil. Aïe, aïe ! que j'ai mal !

Jules.—Que je ne te retienne pas mon ami ! Va vite courir chez ce malheureux !

Le Docteur.—Je m'en garderai bien ; il fait un temps atroce et je serais fort sot d'aller attraper un rhumatisme en essayant de guérir un vieillard de la goutte ! Non tu vas voir. (*Il parle au crâne d'Alexandre le grand*). Bonjour, mon Colonel . . . Bonjour, mon Colonel. Je vous dis bon . . . jour ! Vous ne répondez pas ! Ah ! ce n'est pas bien de me bouder ainsi . . . Mon Colonel j'ai fait ce matin le diagnostic long et soigné de votre cas . . . il vous faut prendre beaucoup de précautions . . . Oui . . . pré . . . cau . . . tions (*à Jules*). Il est sourd comme un pot le bonhomme ; c'est exténuant de lui parler. (*Le docteur retourne parler au crâne d'Alexandre*). Voyons, mon Colonel, de quelle couleur sont vos rideaux . . . rideaux . . . *deaux.* Non je ne vous demande pas si vous avez mal au dos ! Je vous parle de rideaux . . . de quelle couleur sont vos rideaux ? Rouges ! vous avez des tentures rouges ! Changez les à l'instant ! Le rouge vous est funeste . . . funeste ! Envoyez immédiatement chez le tapissier demander des rideaux jaunes. Quel jaune ? jaune canari . . . Puis vous mangerez une pomme cuite en vous levant et une autre en vous couchant tous les jours. Demain matin j'enverrai mon appareil prendre de vos nouvelles (*il coupe la communication*).

Jules.—(*ironiquement*) C'est admirable ! alors voilà comment on devient célèbre ! des rideaux canaris et des pommes cuites ! . . . et dire que tes braves gens de parents ont sué sang et eau pour payer tes études à l'Ecole de Médecine. Des rideaux canaris et des pommes cuites !

Le Docteur.—Eh bien Jules tu te rappelles que je n'étais pas un fainéant à Ste. Barbe ; j'ai passé ma plus belle jeunesse à moisir sur des bouquins, j'ai pris régulièrement mes inscriptions, j'ai subi avec succès mes divers examens, j'ai obtenu le diplôme de docteur en médecine . . .

Jules.—Alors ?

Le Docteur.—Après j'ai couru les hôpitaux sans relâche. Je coupais bras et jambes à tous ceux qui le voulaient bien . . .

Jules.—Tu travaillais sérieusement !

Le Docteur.—En effet, je piochais rudement.

Jules.—C'est comme cela que tu es devenu un des princes de la science ?

Le Docteur.—(*se levant*) Tu es un naïf, toi ; on voit bien que tu passes ta vie à cultiver des potirons et à engraisser des poulardes !

Jules.—Où veux-tu en venir ?

Le Docteur.—Tu crois sincèrement qu'on arrive par le travail ?

Jules.—Sans doute . . . " travaillez, prenez de la peine . . ."

Le Docteur.—Tu es moyen-âgeux mon cher. Du reste, moi aussi j'ai été bête comme cela autrefois.

Jules.—Grand merci !

Le Docteur.—Il n'y a pas de quoi ! Tiens lis cela (*il lui passe le brouillon de son article*).

Jules.—(*lisant*) " Influence des couleurs sur le système nerveux." Mais voyons, c'est de la blague, c'est du charlatanisme !

Le Docteur.—(*Allumant un cigare et se renversant dans son fauteuil*). Eh bien oui ! mon cher, c'est de la blague, c'est du charlatanisme si tu veux—mais on me paie cela vingt francs la ligne !

Jules.—Allons donc ?

Le Docteur.—Ce siècle est fini, mon cher. Nous nageons en pleine modernité ; ce qu'il faut c'est d'être dans le train !

Jules.—Alors les penseurs, les travailleurs, les amoureux du vrai et du beau qu'en fait on ?

Le Docteur.—On les laisse penser, travailler et végèter dans leur coin. Ce que le public demande c'est de l'esbrouffe, de la réclame, du tapage et surtout de l'actualité, ou sinon . . .

Jules.—Sinon ?

Le Docteur.—Sinon on meurt de faim.

Jules.—Sais tu que c'est triste ce que tu me dis là ?

Le Docteur.—La vérité est rarement gaie, mon cher.

Scène V.

Jean.—Pardon, monsieur, les salles sont pleines, on y étouffe et deux dames viennent déjà de s'évanouir.

Jules.—Les pauvres dames ! (*au Docteur*) va les soigner mon vieux !

Jean.—Monsieur, je crois que ce n'est pas nécéssaire, je leur ai jeté de l'eau glacée au visage et les voilà presque remises.

Le Docteur.—Je n'aurais pas mieux fait moi-même. Jean s'y connait parfaitement. (*à Jean*). Fais passer ces dames dans le jardin et montre leur la volière.

Jean.—Bien monsieur. (*fausse sortie*). A quelle heure, monsieur, déjeune-t-il ?

Le Docteur.—A l'heure ordinaire ; tu mettras deux couverts. (*à Jules*). Car tu me restes, n'est ce pas ?

Jules.—Volontiers. (*Jean sort*).

Scène VI.

Jules.—A Ste. Barbe je me figurais que tu allais devenir un de nos grands poètes ; tu faisais des vers superbes.

Le Docteur.—Hélas cette manie m'est toujours restée ; mais je cache mon penchant poétique comme si c'était un crime.

Jules.—Il me semble que tu ne sais pas arranger ton existence, mon cher copain ; cette vie de charlatanisme doit écœurer un brave homme comme toi.

Le Docteur.—Oui, parfois j'ai honte des trucs qu'il me faut employer—et je voudrais me retirer dans un coin bien paisible et passer mon temps à faire des stances à la lune.

Jules.—Pourquoi ne point suivre ton désir ?

Le Docteur.—Tu oublies, mon cher que je suis sans fortune.

Jules.—Mais si tu faisais publier tes œuvres poétiques ?

Le Docteur.—Voyons, Jules, tu crois qu'au jour d'aujourd'hui où le sport, le cyclisme et l'automobilisme priment tout, il se trouverait encore des gens pour acheter des volumes de poésie ?

Jules.—Cher ami, il ne faut pas trop médire de notre époque, elle a du bon, notre époque, crois-moi ; laisse moi lire quelques-unes de tes pages, veux tu ?

Le Docteur.—A toi, mon ancien camarade, je veux bien montrer ce que je cache soigneusement au monde entier (*il ouvre un tiroir secret et passe un cahier à Jules*). Avant tout laisse moi voir si aucun des appareils téléphoniques n'est ouvert (*il examine les bustes*) car si je ne faisais pas bien attention tout ce que je te dis pourrait être entendu par l'un ou l'autre de mes malades. (*Pendant que le Docteur arrange les bustes Jules a ouvert le cahier*).

Jules (*lisant*).—Mais c'est admirable, c'est superbe ! " Cette nuit étoilée" (*il serre la main au Docteur*) mais j'en pleure, mon ami, j'en pleure ! Permets moi de lire cela à ma nièce Elise, elle raffole de la poésie.

Le Docteur.—Ah ! tu as une nièce ?

Jules.—Oui, mon cher, la fille de ma sœur tant regrettée ; Elise demeure avec moi ; je voudrais bien la marier ; mais les prétendants ont beau se présenter, elle les refuse tous.

Le Docteur.—Tous ?

Jules.—Tous. Elle a une ideé fixe dans son petit cervelet féminin ; elle ne veut épouser qu'un poète.

Le Docteur.—Rêve de jeune fille ! Est-elle jolie, ta nièce Elise ?

Jules.—Tu en jugeras toi-même, car je lui ai donné rendez-vous ici ; aujourd'hui elle court les magasins de Paris avec Madeleine, notre servante, et je ne sais quand elles en auront fini.

Le Docteur.—Jean, nous préviendra de leur arrivée ; elles seront les bienvenues ici.

Jules.—Merci, mon cher. Tiens, je suis encore sous

l'émotion de tes strophes ; renonce à Paris et à tout cet attirail (*il montre les bustes*) et viens vivre près de moi dans notre vallon si riant et . . . (*on entend une sonnerie.*)

Une voix.—Impossible de trouver des rideaux canaris . . . on n'en fait plus, on n'a plus ce jaune là !

Le Docteur (*parlant au crâne d'Alexandre.*)—Cependant il le faut absolument.

La voix.—Le jaune orange ferait il l'affaire ?

Le Docteur.—Mais non, mon Colonel ; j'ai dit canari, il faut du canari. (*Il coupe la communication.*)

(*To be continued.*)

A SELECTION OF EXPERIMENTS IN PHYSICS.[1]

SURFACE OF A SPHERE.

IT is difficult to determine experimentally the area of the surface of a sphere, but the device shown in Fig. 1 provides a rough means of showing that it is four times the area of the hemispherical cross section.

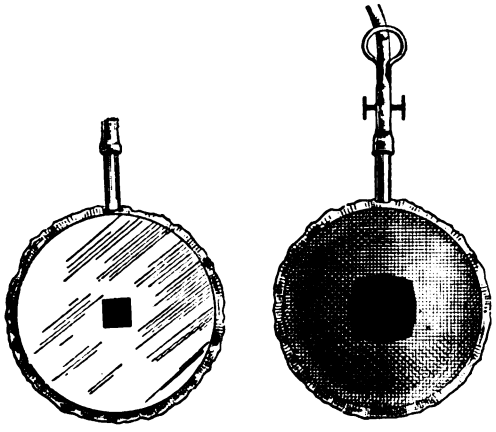


FIG. 1.—Device for indicating that the surface of a sphere has four times the area of the hemispherical section.

To make the instrument, a narrow metal ring with a neck obtained. Thin sheet india-rubber is fastened upon the ring, so as to form a hollow box with flexible ends. A square centimetre is drawn upon the india-rubber. A flat disc, which can be inflated into a sphere of the same diameter, is thus obtained.

By means of a tube fastened upon the neck blow out the india-rubber until it takes the form of a ball. While it is stretched measure the area of the square marked upon it. The area will be found approximately four times greater than it was originally, thus indicating that the surface of a sphere has four times the area of the hemispherical section or flat part obtained by cutting it into halves.

The area of the surface of a sphere may also be found in the following way : Procure an old tennis ball. Measure its diameter and then cut off the flannel covering. Flatten each half section down on square section paper and find the area. Add the two to get the area of the whole surface. Hence prove that the area of the sphere is four times that of a circle of the same diameter.

A fives ball may be similariy employed, the four coatings being cut off and their areas measured.

DENSITIES OF LIQUIDS.

For the determination of the density of a liquid, a tube of the form shown in Fig. 2 has several advantages over a flask having a mark upon the neck. The tube is filled with liquid by putting one of the open ends in a vessel containing the

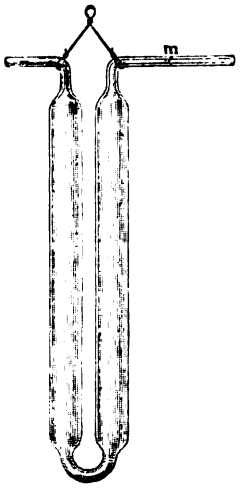


FIG. 2.

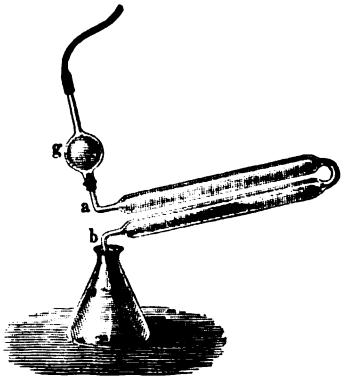


FIG. 3.

liquid, and attaching to the other end a pipette, by means of which suction can be applied (Fig. 3). When the tube is full, the pipette is taken off, and the tube is then ready to be suspended from the balance. Specific gravity tubes of this kind can easily be made in the laboratory.

A NEW INCLINED PLANE.

From a thick glass tube cut off two pieces each a foot or so in length, and two pieces about an inch long. From thick brass wire which will go into the tubing cut off two pieces about six inches long. Put one of the short glass tubes at the middle of

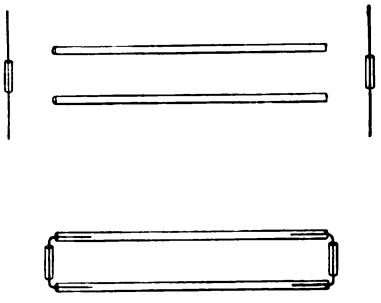


FIG. 4.—Stages in the construction of an arrangement for inclined plane experiments.

each wire and then bend the wire twice at right angles. Now put the ends of the wires into the long glass tubes, so as to form the oblong figure about two inches wide, shown in the Fig. 4.

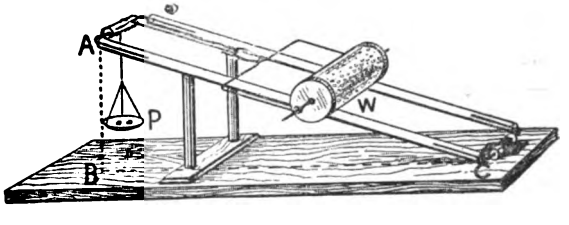


FIG. 5.—Glass inclined plane. Effort exerted parallel to plane.

Fasten one of the short tubes with the wire in it to a strip of wood about fifteen inches long, as at C in Fig. 5.

The long glass tube can be given any inclination by moving the support shown along the base.

[1] Extracted, with permission, from "Exercises in Practical Physics," Vol. I. By Prof. R. A. Gregory and A. T. Simmons, B.Sc. (Macmillan.)

Fit corks into the ends of a piece of glass tubing, about three inches long, and pass a knitting needle or a piece of one through them to form an axle. Bend a piece of wire to form a handle for the roller thus produced, making the distance between the two sides of the wire greater than the distance from the outer edge of one long glass tube to the outer edge of the other (Fig. 6).

Use of Inclined Plane.

Effort exerted Parallel to Plane. Set the glass tubes to any convenient inclination. Take out one of the corks, and after putting some shot in the tube replace the cork. Place the roller W upon the inclined tubes, and add a sufficient load to the tray P (Fig. 5) to keep it from running down. Weigh the roller W and its contents, and P and its contents. Also measure the length AC of the plane of the tubes, and the height AB.

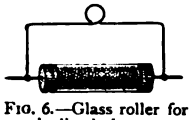


Fig. 6.—Glass roller for inclined plane.

After making these measures, tabulate the result thus:

W.	P.	Length, AC.	Height, AB.	$\frac{W}{P}$.	$\frac{AB}{AC}$.

Effort exerted Horizontally. Cut off a piece of wire nine or ten inches long, and bend it into the shape shown at A in Fig. 7, after placing a short piece of glass tube at the middle of it. Remove the top wire from the tubes already used, and put the

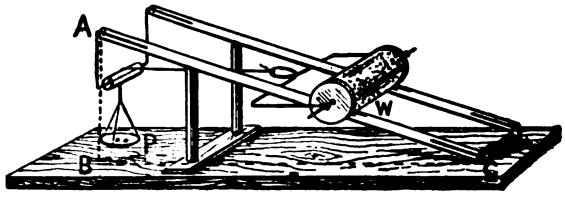


Fig. 7.—Glass inclined plane and roller. Effort exerted horizontally.

newly bent wire in its place as indicated. Set the tubes at any convenient inclination, place the roller, with shot in it, upon them, and keep it in position by putting "weights" in the tray P. With this arrangement the force which keeps the roller W from running down the plane acts horizontally, that is, parallel to the base of the plane instead of parallel to the length. Determine the values of W and P for several inclinations, taking care that in each case the force due to P acts horizontally upon W. Measure the lengths BC and AB for each experiment, and tabulate the observations as follows:

W.	P.	Base, BC.	Height, AB.	$\frac{W}{P}$.	$\frac{BC}{AB}$.

Determinations of the Intensity of Gravity.

A rough form of apparatus for determining the value of g by the method here described was shown by Mr. S. Whalley at a Conference of Science Teachers, held in London in January, 1899. To Mr. Whalley belongs the credit of experimentally developing the method, but he does not claim to have been the originator of it. The neat arrangement shown in Fig. 8 represents the form in which the apparatus is used in Nottingham Science Schools. The illustration and particulars referring to it have kindly been furnished by Mr. W. R. Swain, one of H.M. Inspectors of the Department of Science and Art.

The value of g, or the velocity produced per second by a body falling freely under the action of the force of gravity, can be determined very satisfactorily by the following ingenious device:

An upright frame (Fig. 8) about three feet high has a ledge screwed at the back so that it can be supported at the edge of a bench. Near the top of a frame a small platform of hard wood, having a slot cut in it, is screwed. Upon the platform rests the knife-edge of a pendulum formed by a bar of wood about four feet long and one inch square section. The pendulum is cut away at the top to enable it to swing freely in the slot of the platform. Holes at right angles to the plane of oscillation are bored in the pendulum for the insertion of lead plugs to alter the mass centre and so vary the time of vibration. A silk thread, to which a double conical bob is attached, is connected with the pendulum, and passes over two light pulleys, as shown in the illustration. Small boxwood pulleys, bushed with glass tubing, and pivoted on steel hat-pins with large heads, work very well. The sharp equator of the bob is smeared with Brunswick black, or the lower part of the face of the pendulum may be given a thin coating of paraffin wax.

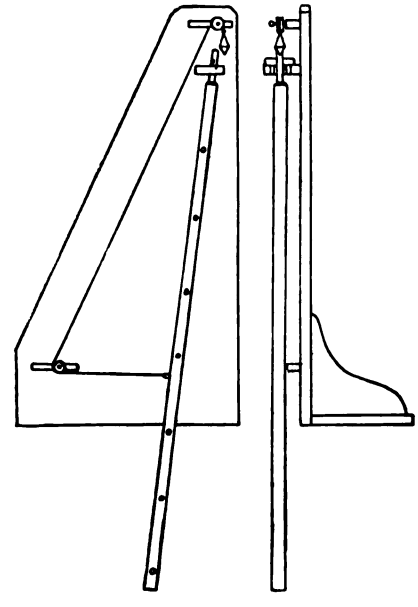


Fig. 8.—Apparatus for the determination of the acceleration due to gravity.

To perform an experiment with this apparatus, the pendulum is adjusted so that the face when vertical touches the equator of the bob. Pull the pendulum a little out of the vertical as shown in the diagram (Fig. 8). Measure the height in feet of the equator of the bob above any convenient base below the pendulum. Then burn the thread at a point just above the bottom pulley. The pendulum is thus released, and the instant it reaches the vertical line it is struck by the sharp equator of the falling bob, and a mark is thereby made upon it. Measure the distance in feet from the base to the top of this mark when the pendulum has come to rest. The difference gives the space passed through by the bob in one quarter of a complete swing-

swang. Determine the time taken by 10 or 20 to-and-fro vibrations of the rod swinging freely, and calculate from it the time (t) of ½ of a vibration. The value of the force of gravity (g) can then be determined from the simple formula:

$$s = \tfrac{1}{2} g t^2,$$

so that

$$g = \frac{2s}{t^2}.$$

Repeat the experiment by varying the rate of vibration of the pendulum and making the measurements in centimetres.

RELATIVE CONDUCTIVITIES OF METALS FOR HEAT.

The following effective arrangement for determining the relative thermal conductivities of metals is described by Mr. Edwin Edser in *Nature* of July 13, 1899.

Procure a piece of brass tube, about 10 cm. in diameter and 20 cm. in length. Close one end by means of a brass disc. Bore a number of holes in this disc to receive the extremities of rods of copper, brass, iron, etc., each rod being 2·5 mm. in diameter and about 15 to 20 cm. in length. Solder the rods in position perpendicular to the disc.

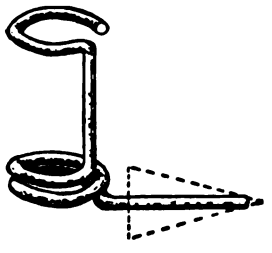


FIG. 9.—Enlarged view of index of Edser's conductivity apparatus.

Upon each rod place a small index, made from a piece of copper wire of about ·8 mm. diameter, bent into the form shown in Fig. 9, a small arrow-head of blackened paper or mica being attached by shellac varnish. The rings forming part of each index should be wound on a rod *very slightly* larger in diameter than the experimental rods.

To perform an experiment, invert the brass vessel; slip an index on each rod, the single ring (Fig. 9) being left in contact with the disc, and melt a very small amount of paraffin wax round the rings. Support the vessel with the rods downwards, as in Fig. 10. The solid wax will hold the index in position. Now pour boiling water into the brass vessel.

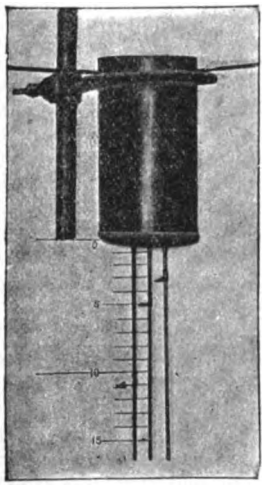


FIG. 10.—Edser's apparatus for demonstrating the relative thermal conductivities of metal. (The left-hand rod is of copper, the middle one of brass, and the right-hand one of soft steel.)

When that part of the metal rod, in the neighbourhood of the double ring of the index, reaches the melting temperature of the wax, the index commences to slip downwards, carrying the wax with it, and when the rods have acquired steady values, the indexes will have descended to points on the various rods where the wax just solidifies, and which, therefore, possess equal temperatures. The conductivities of the rods are proportional to the squares of the distances from the bottom of the brass vessel to the respective positions indicated by the several arrow-heads.

Observe the positions of the indexes on the rods you use and determine the relative conductivities of the substances of which they are composed.

TEACHERS' NOTES ON ENGLISH HISTORY, 1603-1715.

By C. S. FEARENSIDE, M.A.(Oxon.)

I.—INTRODUCTORY.

IT is proposed to publish, in the next few issues of THE SCHOOL WORLD, a series of Teachers' Notes on English History, 1603-1715—the prescribed period of English History which is common to all three grades in the Oxford Local Examination, 1900. These Notes will differ from those contained in Mr. Evans's articles in several important respects: they will be lists of points rather than connected narrative, exposition or criticism; they will attempt to set forth not things which ought to be in the teacher's mind, but facts which it is desirable and possible to get into the minds of comparatively young pupils. *Desirable*—for the purpose of passing the examination in view, and also on educational and civic grounds. *Possible*—because these Notes, after the present issue, will be based on notes successfully used for many years in junior class-work.

On starting to work on any special period of English history it is well to give the class some general notions on the period, introducing contrasts to the state of things existing in our own days. The following points for such a preliminary lecture are arranged in a logical rather than a teaching order.

I. International Affairs.

(i.) THE MAP OF EUROPE was quite different, politically, then and now. Russia was still an Asiatic Power; Turkey was still vigorous and extended much further north-west than now; Sweden and Denmark-Norway were important Powers; there was no united Italy and no united Germany; Austria, Bavaria, the Palatinate, Saxony and Brandenburg (called Prussia after 1700) were the principal states making up "the Empire" (which was called Roman but was mainly German); Spain was a Great Power, possessing till 1700 the Southern Netherlands (now called *Belgium*), and in 1603 still claiming to possess the Northern Netherlands (now called *Holland*); and France was growing in might almost throughout the period.

N.B.—Europe was cut up into family estates; and international policy turned rather on dynastic than on national, religious or commercial considerations.

(ii.) ENGLISH FOREIGN POLICY was directed towards magnifying the reigning House of Stuart, maintaining Protestantism, spreading commerce, and acquiring land outside Europe (land inside Europe being unattainable). Main features of the period:—

(1) Gradual growth of a regular Army and a regular Navy;

(2) Drift from Alliance with France against Spain to the Second Hundred Years' War against France and Spain. [Seeley's "Growth of British Policy" is invaluable on this head.]

II. Constitutional Affairs.

(i.) TERRITORIAL EXPANSION: contrast the dominions of Anne (1714) with those of Elizabeth (1603) and Victoria (1899).

(ii.) GROWTH OF CIVIL UNITY: James I. was the first King of England who also ruled over Scotland and *all* Ireland; and in his reign, too, the first English Colonies over sea were successfully planted.

N.B.—This unity was mechanical and political rather than organic and social: the average Englishman of the 17th century looked on the Irish Papists and the Scottish Highlanders much as the present-day Englishman regards the Matabele or the Papuans—as quaint but tiresome savages.

(iii.) Growth of Ecclesiastical Disunity.—James I. believed that all his subjects ought to be of his religion (*cuius regio eius religio*): before the end of the period that idea was practically dead, and was, practically though not altogether legally, replaced by our present system of Polychurchism.

(iv.) Government Machinery. — Despotic monarchy gradually developed into parliamentary monarchy; that is to say, the well-to-do classes discovered or developed the means of exercising regular control over the conduct of political affairs.

III. Social Affairs.

(Vitally affecting both I. and II. above.)

(1) England agricultural not industrial: little distinction between town and country.

(2) Difficulty of communication: bad roads, irregular posts, no railways or regular coaches.

(3) Newspapers still in infancy: few in number, expensive, and subject to Government censorship (till 1695).

(4) Tea and coffee introduced during the period.

(5) No daily post, no street lighting, no fire-brigades, no sanitation, no house-to-house water supply, no annual going away "for a change."

(6) Civil wars and frequent epidemics.

[The most suggestive, short and readily-accessible sources of information on headings II. and III. are Gardiner's Introduction to "Constitutional Documents of the Puritan Revolution," Macaulay's "History of England," chapters ii. and iii., and Boutmy's "English Constitution." The best large book on the early part of the period (to 1654) is Dr. Gardiner's great work: the best large book on the whole period is Ranke's "History of England especially in the Seventeenth Century."]

Text-Books.

Most text-books sold in parts divide at 1688: so far as the present writer is aware, there are in existence only two trustworthy books of moderate size and price, dealing in one volume with the whole of this special period, and nothing else:—

For the Teacher: Fearenside and Evans' "Intermediate Text-Book of English History," vol. iii. (Clive, 4s. 6d.)

For the Pupil: Wakeling's "King and Parliament." (Blackie, 1s.)

The compilers of these Notes would be glad to receive from teachers information as to topics in which they feel the need of help, suggestions and criticisms. Letters should be marked outside "Oxford History," and addressed to the Editors of The School World.

THE FLOOR OF THE OCEAN.[1]

The recognition of oceanography as a distinct branch of science may be said to date from the commencement of the *Challenger* investigations. The fuller knowledge we now possess about all oceanic phenomena has had a great modifying influence on many general conceptions as to the nature and extent of those changes which the crust of the earth is now undergoing and has undergone in past geological times. Our knowledge of the ocean is still very incomplete. So much has, however, already been acquired that the historian will, in all probability, point to the oceanographical discoveries during the past forty years as the most important addition to the natural knowledge of our planet since the great geographical voyages associated with the names of Columbus, Da Gama, and Magellan, at the end of the fifteenth and the beginning of the sixteenth centuries.

[1] Abstract of the Presidential Address delivered by Sir John Murray, K.C.B., F.R.S., D.Sc., LL.D., to the Geographical Section of the British Association for the Advancement of Science, Dover, September 14th.

Depth of the Ocean.

All measurements of depth, by which we ascertain the relief of that part of the earth's crust covered by water, are referred to the sea-surface; the measurements of height on the land are likewise referred to sea-level. It is admitted that the ocean has a very complicated undulating surface, in consequence of the attraction which the heterogeneous and elevated portions of the lithosphere exercise on the liquid hydrosphere. In the opinion of geodesists the geoid may in some places depart from the figure of the spheroid by 1,000 feet. Still it is not likely that this surface of the geoid departs so widely from the mean ellipsoidal form as to introduce a great error into our estimates of the elevations and depressions on the surface of the lithosphere.

I have redrawn the several contour-lines of depth in the great ocean-basins, after careful consideration of the most recent data, and these may now be regarded as a somewhat close approximation to the actual state of matters, with the possible exception of the great Southern and Antarctic Oceans, where there are relatively few soundings, but where the projected Antarctic Expeditions should soon be at work. On the whole, it may be said that the general tendency of recent soundings is to extend the area with depths greater than 1,000 fathoms, and to show that numerous volcanic cones rise from the general level of the floor of the ocean-basins up to various levels beneath the sea-surface.

The areas marked out by the contour-lines of depth are now estimated as follows:—

	Fms.	Sq. geo. m.		
Between the shore and	100 ..	7,000,000	(or 7 per cent. of the sea-bed)	
,, 100 ,,	1,000 ..	10,000,000	,, 10	,, ,,
,, 1,000 ,,	2,000 ..	22,000,000	,, 21	,, ,,
,, 2,000 ,,	3,000 ..	57,000,000	,, 55	,, ,,
Over 3,000 fathoms	..	7,000,000	,, 7	,, ,,
		103,000,000	100	

From these results it appears that considerably more than half of the sea-floor lies at a depth exceeding 2,000 fathoms, or over two geographical miles. It is interesting to note that the area within the 100-fathom line occupies 7,000,000 square geographical miles, whereas the area occupied by the next succeeding 900 fathoms (viz., between 100 and 1,000 fathoms) occupies only 10,000,000 square geographical miles. This points to a relatively rapid descent of the sea-floor along the continental slopes between 100 and 1,000 fathoms, and therefore confirms the results gained by actual soundings in this region, many of which indicate steep inclines or even perpendicular cliffs. Not only are the continental slopes the seat of many deposit-slips and seismic disturbances, but Mr. Benest has given good reasons for believing that underground rivers sometimes enter the sea at depths beyond 100 fathoms and there bring about sudden changes in deep water. Again, the relatively large area covered by the continental shelf between the shore-line and 100 fathoms points to the wearing away of the land by current and wave action.

On the *Challenger* charts all areas where the depth exceeds 3,000 fathoms have been called "deeps," and distinctive names have been conferred upon them. Forty-three such depressions are now known; twenty-four are situated in the Pacific Ocean, three in the Indian Ocean, fifteen in the Atlantic Ocean, and one in the Southern and Antarctic Oceans. The area occupied by these thirty-nine deeps is estimated at 7,152,000 square geographical miles, or about 7 per cent. of the total water-surface of the globe. Within these deeps over 250 soundings have been recorded, of which twenty-four exceed 4,000 fathoms, including three exceeding 5,000 fathoms.

Depths exceeding 4,000 fathoms (or four geographical miles) have been recorded within eight of the deeps, viz., in the

North Atlantic within the Nares Deep; in the Antarctic within the Ross Deep; in the Banda Sea within the Weber Deep; in the North Pacific within the Challenger, Tuscarora, and Supau Deeps; and in the South Pacific within the Aldrich and Richards Deeps. Depths exceeding 5,000 fathoms have been hitherto recorded only within the Aldrich Deep of the South Pacific, to the east of the Kermadecs and Friendly Islands, where the greatest depth is 5,155 fathoms, or 530 feet more than five geographical miles, being about 2,000 feet more below the level of the sea than the summit of Mount Everest in the Himalayas is above it. The levels on the surface of the lithosphere thus oscillate between the limits of about ten geographical miles (more than eighteen kilometers).

Temperature of the Ocean-floor.

Our knowledge of the temperature on the floor of the ocean is derived from observations in the layers of water immediately above the bottom by means of deep-sea thermometers, from the electric resistance of telegraphic cables resting on the bed of the great ocean-basins, and from the temperature of large masses of mud and ooze brought up by the dredge from great depths. These observations are now sufficiently numerous to permit of some general statements as to the distribution of temperature over the bottom of the great oceans.

All the temperatures recorded up to the present time in the sub-surface waters of the open ocean indicate that at a depth of about 100 fathoms seasonal variation of temperature disappears. Beyond that depth there is a constant, or nearly constant, temperature at any one place throughout the year.

It is estimated that 92 per cent. of the entire sea-floor has a temperature lower than 40° F. This is in striking contrast to the temperature prevailing at the surface of the ocean, only 16 per cent. of which has a mean temperature under 40° F. The temperature over nearly the whole of the floor of the Indian Ocean in deep water is under 35° F. A similar temperature occurs over a large part of the South Atlantic and certain parts of the Pacific, but at the bottom of the North Atlantic basin and over a very large portion of the Pacific the temperature is higher than 35° F. In depths beyond 2,000 fathoms, the average temperature over the floor of the North Atlantic is about 2° F. above the average temperature at the bottom of the Indian Ocean and South Atlantic, while the average temperature of the bed of the Pacific is intermediate between these.

It is admitted that the low temperature of the deep sea has been acquired at the surface in Polar and sub-Polar regions, chiefly within the higher latitudes of the southern hemisphere, where the cooled surface water sinks to the bottom and spreads slowly over the floor of the ocean into equatorial regions. These cold waters carry with them into the deep sea the gases of the atmosphere, which are everywhere taken up at the surface according to the known laws of gas absorption. In this way myriads of living animals are enabled to carry on their existence at all depths in the open ocean. The nitrogen remains more or less constant at all times and places, but the proportion of oxygen is frequently much reduced in deep water, owing to the processes of oxidation and respiration which are there going on.

The deep sea is a region of darkness as well as of low temperature, for the direct rays of the sun are wholly absorbed in passing through the superficial layers of water. Plant life is in consequence quite absent over 93 per cent. of the bottom of the ocean, or 66 per cent. of the whole surface of the lithosphere. The abundant deep-sea fauna, which covers the floor of the ocean, is therefore ultimately dependent for food upon organic matter assimilated by plants near its surface, in the shallower waters near the coast lines, and on the surface of the dry land itself.

Marine Deposits on the Ocean Floor.

The marine deposits now forming over the floor of the ocean present many interesting peculiarities according to their geographical and bathymetrical position. On the continental shelf, within the 100-fathom line, sands and gravels predominate, while on the continental slopes beyond the 100-fathom line, blue muds, green muds, and red muds, together with volcanic muds and coral muds, prevail, the two latter kinds of deposits being, however, more characteristic of the shallow water around oceanic islands. The composition of all these terrigenous deposits depends on the structure of the adjoining land. Around continental shores, except where coral reefs, limestones, and volcanic rocks are present, the materials consist principally of fragments and minerals derived from the disintegration of the ancient rocks of the continents, the most characteristic and abundant mineral species being quartz. River detritus extends in many instances far from the land, while off high and bold coasts, where no large rivers enter the sea, pelagic conditions may be found in somewhat close proximity to the shore-line. It is in these latter positions that green muds containing much glauconite, and other deposits containing many phosphatic nodules, have for the most part been found; as, for instance, off the eastern coast of the United States, off the Cape of Good Hope, and off the eastern coasts of Australia and Japan. The presence of glauconitic grains and phosphatic nodules in the deposit at these places appears to be very intimately associated with a great annual range of temperature in the surface and shallow waters, and the consequent destruction of myriads of marine animals. As an example of this phenomenon may be mentioned the destruction of the tile-fish in the spring of 1882 off the eastern coast of North America, when a layer six feet in thickness of dead fish and other marine animals was believed to cover the ocean floor for many square miles.

In all the terrigenous deposits the evidences of the mechanical action of tides, of currents, and of a great variety of physical conditions, may almost everywhere be detected, and it is possible to recognise in these deposits an accumulation of materials analogous to many of the marine stratified rocks of the continents, such as sandstone, quartzites, shales, marls, greensands, chalks, limestones, conglomerates, and volcanic grits.

With increasing depth and distance from the continents the deposits gradually lose their terrigenous character, the particles derived directly from the emerged land decrease in size and in number, the evidences of mechanical action disappear, and the deposits pass slowly into what have been called pelagic deposits at an average distance of about 200 miles from continental coast-lines. The materials composing pelagic deposits are not directly derived from the disintegration of the continents and other land surfaces. They are largely made up of the shells and skeletons of marine organisms secreted in the surface waters of the ocean, consisting either of carbonate of lime, such as pelagic molluscs, pelagic foraminifera, and pelagic algæ, or of silica, such as diatoms and radiolarians. The inorganic constituents of the pelagic deposits are for the most part derived from the attrition of floating pumice, from the disintegration of water-logged pumice, from showers of volcanic ashes, and from the *débris* ejected from submarine volcanoes, together with the products of their decomposition. Quartz particles, which play so important a *rôle* in the terrigenous deposits, are almost wholly absent, except where the surface waters of the ocean are affected by floating ice, or where the prevailing winds have driven the desert sands far into the oceanic areas. Glauconite is likewise absent from these abyssmal regions. The various kinds of pelagic deposits are named according to their characteristic constituents, pteropod oozes, globigerina oozes, diatom oozes, radiolarian oozes, and red clay.

The carbonate of lime shells derived from the surface play a great and puzzling *rôle* in all deep-sea deposits, varying in abundance according to the depth of the ocean and the temperature of the surface waters. In tropical regions removed from land, where the depths are less than 600 fathoms, the carbonate of lime due to the remains of these organisms from the surface may rise to 80 or 90 per cent.; with increase of depth, and under the same surface conditions, the percentage of carbonate of lime slowly diminishes, till, at depths of about 2,000 fathoms, the average percentage falls to about 60, at 2,400 fathoms to about 30, and at about 2,600 fathoms to about 10, beyond which depth there may be only traces of carbonate of lime due to the presence of surface shells. The thin and more delicate surface-shells first disappear from the deposits, the thicker and denser ones alone persist to greater depths. A careful examination of a large number of observations shows that the percentage of carbonate of lime in the deposits falls off much more rapidly at depths between 2,200 and 2,500 fathoms than at other depths.

The red clay, which occurs in all the deeper stretches of the ocean far from land, and covers nearly half of the whole sea-floor, contains—in addition to volcanic *débris*, clayey matter, the oxides of iron and manganese—numerous remains of whales, sharks, and other fishes, together with zeolitic crystals, manganese nodules, and minute magnetic spherules, which are believed to have a cosmic origin. One haul of a small trawl in the Central Pacific brought to the surface on one occasion, from a depth of about two and a half miles, many bushels of manganese nodules, along with fifteen hundred sharks' teeth, over fifty fragments of earbones and other bones of whales. Some of these organic remains, such as the careharodon and lamna teeth and the bones of the ziphioid whales, belong apparently to extinct species. One or two of these sharks' teeth, earbones, or cosmic spherules, may be occasionally found in a globigerina ooze, but their occurrence in this or any deposits other than red clay is extremely rare.

Life on the Ocean Floor.

It has already been stated that plant life is limited to the shallow waters, but fishes and members of all the invertebrate groups are distributed over the floor of the ocean at all depths. The majority of these deep-sea animals live by eating the mud, clay, or ooze, or by catching the minute particles of organic matter which fall from the surface. It is probably not far from the truth to say that three-fourths of the deposits now covering the floor of the ocean have passed through the alimentary canals of marine animals. These mud-eating species, many of which are of gigantic size when compared with their allies living in the shallow coastal waters, become in turn the prey of numerous rapacious animals armed with peculiar prehensile and tactile organs. Some fishes are blind, while others have very large eyes. Phosphorescent light plays a most important *rôle* in the deep sea, and is correlated with the prevailing red and brown colours of deep-sea organisms. Phosphorescent organs appear sometimes to act as a bull's-eye lantern to enable particles of food to be picked up, and at other times as a lure or a warning. All these peculiar adaptations indicate that the struggle for life may be not much less severe in the deep sea than in the shallower waters of the ocean.

Many deep-sea animals present archaic characters; still the deep sea cannot be said to contain more remnants of faunas which flourished in remote geological periods than the shallow and fresh waters of the continents. Indeed, king-crabs, lingulas, trigonias, Port Jackson sharks, Ceratodus, Lepidosiren, and Protopterus, probably represent older faunas than anything to be found in the deep sea.

Evolution of the Continental and Oceanic Areas.

The surface of the globe has not always been as we now see it. When, in the past, the surface had a temperature of about 400° F., what is now the water of the ocean must have existed as water vapour in the atmosphere, which would thereby—as well as because of the presence of other substances—be increased in density and volume. Life, as we know it, could not then exist. Again, science foresees a time when low temperatures, like those produced by Professor Dewar at the Royal Institution, will prevail over the face of the earth. The hydrosphere and atmosphere will then have disappeared with the rocky crust, or the waters of the ocean will have become solid rock, and over their surface will roll an ocean of liquid air about forty feet in depth. Life, as we know it, unless it undergoes suitable secular modifications, will be extinct. Somewhere between these two indefinite points of time in the evolution of our planet it is our privilege to live, to investigate, and to speculate concerning the antecedent and future conditions of things.

When we regard our globe with the mind's eye, it appears at the present time to be formed of concentric spheres, very like, and still very unlike, the successive coats of an onion. Within is situated the vast nucleus or *centrosphere*; surrounding this is what may be called the *tektosphere*,[1] a shell of materials in a state bordering on fusion, upon which rests and creeps the *lithosphere*. Then follow *hydrosphere* and *atmosphere*, with the included *biosphere*.[2] To the interaction of these six geospheres, through energy derived from internal and external sources, may be referred all the existing superficial phenomena of the planet.

The vast interior of the planetary mass, although not under direct observation, is known, from the results of the astronomer and physicist, to have a mean density of 5·6, or twice that of ordinary surface rock. The substances brought within the reach of observation in veinstones, in lavas, and hypogene rocks—by the action of water as a solvent and sublimant—warrant the belief that the centrosphere is largely made up of metals and metalloids with imprisoned gases. It is admitted that the vast nucleus has a very high temperature, but so enormous is the pressure of the super-incumbent crust that the melting-point of the substances in the interior is believed to be raised to a higher value than the temperature there existing—the centrosphere in consequence remains solid, for it may be assumed that the melting-point of rock-forming materials is raised by increase of pressure. Astronomers, from a study of precession and nutation, have long been convinced that the centrosphere must be practically solid.

Now, as the solid centrosphere slowly contracted from loss of heat, the primitive lithosphere, in accommodating itself—through changes in the tektosphere—to the shrinking nucleus, would be buckled, warped, and thrown into ridges. That these movements are still going on is shown by the fact that the lithosphere is everywhere and at all times in a slight but measurable state of pulsation. The rigidity of the primitive rocky crust would permit of considerable deformations of the kind here indicated. Indeed, the compression of mountain chains has most probably been brought about in this manner, but the same cannot be said of the elevation of plateaus, of mountain platforms, and of continents.

From many lines of investigation it is concluded, as we have seen, that the centrosphere is homogeneous in structure. Direct observation, on the other hand, shows that the lithosphere is heterogeneous in composition. How has this heterogeneity been brought about? The original crust was almost certainly composed of complex and stable silicates, all the silicon dioxide being in combination with bases. Lord Kelvin has pointed

[1] τηκτός, molten.
[2] βίος, life.

out that, when the solid crust began to form, it would rapidly cool over its whole surface; the precipitation of water would accelerate this process, and there would soon be an approximation to present conditions. As time went on, the plastic or critical layer—the tektosphere—immediately beneath the crust would gradually sink deeper and deeper, while ruptures and re-adjustments would become less and less frequent than in earlier stages. With the first fall of rain the silicates of the crust would be attacked by water and carbon dioxide, which can at low temperatures displace silicon dioxide from its combinations. The silicates, in consequence, have been continuously robbed of a part, or the whole, of their bases. The silica thus set free goes ultimately to form quartz veins and quartz sand on or about the emerged land, while the bases leached out of the disintegrating rocks are carried out into the ocean and ocean-basins. A continuous disintegration and differentiation of materials of the lithosphere, accompanied by a sort of migration and selection among mineral substances, is thus always in progress. Through the agency of life, carbonate of lime accumulates in one place; through the agency of winds, quartz sand is heaped up in another; through the agency of water, beds of clay, of oxides of iron and of manganese are spread out in other directions.

The contraction of the centrosphere supplies the force which folds and crumples the lithosphere. The combined effect of hydrosphere, atmosphere, and biosphere on the lithosphere gives direction and a determinate mode of action to that force. From the earliest geological times the most resistant dust of the continents has been strewn along the marginal belt of the sea-floor skirting the land. At the present time the deposits over this area contain on the average about 70 per cent. of free and combined silica, mostly in the form of quartz sand. In the abysmal deposits far from land there is an average of only about 30 per cent. of silica, and hardly any of this in the form of quartz sand. Lime, iron, and the other bases largely predominate in these abysmal regions. The continuous loading on the margins of the emerged land by deposits tends by increased pressure to keep the materials of the tektosphere in a solid condition immediately beneath the loaded area. The unloading of emerged land tends by relief of pressure to produce a viscous condition of the tektosphere immediately beneath the denuded surfaces. Under the influence of the continuous shakings, tremors, and tremblings always taking place in the lithosphere, the materials of the tektosphere yield to the stresses acting on them, and the deep-seated portions of the terrigenous deposits are slowly carried towards, over, or underneath the emerged land. The rocks subsequently re-formed beneath continental areas out of these terrigenous materials, under great pressure and in hydrothermal conditions, would be more acid than the rocks from which they were originally derived, and it is well known that the acid silicates have a lower specific gravity than the intermediate or basic ones. By a continual repetition of this process the continental protuberances have been gradually built up of lighter materials than the other parts of the lithosphere. The relatively light quartz, which is also the most refractory, the most stable, and the least fusible among rock-forming minerals, plays in all this the principal *rôle*. The average height of the surface of the continents is about three miles above the average level of the abysmal regions. If now we assume the average density of the crust beneath the continents to be 2·5, and of the part beneath the abysmal regions to be 3, then the spheroidal surface of equal pressure—the tektosphere—would have a minimum depth of eighteen miles beneath the continents and fifteen miles beneath the oceans, or if we assume the density of the crust beneath the continents to be 2·5, and beneath the abysmal regions to be 2·8, then the tektosphere would be twenty-eight miles beneath the continents and twenty-five miles beneath the oceans. The present condition of the earth's crust might be brought about by the disintegration of a quantity of quartz-free volcanic rock, covering the continental areas to a depth of eighteen miles, and the reformation of rocks out of the disintegrated materials.

Where the lighter and more bulky substances have accumulated there has been a relative increase of volume, and in consequence bulging has taken place at the surface over the continental areas. Where the denser materials have been laid down there has been flattening, and in consequence a depression of the abysmal regions of the ocean-basins. It is known that, as a general rule, where large masses of sediment have been deposited, their deposition has been accompanied by a depression of the area. On the other hand, where broad mountain platforms have been subjected to extensive erosion, the loss or altitude by denudation has been made good by a rise of the platform. This points to a movement of matter on to the continental areas.

If this be anything like a true conception of the interactions that are taking place between the various geospheres of which our globe is made up, then we can understand why, in the gradual evolution of the surface features, the average level of the continental plains now stands permanently about three miles above the average level of those plains which form the floor of the deep ocean-basins. We may also understand how the defect of mass under the continents and an excess of mass under the oceans have been brought about, as well as deficiency of mass under mountains and excess of mass under plains. Even the local anomalies indicated by the plumb-line, gravity, and magnetic observations may in this way receive a rational explanation.

COMMERCIAL EDUCATION IN BIRMINGHAM.

A VALUABLE report has been issued by the Education Commitee of the Birmingham Chamber of Commerce upon commercial education in their city. The importance of business training in Birmingham, with its great variety of manufactures, is strongly emphasised, and the aim in view is clearly stated, namely, to develop a system of commercial education at least equal to that of any other country, extending from the Board school to the new University, in which there will be a distinct faculty of commerce. The report then provides a luminous and eminently satisfactory account of what is already being done in this direction, and the fulness of detail in this section demonstrates in the best possible manner the thoroughness of the Committee's investigations. With the object of persuading those schoolmasters who are immediately responsible for training boys for commercial life that this is a report they should obtain and study, a few of the most important of the Committee's suggestions are given.

Suggested Standard for the Commercial Education of Employees.

The Committee is of opinion that the subjects in which a boy should be efficient on leaving a Board school to enter an office, say, at the age of 14, are as follows:—He should write a good hand; he should be able to compose a good ordinary business letter; he should have a good knowledge of arithmetic, including the Metric System, and especially he should have a sound knowledge of geography, with commercial application.

Every boy entering business at 15 or 16 should have the following qualifications:—(1) He should write a good hand—the experience of business men of Birmingham tends to show that insufficient attention is given to writing in the Higher

schools, and that often the boys from the Board schools write a better hand than those coming from the Higher schools; (2) he ought to have a good knowledge of the whole of arithmetic; (3) he should know the principles of book-keeping by single and double entry—as systems of book-keeping vary in each office, it is of greater importance that a boy should be well grounded in the general principles than that he should possess detailed knowledge of book-keeping; (4) his knowledge of commercial geography should be very thorough; (5) he ought to have one foreign language thoroughly at his command, *e.g.*, he should be able to write an ordinary business letter with correctness and facility, and to read and understand any book or newspaper with ease as well as to converse fluently—this last qualification, it is to be feared, will not be attained till the supply of first-class teachers of modern languages has been very much increased; (6) he should also have a good grounding in a second modern language, that he may continue the study of it in the evening if necessary.

The Committee would give preference to German as being the most important language to learn, as the literature connected with commercial and industrial education is better in Germany than in any other country, and a large proportion of the commercial houses in South America and other countries, with whom we seek to do business, are managed or owned by Germans.

Suggestions of the Committee.

Special attention should be given to commercial geography. Understanding that in the Board schools geography is excellently taught, the Committee only suggest that this teaching should be supplemented by frequent lectures, accompanied with limelight and other illustrations, in order to familiarise the pupils with the life, climate, and other conditions in foreign countries, and with the articles used and produced in those countries. In the Higher schools the Committee consider the education in geography already given should be continued, and that special attention should be given to the requirements of foreign countries, modes of doing business, trade routes, adaptability of a country to special manufactures or products, &c.

Probably there are few countries where a boy leaving a Higher school knows as little of modern languages as the average English boy does. It is stated continually by masters that the reason of this is, that boys will get a better mental training by studying the Classics than they will by studying modern languages. In the opinion of the Committee, *there have been insufficient opportunities in England of showing what modern languages can do in the way of mental training.* One reason of this probably is that the number of efficient teachers of modern languages in England is comparatively small. More than one of the masters who have interviewed the Committee stated that they had no difficulty in getting good teachers of Classics, but the very greatest difficulty in getting teachers of modern languages who, with other necessary qualifications, can maintain good discipline in the lower forms.

The Committee, therefore, strongly recommends that every effort should be made in the schools in Birmingham to get good English-born teachers of modern languages for the lower forms in the schools, and would strongly urge upon the governing bodies the importance of using some of their funds to increase the salaries of teachers of modern languages, so as to attract the very highest class of teacher. The one necessity being the supply of high-class English teachers of modern languages who have spent a year or more in the country where the language is spoken which they intend to teach.

It is worth notice that in Germany, where modern languages are most excellently taught, they think very highly of modern languages as a mental training, and it will surprise English people to know that in the great commercial centre of Hamburg, with over 600,000 inhabitants, out of one hundred and twenty-four public schools, Latin is only taught in three, while modern languages are taught in every boys' school.

The Committee is of opinion that in the case of pupils beginning a foreign language certainly not less than four hours a week should be given to it in school hours. This has been the experience of the teachers of modern languages all over the Continent, and at the recent Conference in Venice it was the unanimous opinion of the delegates that the teaching of foreign languages should "commence with one language only at the age of ten, with five or six lessons per week for two years, at which time the teaching of a second language may be commenced, with the same number of lessons a week, reducing the number of lessons of the one first started to four or three." It seems further to be a general opinion that to give one or two hours a week to a language when it is first learned is a mere waste of time. On the other hand, after a good knowledge of the language has been attained, it is then possible to maintain and develop it with one or two hours a week.

With a view of increasing the time available for this purpose, the Committee is of opinion that those boys who intend to enter commercial life at a comparatively early age should, in place of Latin, devote their time to modern languages, especially German. The Committee is further of opinion that Latin should not be made a compulsory subject in the Matriculation examination for the Faculty of Commerce of the Birmingham University.

The Committee is of opinion that there is need in Birmingham for one school at which a purely modern education should be given, where modern languages should take the chief place among the subjects taught. Such a school would make a stepping-stone to the Faculty of Commerce in the new University, and the Committee suggests that, with a view to meet this need, one of the branch Grammar Schools, preferably the Five Ways School, might be re-modelled on these lines, which probably would not entail so great a change as would at first appear.

The Committee strongly urge upon commercial and manufacturing employers of labour the necessity of requiring a definite standard of commercial knowledge in all applicants for situations. With this view it suggests that they might with advantage, when engaging boys, consult the masters of the different schools, and give preference, other things being equal, to those pupils who have shown the greatest aptitude in commercia subjects.

CURRENT GEOGRAPHICAL TOPICS.

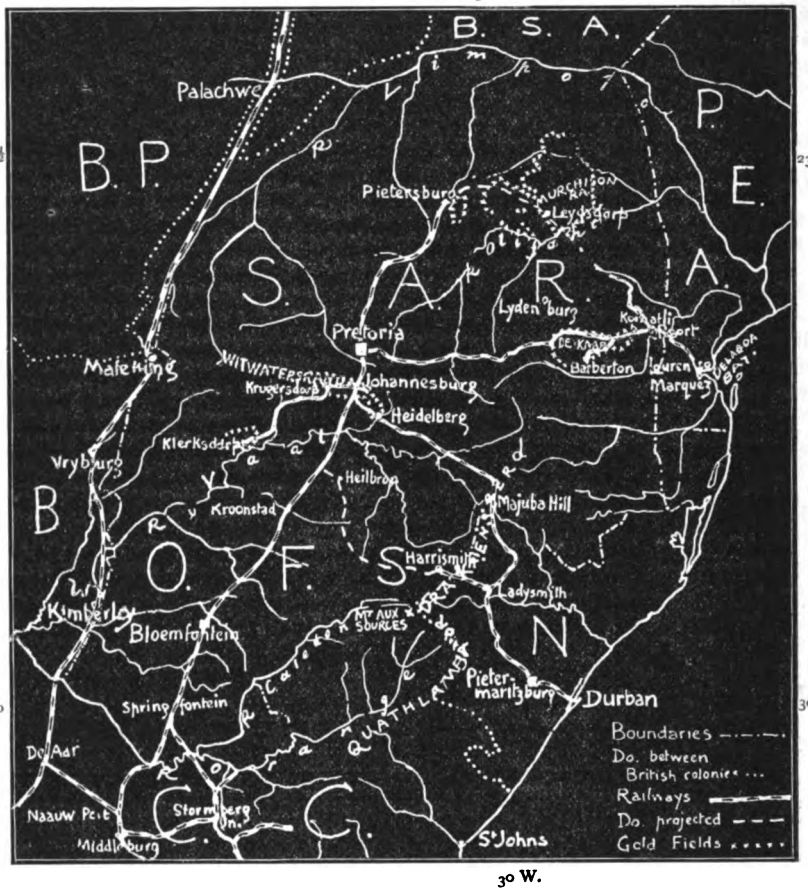
By A. J. Herbertson, Ph.D., F.R.S.E., F.R.G.S.

The Transvaal.

South Africa is a true tableland of almost horizontal rocks, which form precipitous escarpments and flat shelves. The steep escarpments, seen from below, look like mountain ridges, while seen from above they seem the edge of a rolling plain. In the region between the Orange and Limpopo, shown on the map, the rivers indicate the slope of the land. There is a great water-parting in the Quathlamba or Drakensberg mountains, not far from the east coast. Through this the rivers break only in the north, where the Limpopo and its tributary, the Olifants, have cut across it to reach the coast. South of this, the divide is rarely under 5,000 feet. Round the sources of the Orange river, the summits rise to from 10,000 to 12,000 feet. Some of these are found within 100 miles of the east coast, which is here fringed with a plain not more than 600 feet high, and from 10 to 20 miles broad.

The Drakensberg escarpment faces the south-east, the direction of the prevailing winds, which bring abundant rain in summer to the eastern slopes. Most of the important streams of South Africa rise in this region. The Orange, the Vaal, and their tributaries all flow westward in deep gorges cut in the plateau. Their beds are rocky and interrupted by falls, making them of little use for either irrigation or transport. The routes do not follow the rivers, which act as barriers rather than as means of communication. North of the Vaal, there is a slight rise in the plateau, which forms a low divide, the Hooge Veld, between the short tributaries flowing southwards to the Vaal and the long rivers flowing north to the Limpopo.

A tributary of the Limpopo rises at the western end of the Hooge Veld. The Limpopo itself, here also known as the Crocodile river, rises in the highest part, the Witwatersrand (white-water ridge), and flows in a semi-circular course to the Indian Ocean, which it enters a little north of Delagoa Bay. The lowest land north of the Vaal is found along the east coast and up the Limpopo valley. The Hooge Veld and the Drackensberg are the highest land of the Transvaal, rising in parts above 5,000 feet. This elevation is great enough to render the temperature moderate, cool in winter and not too warm in summer. The mean temperature at Pretoria (about 4,460 feet) is January, 73½° F.; July, 59° F.; year, 67° F. The air is fresh and dry, and the climate agreeable. Irrigation is necessary for successful agriculture, but the rainfall is sufficient to produce rich crops of grass, which make the Transvaal one of the best pastoral regions in the world. Lower down the rivers, more particularly on the north and east, where the rainfall is greater, tropical produce of all kinds is cultivated. The climate becomes more and more unhealthy nearer the sea-level.



30 W.

THE LAND BETWEEN THE ORANGE AND THE LIMPOPO.

Scale 1 : 10,000,000.

B. = Bechuanaland. B.P. = Bechuanaland Protectorate. B.S.A. = British South Africa Company's Territories. C.C. = Cape Colony. N. = Natal. O.F.S. = Orange Free State. P.E.A. = Portuguese East Africa. S.A.R. = South African Republic.

The mineral wealth of the country, first spoken of in the seventies, has attracted many miners since 1885. Johannesburg was founded on the famous Witwatersrand, in September, 1896. Other gold-fields, shown on the map, were discovered, but those of the Witwatersrand, popularly known as the Rand, are by far the most important.

The gold of the Witwatersrand does not occur in alluvial deposits, but in the sandy and clayey matter of a conglomerate, or banket, which forms strata from a few inches to twenty feet thick, in which it is now found pretty uniformly distributed in fine crystals or flakes, too small to be visible to the naked eye. This comparatively uniform distribution of gold in the banket is one of the chief advantages of the Rand mines. £11,500,000 worth of gold was produced in the South African Republic in 1897, of which £10,600,000 worth was obtained from the Rand.

The opening of the mines led to the development of trade and the opening of transport routes. The map shows the chief railways at present open in and around the Transvaal Delagoa Bay, East London, Port Alfred, Port Elizabeth, and Cape Town are the chief ports in direct railway communication with the Transvaal.

The area of the republic is 119,000 square miles, or almost that of the British Isles. The white population in 1890 was 120,000; in 1896, 180,000; in 1898, 245,400 (138,000 males, 107,400 females.) Natives in 1898 numbered 748,800.[1] Pretoria has a population of about 10,000 whites. In 1896 Johannesburg numbered, within three miles of its centre, 102,000 (80,000 males), of whom 51,000 were white, 1,000 Malays, 5,000 coolies and Chinese, 42,000 Kafirs, and 3,000 of mixed race. It is difficult to estimate the proportion of Outlanders in the South African Republic. They are concentrated in and around Johannesburg, where few Transvaal burghers live, but they are probably in a considerable majority of the white population.

In 1817, a band of Zulu warriors, from whom the Matabili descended, massacred most of the Kafir inhabitants of the Transvaal. In 1836, large numbers of Dutch farmers, President Kruger among them, dissatisfied with British rule at the Cape, began to "trek" across the Orange and to Natal. In 1842, after being defeated by the British, the Natal Boers, who had subdued the redoubtable Zulus, trekked across the Drakensberg to the Transvaal. The massacre of the first band of

[1] The 1890 and 1896 figures are from "Chambers's Encyclopedia." The 1898 figures are from the "Statesman's Year Book," but expressed in round numbers.

immigrants by the Matabili led to reprisals by succeeding immigrants, and the defeated Matabili crossed the Limpopo, and, after subduing the inhabitants, made Bulawayo their headquarters. The land between the Orange and the Limpopo was thus opened to settlement, and the Boers gradually occupied more and more of it.

The Transvaal Republic was recognised as independent in 1856. It was annexed by Britain in 1877, but this country did not fulfil its promise to grant internal self-government. This and other grievances led to the rising of 1881, when, after the skirmishes at Laing's Nek and Majuba Hill, the Transvaal was hurriedly and unfortunately recognised as a republic. Britain, however, retained the suzerainty and the control of foreign and native affairs. In 1884 the title South African Republic was recognised, and British control limited to foreign relations.

The Boers were and are essentially pastoral, and many of them are still semi-nomadic, moving up and down to different pastures as the seasons change. They recall the patriarchs of the Old Testament. "Brave, good-natured, hospitable, faithful to one another, generally pure in their domestic life, seldom touched by avarice or ambition" (James Bryce), such are the natural characteristics of the pastoral Boers.

Since 1885 gold seekers have rushed into the country, "mainly English—at any rate, mainly British subjects, though many of them were Jews from England, or from France and Germany, who had become naturalised British subjects" (Sir Harry Johnston). "They were miners, traders, financiers, engineers, keen, nimble-minded men, all more or less skilled in their respective crafts, all bent on gain, and most of them with that sense of irresponsibility and fondness for temporary pleasure which a chanceful and uncertain life, far from home, and relieved from the fear of public opinion, tends to produce" (James Bryce).

Naturally there is nothing in common between two such different peoples. The Boer Government tried to protect itself by excluding outlanders from a share in legislation and administration. The Boer Administration, like every other pastoral one, was not very efficient, and deteriorated with prosperity. Difficulties arose between burghers and outlanders, and the present crisis is a very modern form of the ever-recurring struggle between civilisations based on different geographical conditions and occupations.

ITEMS OF INTEREST.

GENERAL.

We have much pleasure in presenting to our readers' attention this month a new and original French play by Mrs. J. G. Frazer (Lilly Grove). The play will prove eminently suitable for the purpose of the Christmas entertainments which so commonly take place at the end of the current term. Mrs. Frazer has kindly permitted us to say that she will be pleased to make any alteration or addition to the play to suit the special requirements of teachers, and will also advise them in any way with regard to its performance. Mrs. Frazer's work is so well known that it needs no words of recommendation from us.

Sir Philip Magnus contributed an important paper to the Economic Section of the British Association, at its recent meeting, on "The Teaching University of London and the Faculty of Economics," in which he dealt in some detail with the organisation, plan, and functions of the new University, and insisted most particularly on the possible value of the faculty of economics.

A new volume by Sir Joshua Fitch, under the title of "Educational Aims and Methods," is announced by the Cambridge University Press. Its predecessor, "Lectures on Teaching," delivered in the University of Cambridge under the auspices of the Teachers' Training Syndicate, has had a large circulation in Great Britain, America and the Colonies, and has been translated into Spanish and into one of the vernacular languages of India. That book dealt in succession with the principal subjects of ordinary school instruction, and sought to elucidate the principles on which all successful teaching depends. The forthcoming volume is more miscellaneous in character, and consists of lectures and addresses given in Cambridge, or before the Teachers' Guild and other bodies of teachers in England and in America. Its general aim is to direct attention to various aspects of educational theory and of practical work; and it includes several monographs on the lives of distinguished and representative teachers.

The September meeting of the Assistant Masters' Association was held at Birmingham. The members dined together at the Great Western Hotel on the evening of September 15, and the business meeting took place on the following day, under the presidency of Mr. J. L. Norton (Bury Grammar School). The executive urged the importance of the early incorporation of the Association in a resolution moved by Messrs. A. Burrell and P. E. Swinstead. Mr. F. O. Lane, the honorary secretary of the local branch, advocated the desirability of the insertion of degrees and educational diplomas in the next members' list as likely to facilitate the formation of a register of teachers. The following papers were read and discussed:—On "Tenure of Office in Endowed Schools," by Mr. O. G. Pickford; "The necessity for the inclusion of persons qualified to represent the views of assistant masters on the Consultative Committee to be formed under the new Act," by Mr. Fabian Ware; on "Pensions," by Mr. G. F. Bridge; and on "Inspection," by Mr. P. E. Swinstead. We are glad to observe the increase in the membership and the growth in importance of this very necessary association.

Among numerous resolutions adopted at the September meeting of the Assistant Masters' Association the following are of general interest:—(1) "That the appointment and dismissal of assistant masters should always be subject to confirmation by the governing body, with a right of appeal on the part of the assistant masters before the dismissal is confirmed." (2) "That among the members of the Consultative Committee should be persons qualified to represent the views of assistant masters." (3) "That this meeting, having in view the inadequate remuneration given to assistant masters in public secondary schools, and also the fact that they are engaged in the public service, considers that such assistant masters have a just claim to a pension scheme assisted by public money." (4) "That any pension scheme to be satisfactory must be based on the principle of the formation of a central fund by the compulsory contributions of governing bodies and assistant masters." (5) "That this meeting is of opinion that in secondary schools inspection should be compulsory, that the cost should be borne by the Board of Education, and that the inspectors should have had at least five years' recent experience in those schools."

In the July examinations this year for certificates of the Oxford and Cambridge Schools Examination Board 2140 candidates presented themselves for higher certificates (but of this total 454 were girls who were candidates for letters only), and 1201 were successful. The subjects most frequently offered by candidates were Mathematics (1824), Scripture Knowledge (1374), Latin (1358), History (1281), French (1257), and Greek (1189). The total number of candidates examined for lower certificates was 962, of whom 533 were awarded certificates.

Arithmetic (960) and French (954) were the most popular subjects in this section, being followed by additional Mathematics (908), Scripture Knowledge (733), and Latin (698). Only 38 offered Geometrical Drawing, and 55 Mechanics with Physics.

The results of this year's examination by the University of St. Andrews for the L.L.A. diploma have been issued, from which it appears that 959 candidates entered for examination at 77 centres, as compared with 950 at 74 centres in 1898. 127 candidates have this year completed the requisite number of subjects, and will in due course be entitled to use the letters L.L.A. Taking a joint view of all the subjects in which candidates entered, 1528 papers were written, passes were obtained in 886 instances, and honours in 247. The centres of examinations were not confined to Great Britain and Ireland. Candidates were also examined locally in France, Germany, Belgium, Switzerland, Roumania, Natal, Cape Colony, Victoria, and the United States of America.

French holiday courses will be held again at the University of Caen in August, 1900. The courses will be open to ladies and gentlemen of any profession, although chiefly intended for teachers. All instruction will be given in the French language. M. Roussot, Professor at the Lycée Condorcet, Paris, late student of the Higher Normal School, Agrégé des Lettres, will give a series of lectures on "French Fiction." M. Prentout, Professor at the Lycée Malherbe, Caen, Agrégé d'Histoire, will lecture on "Napoleon." M. Lebonnois, Professor at the Lycée Malherbe, Agrégé de l'Université, will lecture on "France, Social and Political Life, Art and Literature." Extra lectures will be given by Professors of the University. Classes will also be held for practice in reading and conversation. To secure the diploma of Degré Elémentaire students will be required to pass in dictation and to maintain correctly a conversation of about ten minutes. Degré Supérieur—French essay 1½ hours, reproduction in writing of piece read, reading aloud from French author, conversation. The authors to be read for the Degré Supérieur are:—Mme. de Sevigné—"Lettres Choisis," Edit. Marcou (Garnier, 1 fr. 5 c.); Racine—"Britannicus," Edit. Anthoine (Hachette, 1 fr. 2 c.); Molière — "Femmes Savantes"; Bernardin— "Morceaux-choisis," 19me siècle (Delagrave, 2 fr. 25 c).

In order to make proper provision for the special training of teachers (both for those who enter the Day Training College with a view to work in primary schools and also for those who intend to teach in secondary schools), the council of the Owens College, Manchester, has recently instituted a Professorship of the Theory, Art, and Practice of Education. The professor will have a seat on the Senate of the college and on the Board of Studies of the Victoria University. An assistant and the Mistress of Method in the Women's College will be associated with the professor in the work of the department. The new chair has been offered to and accepted by Mr. H. L. Withers, now Principal of the Borough-road Training College at Isleworth.

A new college for the training of teachers for elementary schools was opened last month. We refer to Kennington (St. Gabriel's) College, at the head of which is Miss Bishop, late Principal of the Royal Holloway College. St. Gabriel's College is under Government inspection, and is subject to the Regulations respecting Training Colleges issued by the Education Department. It opened in temporary premises (154, Denmark Hill, S.E.) with about thirty first-year students. Meantime, the permanent building is in process of erection on a site in Camberwell, overlooking Myatt's Fields (one of the County Council's parks), so that it will always have the advantage of an open space of some fourteen acres in front of it. It will provide ample accommodation for eighty resident and eighty day students, and, it is hoped, will be ready for occupation by September, 1900. The college authorities desire to call special attention to the good opening for professional work, and the great opportunity for usefulness which elementary teaching offers to young women of high school or university education, as well as to the increased facilities for entering the profession which recent regulations of the Education Department provide.

The Technical Education Committee of the London County Council have arranged for Saturday morning classes for teachers at King's College, London, during the forthcoming winter. Among these we notice (i.) a course of about ten lectures on the "Teaching of Elementary Mathematics," by Professor Hudson, to be held on alternate Saturdays at 10 a.m., beginning on October 8th; (ii.) a course of Physics, under the direction of Professor W. Grylls Adams, F.R.S., which begins on October 14th, and (iii.) a series of twenty lectures on Physiology, by Professor Halliburton, F.R.S., also beginning on October 14th. Teachers can also study Experimental Applied Mechanics, under Professor Hudson Beare, at University College, on the Saturday mornings of October, November and December. These demonstrations will commence on October 14th, at 10.30 a.m. A course of Physiology, for women teachers only, will be delivered by Dr. Edkins at Bedford College. Intending students for any of these lectures should communicate with the various professors at the colleges mentioned.

It is often contended that the Welsh Intermediate Education Act made it possible for the establishment of far too many County Schools. Yet, in spite of the fact that the Act has now been in operation for about six years, and that educationists have had the opportunity of forming an opinion upon the point, schools continue to be built in comparatively out-of-the-way districts, and, so far, appear to show signs of vigorous life. In almost all such cases, however, it has been found necessary, for reasons of finance, as well as of organisation, to combine the girls' and boys' departments and work the schools as mixed schools. Hence the problem of mixed education is from sheer force of circumstances rapidly solving itself in Wales; and, if it is possible to judge within so short a space of time, the solution bids fair to be a simple and satisfactory one.

It is, therefore, somewhat surprising to find that the Governors of the Llanrwst School, contrary to the advice of the Headmaster and Professor Lloyd, the governor representing the University College of North Wales, contemplate separating the boys from the girls and maintaining two distinct schools. Boys and girls together number from seventy to eighty. It is nothing less than waste of money and opportunities to have two separate buildings and maintain two inadequate staffs of teachers.

Great interest has been shown in the results of the Central Welsh Board's first examination for Junior and Senior Leaving Certificates. The Headmasters have, with but few exceptions, welcomed them as ultimate relief from the multiplicity of outside examinations. The Senior Leaving Certificate is not only accepted by the various bodies in lieu of their "Preliminaries," but also by the University of Wales in place of Matriculation. On the whole, it has this year been felt that the Central Board Examination was more difficult than that of the University. Indeed, there are strong complaints against the mathematical papers, which were unreasonably long and difficult, particularly in the higher stages. It is to be hoped that the Central Board will make an effort to have the Certificate results out earlier in future. At present the results are not published until September 29th. Consequently, when term begins, pupils who have been candidates for the equivalent certificate to Matriculation are unable to decide whether to proceed to college or remain at school another year.

Professor Nicholas Butler, of Columbia University, in a report presented to the National Council of Education, during their summer conference at Los Angeles, California, dealing with the "Educational Progress of the Year," referred to what had happened in England during the academic year 1898-99. "One cannot help being struck," he said, "by the fact that the long-delayed awakening of England to her educational duty and her educational opportunity is an accomplished fact." Professor Butler then proceeded to refer to the publication of Mr. Graham Balfour's "Educational Systems of Great Britain and Ireland," which we this month review; the revival of the *Educational Review*, and the appearance of The School World and the *Paidologist*.

The Civil Service Commissioners have announced an open competitive examination for not fewer than twenty-four situations as Assistant Surveyor of Taxes in the Inland Revenue Department. The examination will be held in London, Edinburgh, and Dublin, commencing October 31st, 1899. The limits of age for this situation are 19 and 22, and candidates must be of the prescribed age on the first day of the examination. The examination will be in the following subjects:—Arithmetic, English composition, including orthography and handwriting; geography; book-keeping by double entry; translation from and into *any one* of the following languages, viz., French, German, or Latin; Euclid, Books I. to IV., and VI.; algebra; and political economy. The salary of an Assistant Surveyor is £100 a year, rising by annual increments of £10 to £180. On being appointed Surveyor this increases to £200, and there is a prospect of the salary rising to £600. Application forms, to be obtained from the Secretary, Civil Service Commission, London, S.W., must be returned to him on or before October 12th, 1899.

In an interesting monograph entitled "Conduct and the Weather," by Professor Dexter, published in *The Psychological Review*, some remarkable results are given of an extensive series of investigations into the mental effects of definite meteorological conditions. Amongst an abundance of conclusions we notice some of wide-spread interest. In climates similar to that of New York the deportment and work of public-school boys and girls are generally found to be at their best on cold, calm and clear days. There is the greatest unanimity in considering the work and behaviour best on clear days. On muggy days both conduct and diligence are at their worst, and hot and windy days also show bad results. Boys are influenced more than girls by the weather conditions, at least by heat, cold and wind. A fact worthy of note, too, is the increased bad effect of heat upon the production of mechanical work, over its effect upon behaviour or mental work. Since a muggy day is hardly known in places like Colorado, the teachers there, if Professor Dexter's results are of universal application, are to be sincerely congratulated.

The effect of making "Object Lessons" obligatory in the three lower standards of Elementary Schools since September, 1896, has resulted in a marked progress in the share taken by science in primary education. The full effect of the change has hardly yet appeared, as is pointed out by the British Asssociation Committee concerned with the collection of information on the subject in their last report. It will be remembered that for eight years preceding the Code of 1890 English was obligatory as a "class subject," if any such subject was taken in the school. The placing it merely on a level with the other subjects had the effect of reducing the number of departments in which English was taken from 20,304 in 1889-90 to 19,825 in 1890-91, while in the same years the number of departments taking elementary science rose from the almost nominal figure of 32 to 173. The table shows the increase from that time onwards:

Class Subjects—Departments.	1891-92	1892-93	1893-94	1894-95	1895-96	1896-97	1897-98
English	18,175	17,394	17,032	16,280	15,327	14,286	13,456
Geography	13,485	14,256	15,230	15,702	16,171	16,646	17,049
Elementary Science	788	1,073	1,215	1,712	2,237	2,617	2,143
Object Lessons ..	—	—	—	—	1,079	8,321	21,882

Messrs. Philip Harris and Company, of Edmund Street, Birmingham, have recently published a handy little pocket-diary containing a valuable series of tables of useful physical constants, and just those chemical data which are continually required in laboratories. It will prove of the greatest service to science masters.

FOREIGN.

In many schools erected in Philadelphia prior to 1870 no provision whatever has been made for ventilation, which can only be effected by lowering the upper window-sashes. So writes Mr. John Gormley in a recent report to the American Society of Heating and Ventilating Engineers. Commenting upon the report, *The Builder* says:—"This seems to be a general practice in Philadelphia, where there is a law compelling attendance, but none compelling ventilation. Where fan systems are used, from 24 to 30 cubic feet of air are supplied per pupil per minute, and with ordinary indirect steam and hot air plants 10 cubic feet of air are given per pupil per minute. As the quantity of fresh air necessary to keep down the proportion of CO_2 to 8 parts per 10,000 is 33 cubic feet per head per minute, none of these systems can be said to err on the side of safety." In fan-heated schools, where modern apparatus has been installed, much more satisfactory results are found to be achieved, and it would therefore appear that managing bodies, rather than ventilating engineers, are to be blamed for the unsatisfactory state of things at present exisiting.

Mr. James C. Boykin, of the Washington Bureau of Education, gives, in a paper entitled "Women in the Public Schools," in the September number of the New York *Educational Review*, some interesting statistics which strikingly demonstrate the remarkable increase in the number of women teachers in the United States. St. Louis had one man and one woman teacher at the inception of its school system in 1837. There were five men and five women in 1844, and by 1858 the men had increased to twenty and the women to one hundred and eight. In Cincinnati there were twenty-one men and thirty-eight women in the schools in 1840, and thirty-four men and one hundred and eight women in 1850. And these cities are typical. Women principals, too, are now very commonly appointed. In Wilmington, Minneapolis, and some other cities there are no men whatever in the elementary schools; in Atlanta there is one male grammar-school principal only; in Grand Rapids there are four male principals and twenty-nine women; Louisville has nineteen women principals and ten men; and there are thirty-eight women to eleven men in charge of the schools of Cleveland. In none of these cities is there a single male assistant.

The movement for commercial education in Denmark, though on a small scale, may be said to be well advanced in proportion to the extent of the population. The increasing trade of the country has necessarily offered a greater opening to commercial employment, and by raising the numbers has thereby raised the standard of education required for the various commercial clerks. Although the Government has for some years contributed in a small way to the support of commercial schools in the provinces, it is only of late years that a subvention has been granted to schools in the capital. The success which has attended the movement is shown by the fact that it is now proposed to make a further increase in the amount granted, and there is no doubt that this proposal will meet with approval.

The stipend of masters in the commercial schools of Switzerland varies according to the number of hours they are engaged in teaching weekly, the highest being between 200*l.* to 240*l.* a year at the school at Bâle. After ten years an additional 16*l.* is allowed, and after fifteen years 20*l.* in the case of teachers employed during twenty or more hours weekly; employment during more than twelve but less than twenty hours a week, entitles them to half the bonus, while the maximum yearly pension that can be obtained is 180*l.* Though varying at different schools, there is no great disparity of treatment as regards salaries and pensions.

There is certainly no commercial school in the United Kingdom which can compare with the higher commercial school in Tokio for comprehensiveness and minuteness of programme, but though the programme is splendid it strikes an observer as being too theoretical. In the make-believe way of practising the methods and forms of Western business it is impossible to practise common sense, judgment, patience, readiness to risk, and other essentials of actual business. Japanese remain at school much longer than boys at home, and the visitor to the school cannot fail to remark the advanced age of the students, the majority of whom are over twenty-three.

Commercial teachers in Austria are divided into four groups: those who give instruction in commercial subjects, in "human science," in natural science, and in modern languages. All such teachers must be specialists in their different branches, and in order to create an efficient teaching staff three categories of examinations were introduced. The first examination embraces purely commercial subjects—that is to say, book-keeping, correspondence, mercantile arithmetic, political arithmetic, commercial knowledge in its widest sense, study of economy. The second examination embraces subjects such as commercial geography, waarenkunde (knowledge of goods), with chemical and mechanical technology, natural history, physics and chemistry, in so far as they were necessary to a knowledge of waarenkunde. The third examination embraces modern languages. The fundamental principle was established that no modern-language teacher should be allowed to teach at a commercial school unless he had spent some time in the country whose language he proposed to teach, and therefore could talk and write that language perfectly.

Commercial education first struck firm root in Austria by the foundation of commercial academies in Prague in 1856, and in Vienna in 1857. This was followed by the foundation six years later of a private commercial academy in Gratz in 1863. Previous to this various commercial schools had been started at different times in different parts of the country, such as those at Laibach in 1834, and that started at by Patzelt 1840. But tradespeople were forced to send their sons to the higher commercial schools in Leipzig in order to learn modern languages, since in Austria these languages were often taught by wholly uneducated masters.

The Governor of Victoria has appointed a Commission to inquire into the administration of the Mining and Agricultural, and also the Trades and Art Schools of the Colony, and to report as to the best method of carrying on the work of technical instruction in connection with such schools; to consider and report upon the question of the affiliation of the Mining Schools with the University of Melbourne; to report as to the adoption in the State Schools of a system of instruction in the elements of the sciences pertaining to mining, agricultural, dairying and manufacturing pursuits; and generally to recommend what means should be adopted for the better provision of a systematic and graduated course of technical instruction.

CURRENT HISTORY.

"Stonehenge for sale!" The announcement sends our thoughts back to the beginnings of things. The ancient circle, now but a fragment of what it once was, has been the puzzle and despair of antiquarians. Certainly it is not English, any more than its neighbour, the mounds of Old Sarum. But who built it, and when, is more than anyone can say. It is generally attributed to "the Druids," but engineering considerations make the date doubtful. A fanciful hypothesis, put forward a few years ago, postulated a revival of Druidism to combat a growing Christianity of the Roman period; a revival somewhat similar, we suppose, to that of Neo-platonism in Alexandria about the same time, whose high-prophetess was Hypatia, and the story of which we may see somewhat fancifully pictured in Kingsley's novel of that name. According to this theory, it was Roman engineering that erected the Druid temple. But we *know* nothing.

"Stonehenge for sale!" Then it is private property. How strange that seems, at least to the mind innocently ignorant of English law. We remember still the shock it gave us when we first learnt that Snowdon belonged to "a Mr. Smith," but we had it rubbed into us when the owner built the railway up the mountain. Who owns the Matterhorn? or Mont Blanc? They belong to somebody, we suppose, and so do the glaciers. Nay, not long ago, there was a skit published which professed that the University of Cambridge had been purchased by a syndicate that were issuing shares in their newly-formed company to acquire "that old-established and flourishing concern." And what would happen, we wonder, if one person bought up the Isle of Man, for example, and then gave everyone notice to quit? We suppose the Government would legally have to enforce the notice. But we stop here on the threshold of the subject of the difference between ownership and sovereignty.

The West Indies have occupied much attention lately. They seem in general to be in a bad way. That which was formerly their main industry—the growth of cane sugar—is now more than threatened with much disaster. Not only do hurricanes destroy their crops, their warehouses and their dwellings—that is an old evil from which no wit of man can save them—but the economic conditions of the world have changed to their disadvantage. European nations are determined to produce their own sugar, and as they cannot grow cane for this purpose, but only beet, and as the beet cannot produce sugar so cheaply as the cane, France, Germany and other states have encouraged the new industry with bounties, so as to place beet sugar on the markets of neutral countries, such as England, at a lower rate than the sugar which comes from the West Indies.

Thus our British West Indian islanders are saying that while Englishmen are getting their sugar cheaper, and English confectioners are making fortunes, *they* are being ruined. Palliatives of various kinds are being tried, such as subsidies in aid, Mansion House Funds, endeavours after new industries. Let us hope that want of wisdom will not hinder a *permanent* improvement in the West Indian archipelago. England-Britain, has fought much to gain possession of these tropical lands. Jamaica was won for us by Oliver Cromwell, our first colonial *conquest*. All through the eighteenth century, *i.e.*, through our second Hundred Years' War with France (and Spain), the possession of the West India Islands was always in dispute. Whenever we destroyed the French fleet, our own followed up its success by going round the islands and receiving their surrender—a good example of the virtues of naval power. It was in the war of the French Revolution that we finally came into possession of most of our acquisitions in that neighbourhood. And now, what were the "jewels of the British crown" are coming to be a burden. Such is the fate of empire!

THE SCHOOL PULPIT.

The Sacredness of Work.[1]

"My Father worketh hitherto, and I work."

IN one short year of work, Jesus has changed the world. Let us consider what he did to make so great a change. He went about doing good and preaching the Gospel of Love. The care of His servants who were with Him, and who heard the gracious words that proceeded out of His mouth, has preserved to us some account of that wonderful year in which the only begotten Son showed forth His glory, that men might have life—life like the stream of living water, springing up, abounding, overflowing unto life eternal.

Christ's was no life of soft luxury in kings' palaces: no brilliant commanding of well-trained soldiers, to whom one need but say, "Do this," and they do it. Nor did He tickle the world's ears, and move its heart with volumes of divine poetry, with the praise of noble deeds, with the enchanting songs of life. Yet He is the greatest of all poets, the first of captains, and the King of Kings.

Above all, the Christ was a man of action. *Work* was His watchword from beginning to end of His ministry.

. . . . . .

Love is the mainspring of all Christ's works. That love He would have us imitate. Love is the fulfilling of the law, that which glorifies regulations into a perfect rule of life. It is all very well to lay down a set of things which one must not do. But merely to avoid doing what one ought not would be a very colourless kind of goodness. Jesus adds one little commandment: little, and yet the greatest of all—the one thing which His disciples must bear in mind every moment—three words which give us a world of work to do—"Love one another." Now the law is complete and fulfilled. Try it in your school life, and you will feel the difference. The law says you must do so much work: you do it, and so satisfy the law. But to fulfil the law, and to be like Jesus, you must love that work also. It is worthy of your love: and so are all your fellow men, since Jesus has counted them worthy of His love. Without that love we might know all languages, science, mathematics, arts, and wisdom of every kind, and yet be mere instruments, with no more human soul than a silent organ or a locked piano. But if we have this knowledge and love also, then by God's grace the music may come out in our lives. An excellent authority has said, "The more wisdom, the more charity." Yet it is not wisdom, though her price be above rubies, but rather love, that covereth a multitude of sins. Without love one is a mere person, a mask for a man, a soulless machine. Martyrdom will not make a saint of him who has not love. And these are the counsels of love—be patient; make the best of things; be kind; envy no one; be humble; be respectful; not self-seeking, not sharp-tempered, not coldly calculating on the evil that others will do, not glad to see the evil done that you may be a spectator of the punishment—be glad rather when right prevails. Let there be no end of your endurance, your faith, your hope, your patience. And of the three heavenly gifts, Faith, Hope, and Love, the greatest of these is love.

. . . . . .

The greatest object of your lives must therefore be to imitate this Lord Jesus, who is our Christ and our God. All His works were done for the good of the whole world, including you. Each one of you will be able to think out for himself hundreds of little things which he can do for love's sake: little everyday kindnesses he can show—not only because a gentleman must be polite, but for the far better reason that Jesus has left us His example. In choosing this text about the works of our blessed Lord, I was thinking of your school work too. I have tried to give you the outlines of His preaching, His miracles and His suffering, because these are the works He refers to in the text. The details of the picture you fill in yourselves whenever you read the Gospels. But though it is the most beautiful picture that any art can make, the picture in a boy's mind of the Son of God, yet be very careful that it is something more than a picture to you. You have to build up your lives, to regulate your life's work, after the model of that perfect life. You must have that same ceaseless activity in doing your duty, that same "straightway" feeling about everything. Every hour must be spent to the best advantage—there is no "slacking" in the Kingdom of God.

God is still working in the beautiful world around you. Plants, animals, stones, the sun, moon, and stars, are still being built up by His will and His eternal wisdom. Each new leaf and each new tree, each butterfly or ant, in short, each created thing, is created a little different from the parent plant or animal. Each is a little better suited to its surroundings. Kinds of plants or animals that are no longer wanted gradually die out and become, as naturalists say, extinct; while new sorts grow up where they *are* wanted, to fill up blanks in God's scheme of nature. So that with all this perpetual change, this evolution, going on day by day, to-day is a day of creation, just as much as that on which God began his work and said, "Let there be light." And God's Son is working still, still working in men's hearts—working with those words of truth and grace spoken in Galilee eighteen centuries ago—working with the story of the nailed hands and of the pierced side—working with the blessing He still pours down from heaven on those who learn of Him—working till one day men shall be made like Him, and there shall be no more sorrow, no more weeping, no more pain. Your work, too, is set before you every day: not an enemy to conquer, but a duty to be loved, and an opportunity to imitate Jesus your Master. Let us, therefore, work while it is day, for the night cometh in which no man can work.

[1] From a sermon preached by Mr. E. W. W. Bowell, Assistant Master in Mostyn House School, Parkgate, Cheshire.

JUNIOR CAMBRIDGE LOCAL EXAMINATION, DECEMBER, 1899.

Monthly Test Papers.—No. II.

ARRANGEMENTS have been made for three sets of test-papers in each of the subjects dealt with below. Copies of papers in any of the subjects can be obtained in a form suitable for distribution in class post free at a cost of sixpence net per packet of twenty-five, on application to the Editors of THE SCHOOL WORLD. Heads of schools who would care to avail themselves of the scheme outlined in our August issue—by which the standard of knowledge attained in those of their forms preparing for the Junior Cambridge Local Examination can be tested by outside examiners—should communicate with the Editors.

English History—449-1509 A.D.

(1154-1327 *A.D.*)

(1) Draw a rough map, fairly covering a sheet of paper, of the dominions of Henry II. State (*a*) how he acquired each of the territories which you insert on your map, (*b*) which of them were in the possession of Edward I.

(2) Tell the story of *one* of the following events:—

(*a*) The so-called "conquest of Ireland by Henry II."

(*b*) The struggle for the Charter in John's reign.

(*c*) The Barons' War in the reign of Henry III.

(*d*) Edward I.'s "conquest of Wales."

(*e*) The relations between England and Scotland from the death of the Maid of Norway to the death of Edward II.

(3) Write brief biographies of two of the following persons, selecting *one* from (*a*) and *one* from (*b*), but not going over the same ground as in your answer to Q. 2 :—

(*a*) Hubert de Burgh, Piers Gaveston, Simon de Montfort, Thomas of Lancaster.

(*b*) Becket, Grosseteste, Langton, Winchelsey.

(4) In what ways did Henry II. reform the methods of maintaining order and administering justice in England?

(5) Which of the kings reigning during this period do you consider to have done most good for England? Give reasons for your choice.

(6) Show that you know something about the occasion and contents of the following constitutional documents :—*Confirmatio Cartarum*, the *Mise of Amiens*, the *Ordinances of* 1310, the *Provisions of Oxford*, the *Treaty of Falaise*.

Take these in chronological order, giving dates where possible.

Geography.

(*Europe.*)

(1) Draw a map of the Baltic Sea, marking the chief ports. State what is the trade of each Compare the Baltic, the Mediterranean and the Black Sea as regards saltness.

(2) What do you know of the following :—Hook of Holland, Chillon, Rennes, Canea, Hammerfest, Baku, Stromboli, Kronstadt, the Y, Wieliczka?

(3) Which are the highest, and which the lowest parts of Europe? Make a section of Europe along the 45th parallel of latitude.

(4) Draw a map of (*a*) the Rhine or (*b*) the Rhone.

(5) Describe a journey from London to Zurich.

(6) In what parts of Europe are the following found in large quantities :—pumice stone, olives, marble, grapes, timber? What are the principal manufactures of France, Switzerland, Holland?

Latin.

CÆSAR.—BOOK IV. (Ch. XX.-XXXVIII.

(1) Translate

(*a*) Ch. XXII. Hoc sibi Cæsar . . . distribuit.

(*b*) Ch. XXVI. Pugnatum est . . . subsidia submittebat.

(*c*) Ch. XXXII. Cum paulo longius . . . circumdederant.

(*d*) Ch. XXXIV. Quo facto . . . a pugna prohiberent.

(2) Translate, explaining the tense and mood of each verb in italics :

(*a*) Ad eum legati veniunt qui *polliceantur* obsides dare.

(*b*) Huic imperat, quas *possit*, *adeat* civitates seque eo *venturum nuntiet*.

(*c*) Dum reliquæ naves eo *convenirent*, ad horam nonam expectavit.

(*d*) Quæ *imperasset* facturos polliciti sunt.

(*e*) Barbari suis demonstraverunt quanta in perpetuum sui liberandi facultas *daretur*, si Romanos castris expulissent.

(3) Give the English for—septentriones ; essedarii ; aquila ; cratoris modo ; adversa nocte ; turma ; supplicatio ; ad nutum ; ex arido ; paulum modo.

(4) Describe in your own words Cæsar's landing in Britain, and give a brief account of the campaign.

VERGIL'S ÆNEID.—BOOK II. (Ll. 250-505.)

(1) Translate :

(*a*) Ll. 268-279. Tempus erat . . . accepit patrios.

(*b*) Ll. 376-385. Dixit . . . fortuna labori.

(*c*) Ll. 453-466. Limen erat . . . late incidit.

(2) Translate and, where necessary, add notes :

Per amica silentia lunæ ; tum vero manifesta fides ; nec sat rationis in armis ; pulchrum mori succurrit in armis ; angusta viarum ; insultans incendia miscet ; qua prima fortuna ostendit se dextra ; Androgei galeam induitur ; vadimus haud numine nostro ; ardentia lumina ; ora sono discordia signant ; iustissimus unus ; linguis micat ore trisulcis.

(3) Write notes upon the grammatical construction of—

(*a*) Per pedes traiectus lora tumentes.

(*b*) Sensit medios delapsus in hostes.

(*c*) Danai gemitu atque ereptæ virginis ira undique collecti invadunt.

(4) Parse, and give the principal parts of—expectate ; festinate ; conserimus ; parietibus ; labentem ; pastus ; ferit ; bipenni ; pas-is ; delubri.

(5) Give the English for—vittæ ; vitæ ; ædes (sing) ; ædes (plur) ; vim ; vires ; infula ; mucrone ; bruma ; fastigia.

(6) Translate, and explain the figure of speech which each of the following sentences illustrates—

(*a*) Moriamur, et in media arma ruamus.

(*b*) Exsultat, telis et luce coruscus æna.

(*c*) Inclusos utero Danaos et pinea furtim Laxat claustra Sinon.

French.

(1) Translate into English :—

La terre et le bois sont les premières matières travaillées par l'homme, celles qui semblaient plus particulièrement destinées à son usage. Ce sont, comme les animaux domestiques, des accessoires obligés de sa vie : aussi y a-t-il entre eux et nous des rapports plus intimes. La pierre, les métaux demandent de longues préparations ; ils résistent à notre action immédiate, et appartiennent moins à l'homme qu'aux sociétes ; le bois et la terre sont, au contraire, les instruments premiers de l'être isolé qui veut se nourrir ou s'abriter.

(2) Give the feminine of—taureau, eux, ils sont paresseux, and the plural of—grand-père, facsimile, quart d'heure.

(3) What are the chief rules as to the agreement of a past participle with a nominative?

Put into French :—

(*a*) She has gone to Paris.

(*b*) All the books I have lent you are very interesting.

(*c*) Have you ever seen such beautiful lilies?

(4) Write in full the present indicative of *faire*, the imperfect subjunctive of *finir* and the future of *voir*.

(5) Show by examples in what cases disjunctive pronouns are used, and give a list of them.

(6) Illustrate by sentences the difference between—*devant* and *avant*, *aussi* and *si*, *mauvais* and *mal*, *ou* and *où*.

(7) Translate into French :—

When the Battle of the Boyne was lost, the French alone retreated in good order. James II.'s precautions for escape were perfectly successful ; he went off under the protection of a regiment of cavalry and fled, as fast as fear could carry him, to Dublin. He endeavoured to throw the blame of the defeat on the brave Irish. As he reached the castle of Dublin, and as Lady Tyrconnell advanced to meet him, he said to her, "Your countrymen, madam, can run very quick." She replied, "Your Majesty excels them in this, as in everything else ; you were here the first."

(8) For those only who offer "La Fortune de D'Artagnan" (chaps. v.-viii.).

(*a*) Translate : (1) p. 41, ll. 17-24 ; (2) p. 57, ll. 15-24 ; (3) p. 77, ll. 23-32.

(*b*) Write notes on—je vous reconnais bien là ; les croupions et les décharnés ; sur les galères ; en vouloir pour cela à mes camarades.

(9) For those only who offer "Charlotte Corday" (ll. 809-1553).

(*a*) Translate : (1) ll. 827-836 ; (2) ll. 1108-1119 ; (3) ll. 1484-1499.

(*b*) Write notes on—j'ai hâte de la voir ; l'étoile du berger ; Les Pitt et les Cobourg ; je n'y puis tenir.

Mathematics

ARITHMETIC

(*Including Proportion, Simple Interest and Square Root.*)

(1) A terrace contains fifteen houses, each house has two front bay windows ; each window has four panes of glass each containing five square feet of glass and two panes each containing nine square feet of glass : how many square feet of glass are there in all the bay windows of the terrace?

(2) Reduce to its simplest form

$$16\tfrac{1}{8} - (3\tfrac{1}{7} + 1\tfrac{5}{21}) \div 3\tfrac{2}{7}.$$

(3) Find the cost of making 25 miles 3 fur. 15 po. of tramway at £2,762 10s. per mile.

(4) Simplify

$$(3{\cdot}621 + {\cdot}24 + 2{\cdot}4756 - 1{\cdot}4226) \div {\cdot}0117.$$

(5) Find the value of a carpet 5 metres 25 centimetres long and 4 metres 15 centimetres wide, if one square metre costs 6 francs 33 centimes (the answer to be correct to the nearest centime).

(6) Find the simple interest on £348 8s. 9d. for $1\frac{4}{5}$ years at $2\frac{1}{2}$ per cent. per annum.

(7) Find the square root of 7·0523 to six places of decimals.

(8) What is the value of 2 ozs. 16 dwts. 21 grs. of gold, it being estimated that 1 oz. 14 dwts. 3 grs. costs £4 4s.?

Answers:

(1) 1140 sq. ft. (2) 15. (3) £70,227 18s. $7\frac{1}{2}$d. (4) 420. (5) 137 francs 91 centimes. (6) £14 12s. $8\frac{1}{2}$d. (7) 2·655621. (8) £7.

ALGEBRA.

(Including Square Root and Quadratic Equations.)

(1) Prove that $(a-b)c = ac - bc$, where a, b and c are positive integers of which a is greater than b.

Simplify

$$b(c-3a) - c(a-3b) - a(3b-c)$$

(2) Divide $(2x-y+z)^2-(x+3y-z)^2$ by $3x+2y$.

(3) If $a+b=c$, show that

$$a^3+b^3+c^3 - (a+b)(b+c)(c+a) + 4abc = 0.$$

(4) Find the least common multiple of

$$5a^2b(a-2b),\ 15ab(a^2-4b^2) \text{ and } 18ab^2(a+2b).$$

(5) Simplify

$$\left(\frac{\frac{x}{y}+5}{\frac{x}{y}-3} - \frac{y}{x}\right) \div \left(\frac{\frac{x}{y}-5}{\frac{x}{y}+3} + \frac{y}{x}\right)$$

6) Solve the equations:

(i.) $10 + 3(x-1)(x+5) = 7+3(x-4)^2$;

(ii.) $y=4(x-3)$
$5x=2y+15$;

(iii.) $3 - \frac{4}{x+5} = \frac{40}{x^2-25} - \frac{3}{5-x}$;

(7) A dealer buys two pictures; the first he sells at a profit of £6 and the second for one-fifth more than its cost price: if his total gain be one-third of what he gave for the pictures, and the first picture cost originally twice as much as the second, what are the selling prices of the pictures?

(8) Obtain the square root of

$$x^2 + \frac{1}{x^2} - 4\left(x - \frac{1}{x}\right) + 2.$$

Answers:

(1) $2b(2c-3a)$. (2) $x-4y+2z$. (4) $90a^2b^2(a^2-4b^2)$. (5) $\frac{x+y}{x-y} \cdot \left(\frac{x+3y}{x-3y}\right)^2$. (6) (i.) $1\frac{2}{3}$; (ii.) $x=3$, $y=0$; (iii.) $7\frac{1}{3}$, or -5. (7) £21, £9. (8) $x - 2 - \frac{1}{x}$.

EUCLID.

(Book I.)

(1) Define a right angle, an isosceles triangle, a rectangle.

(2) The angles at the base of an isosceles triangle are equal, and if the equal sides be produced the angles on the other side of the base are equal.

(3) If from the extremities of the base of a triangle two straight lines be drawn to a point within the triangle, these two straight lines shall be together less than the sides of the triangle but shall contain a greater angle.

(4) If a straight line fall across two other straight lines so as to make the exterior angle equal to the interior and opposite angle on the same side, or the two interior angles on the same side together equal to two right angles, these two straight lines shall be parallel.

(5) To a given straight line apply a parallelogram equal in area to a given triangle and having one of its angles equal to a given angle.

(6) In a right-angled triangle in which one of the angles adjacent to the hypotenuse is twice the other angle, show that the straight line joining the right angle to the middle point of the base is one of the trisectors of the right angle.

(7) ABC is any triangle, and P is any point in AB; find a point Q in BC such that the triangle PQC equals in area the triangle PAC.

(8) Describe a triangle equal in area to a given triangle, and having one of its angles equal to a given angle and one of the sides containing this angle equal to a given straight line.

Theoretical Chemistry.

(1) Give three methods of preparing carbon dioxide, and describe tests for it. Explain why carbon dioxide is called an *anhydride*.

(2) What do you understand by a *salt*? Illustrate your answer by a reference to the action of nitric acid upon copper, tin, caustic potash, and ammonia.

(3) How many cubic centimetres of nitrogen monoxide (measured at 0° C and 760 mm. pressure) can be obtained from 10 grams of ammonium nitrate?

H = 1, N = 14, O = 16.

Two grams of hydrogen at 0° C and 760 mm. pressure occupy 22·4 litres.

(4) The substance obtained by strongly heating iron and sulphur together is treated with dilute sulphuric acid. Describe what experiments you would perform to demonstrate the chief properties of the gas which is evolved.

(5) What tests would you employ to ascertain whether a white solid was a carbonate, a nitrate, or a phosphate?

(6) What chemical changes occur if the gas formed when sulphur burns in the air is dissolved in water and caustic soda is added to the resulting solution?

(7) What is the law which is named after Avogadro? How does this law assist us in assigning a formula to hydrochloric acid gas?

OUR EDUCATIONAL FRAMEWORK.[1]

NOW that an immediate commencement is to be made in the formidable task of organising and co-ordinating English secondary education, it is more than ever imperative that those intrusted with the task of reconstruction, and those who by their much speaking urge reforms, should, by a careful study of what has already been accomplished, as well as of the abortive attempts which have been made at improvement during the passing century, make quite sure that they are not advocating schemes which have already proved incomplete and unsuitable. In other words, no study is likely to prove more useful at the present time than that of the history of nineteenth century educational effort. And so few people are sufficiently acquainted with the hundred and one schemes which have been tried, formulated, or vaguely mooted since Brougham's Commission of 1818. It is true that what is thus indicated as desirable involves no little concentration and thought. But so important is it that new steps on the journey towards a perfect system of national education should be carefully chosen and rightly directed that no pains are too great to ensure an adequate preliminary knowledge of the ground to be covered. Since much of the work to be done, moreover, consists rather in covering, with a due regard to proportion and function, a skeleton which has already been built up, it is manifestly necessary that the educational architects should know enough to avoid reduplication of organs or the omission of fundamental parts.

It is from these points of view that Mr. Balfour's book is likely to be valuable. He provides the reader with a good plan of the whole fabric. There is no glaring omission, no placing of unimportant parts in disproportionate prominence. More

1 "The Educational Systems of Great Britain and Ireland." By Graham Balfour, M.A. xxxvi+320 pp. (Oxford: The Clarendon Press.) 7s. 6d.

than this, the treatment, side by side, of the provisions for the education of England, Wales, Scotland and Ireland, enables the student to perceive with ease what of assistance in deciding upon a line of action in England has transpired in the sister countries. It is to be regretted that the author has confined himself within such narrow limits, that he has made his work so synoptic. When, for instance, the question of the training of English secondary teachers is dealt with in a little over three pages it is impossible to mention everything deserving attention, and minor omissions are consequently occasionally to be noticed.

A notable characteristic of Mr. Balfour's work is the careful exclusion of his own opinions on the questions he brings before the reader's notice. Facts only are presented, and the amount of research which was entailed in bringing them together is roughly indicated by the profusion of references in the way of foot-notes. Nobody desirous of continuing the study of any part of the educational history of these years will, since all authorities are in this way quoted, have the slightest difficulty. If space permitted it would be extremely interesting to refer to some of the anomalies which Mr. Balfour's retrospect brings into relief. One instance must suffice. On page 182 we find: "South Kensington took a generous view of the scope of technical instruction, and fortunately it may be for education in general, but unfortunately for any prospect of delimitation, it has sanctioned under the head of technical instruction almost every subject except the Classics which can well be included under Secondary Education." Yet, as the late Professor Huxley pointed out in 1877, "technical education" is, in fact, a fine Greco-Latin equivalent for what in good vernacular English would be called "the teaching of handicrafts."

PUBLIC SCHOOL SERMONS.[1]

These sermons by Dr. Butler are dedicated to the masters of twelve great public schools, at whose request they were preached. As was to be expected, they exhibit a strong and buoyant sympathy with public-school life. Theological subtleties are avoided, and the tricks of the rhetorician are not resorted to. On the other hand, the expository and informing method of the first sermon, viz., that on "Christian Greatness," creates an expectation which is hardly fulfilled in the remainder of the series. At times there is a discursiveness and redundancy which, though perhaps harmless in delivery, mars their effect when read. But the tone is always manly and optimistic, and the counsel conveyed is that of a wise father, solicitous, above all things, for the purity and integrity of his sons. Here, for instance, is the picture he presents to them of intellectually great men:—"Nothing ever seems quite new to them, armed as they are with a few luminous principles which may be applied to the solution of all questions, however complicated and apparently novel. What a strange reverence we feel for those whose knowledge and judgment have been serviceable to *us*, those who have taught us to appreciate something good or beautiful which otherwise we should have passed over as commonplace and insignificant."

A fine sermon is that on "The Transmission of Inspiration." This is the ideal he puts before the public-school boy:—"In every one of you there lies the power of leaving here, of founding here, before his departure, some good that will last, something that will, by God's help, inspire others, strike them as great and noble and beautiful, and therefore worth reproducing and handing on." In the sermon entitled, "Abide in Me," Dr. Butler pays incidentally what strikes us as a tribute equally honouring to himself and his hearers. He says:—"Boys have always been my great helpers in teaching me the power and the sacredness of life." Here is another noteworthy passage from the same discourse:—"Never laugh at weakness. Never gloat over seeing boy or man at his worst. Never recall to anyone, with a sneer, the meanest or the feeblest moments of his life, but only the bravest and the purest."

There are other similar noble sentiments scattered like gems throughout these pages; one particularly must be quoted. It deals with the value of antiquity, and was addressed, as of course was most fitting, to the boys of our very oldest foundation—Winchester College:—"If the antiquity of great and ancient schools begets a devoted and self-forgetting love; if it inspires a thankfulness and a pride seldom spoken of, seldom pointed to, but always there and always burning; if it brings to mind the simplicity, the piety, the manliness, aye, and even the rough hardships of other days; if it summons before the imagination great and good men in almost every department of public life, and whispers, even in careless ears, that this place was as dear to them a hundred, two hundred, three hundred, four hundred, five hundred years ago as it is to you to-day . . . then, my friends, your antiquity is not a snare to you, but a power. It intertwines itself with every grateful retrospect and every chivalrous aspiration. It makes part both of the life which you now breathe and of the career that lies before you. You are 'sons of the Highest,' even in the ranks of earthly lineage, but how much more in the ranks of a spiritual descent!"

An entire sermon is devoted to Public School "Esprit de Corps," which Dr. Butler considers a development little more than a century old. He says, "It looks as if some centuries of quiet growth were needed before that strange, delightful institution, an English, public school, could awaken its proud self-consciousness, and almost marvel at its own *esprit de corps*."

[1] "Public School Sermons." By H. Montagu Butler, D.D., Master of Trinity College, Cambridge, and formerly Headmaster of Harrow School. 271 pp. (Isbister.)

RECENT SCHOOL BOOKS.

Modern Languages.

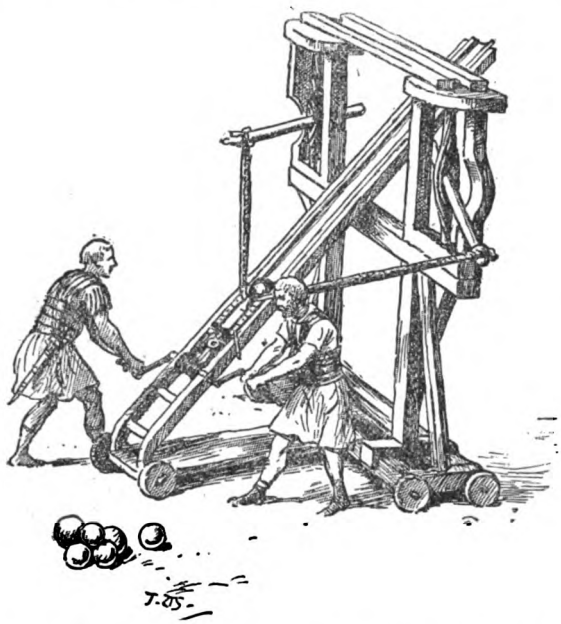
Specimens of Modern French Verse. By H. E. Berthon. lx. + 292 pp. (Macmillan.) 2*s.* 6*d.*—This useful selection will be welcome to teachers. The book consists of a well-written introduction on the structure of French verse, probably the best account in English at present available. The poems range from Béranger to Richepin, and include characteristic specimens of all the more important lyrists of the century. Mr. Berthon has given great care to the writing of the notes, which—in addition to the explanation of allusions and hints for translation—contain short biographies of the poets.

Goethe. Iphigenie auf Tauris. (Siepmann's Series.) Key to the Appendices. By the General Editor of the Series. 45 pp. (Macmillan.) 2*s.* 6*d.*—The translations have been made by Mr. Siepmann with his usual care, and teachers will be glad to have these "fair copies" for the use of their pupils.

Classics.

Messrs. Bell & Sons have begun a new series of easy classics under the general editorship of Mr. Marchant, of St. Paul's School. The distinguishing feature of the series consists in the use of illustrations not only in the introduction, but here and there in the body of the text. They are gathered from such sources as bas-reliefs, vases, Trajan's Column, coins and the like, and in many cases have been specially re-drawn to bring

out more graphically the meaning of the author. They should prove useful in arresting the attention of the pupil, and in giving him a clear notion of phases in ancient life. The volumes (post 8vo size) are well got up, and are issued with notes and with or without vocabulary at 1*s.* 6*d.* each, with vocabulary only at 1*s.* Besides the introductions the books have useful appendices containing forms, grammatical points, technical terms, &c., which will be found to save masters much



time, and to make ignorance on the part of learners inexcusable. The appended illustration of the "Ballista" is from *Cæsar, Book II.*, by A. C. Liddell, M.A. (111.+xxxii. pp.), and we have also received *Cornelius Nepos, Epaminondas, Hannibal and Cato*, by H. L. Earl, M.A. (96+xliv. pp.), and *Livy, Book IX.* cc. i.-xix., by W. C. F. Walters, M.A. (112+xxxiii. pp.). If there is room for fresh editions of some of the authors announced, this series will doubtless occupy it, owing to the good qualities we have indicated above.

In Macmillan's "Elementary Classics" series we have received two books of Vergil, both by Mr. Page, viz., *Georgic III.* (113 pp.), and *Æneid XII.* (171 pp.), 1*s.* 6*d.* each. The excellence of the editor's work in this series is well known, and we heartily recommend these volumes as maintaining the really high standard reached.

Grammar.

A History of English Critical Terms. By J. W. Bray. 345 pp. (Boston: Heath and Co.) 5*s.*—If ever criticism in literature or art is to become truly scientific, this is the sort of volume to help it forward. A reviewer scarcely knows which to applaud most—the happy inspiration which conceived so useful a book, or the patient scholarship which has gone to the perfecting of its excellence; but by virtue of both we have a contribution to English criticism which is at once lucid and exhaustive. The author has placed in historical perspective no less than 1400 critical terms, from among which, by a careful process of selection, only the most important are fully treated. As the author remarks drily, "No one critic has ever made use of half the critical vocabulary which is here presented. Wrong constructions of meaning have been given to terms, and controversies have been waged with no real ground for disagreement." To clear even the ideas of the most acute critics, and to promote a consensus among them of the correct uses of the terms they employ, are in themselves important results which will probably follow from a careful use of this volume; but independently of this practical benefit the scholar will find a mine of instructive information in these pages. The development of the word "conceit," for instance, is well displayed, and the illustrations of all terms are drawn from the whole literature of criticism. It is a far cry from Gabriel Harvey and Puttenham to Wordsworth, Matthew Arnold and Walter Pater, but the writer reviews the whole distance impartially and acutely. The only exception which might perhaps be made is his free quotation from Professor Saintsbury, whose eminence in the capacity for voracious reading seems only equalled by the imperfection of his digestion, if a scientific or even a literary style be looked for in his literary estimates. And that surely is not an unnatural expectation. Not at all the least useful portion of this treatise is an appendix showing the historical grouping of the terms used by the author. This is a welcome addition to an ably executed volume.

Edited Books.

Helps to the Study of Leigh Hunt's Essays. By C. D. Punchard, B.A. 110 pp. (Macmillan.) 1*s.* 6*d.*—Mr. Punchard did excellent service to literature when, some months ago, he published a companion volume to the present, dealing with Addison. In turning now to Leigh Hunt, the only regret a critic can express is that the author has so thin a topic to treat. This being granted, however, these helps and notes are most excellent. The introductory account of the life and work of this simple and not unattractive prose-writer is very readable, though not by any means exhaustive, and is perhaps too much wanting in critical matter. The notes, which are intended as a companion to that selection of Leigh Hunt's Essays which Mr. Walter Scott has included in a volume of his well-known "Scott Library," are as varied and full as only thorough-going scholarship can make them. To read them even without the essays is pleasant employment, and introduces us to a considerable miscellany of names and places about which everybody is the better for having clear and accurate ideas.

Mathematics.

Advanced Arithmetic. By W. W. Speer. xx.+262 pp. (Ginn & Co., Boston, U.S.A.)—In a laudatory notice at the end of this book we are assured that "the philosophy which underlies Speer's Arithmetics is correct, and has won the marked approval of advanced educators. It is a long stride in the right direction of a complete reformation in the teaching of number." We are sorry not to be able to endorse this verdict. Mr. Speer's mathematical notions are certainly, to some extent, original; he defines the province of mathematics as the study of "the relative magnitudes of things," thus excluding, for instance, projective geometry and the theory of groups; while, if (as we suspect) by "things" he means concrete objects, he is simply confounding the science with a part of its applications. He tells us (p. 204) that "if a rectangle equal to the lateral surface of the cylinder D be placed about the sphere O, it could, by great skill in cutting and rearranging, be made to cover exactly the sphere O"; a statement not only not justified by experience, but demonstrably false. As to the general contents of the book, they comprise a rambling and pretentious introduction; a set of very elementary (we had almost written kindergarten) questions on fractions, ratio, percentages, and mensuration; numerous quotations from the works of Spencer, G. H. Lewes, and other philosophers; and some really excellent illustrations, including a view of the Pyramids and a representation of three men in a balloon. Why this should be called "Advanced Arithmetic" we cannot imagine.

Elementary Practical Mathematics. By F. Castle, M.I.M.E. x.+402 pp. (Macmillan.) 3*s.* 6*d.*—Written by a disciple of Professor Perry, and adapted to the new Science and Art syllabus, this book is sure to command a good sale. Fortunately it deserves this on its own merits; the chapters on graphical methods, the use of scales and of the slide rule, elementary graphical statics, indicator diagrams, &c., are well done, and the more analytical part, although it might be criticised here and there, has been selected with judgment, and is written intelligently. Many of the subjects dealt with by the author might be introduced with great advantage into a school course; and his book deserves the careful attention of teachers from this point of view.

Elementary Dynamics. By W. M. Baker, M.A. viii.+252 pp. (G. Bell & Sons.)—A concise analytical treatise without any very novel features. It is intended for beginners as well as for Army and scholarship candidates; but it is most likely to be useful for purposes of revision. There is a large collection of examples, worked out and otherwise; these, in fact, make up the bulk of the book. By way of criticism it may be remarked that (1) speed ought to be distinguished from velocity, the latter term being restricted to a vector quantity; (2) the treatment of the problem of two weights slung over a pulley by saying, "The mass moved $=m_1+m_2$ pounds, the moving force $=m_1g-m_2g$ poundals: therefore $f=(m_1-m_2)\,g/(m_1+m_2)$" is most unsatisfactory and misleading, and should no longer find a place in text-books; (3) after calculating the loss of (molar) kinetic energy after the impact of two elastic spheres, it would be well to indicate what becomes of the energy thus dissipated. But, on the whole, the bookwork is sound, and clearly put; any critical discussion of first principles is, of course, out of place in a work of this kind.

Science and Technology.

An Elementary Course in Practical Physics. By F. Castle, M.I.M.E. (Nelson.) 2*s.*—This small book is full of useful and easily-performed experiments designed for first and second-year students in science schools. Commencing with mensuration, the work includes exercises on all the branches of physics. The impression left on reading it is that too much is compressed into the 200 pages. Used as a text-book for boys in secondary schools, much would have to be omitted in the first reading. The introduction, especially that part concerning the properties and states of matter, is considerably more difficult than the second chapter, and some will consider that often the "theory" and the experiment are in the wrong order. In the hands of a good teacher the book could be made very useful as a text-book for a practical course with boys who have already had some little experience in scientific methods. The large number of numerical examples and experimental details will make the book acceptable to many teachers.

Miscellaneous.

Educational Aims and Educational Values. By Paul H. Hanus. vii. + 211 pp. (New York: The Macmillan Co.) 4*s.* 6*d.*—With one exception these essays have previously appeared at different times in American educational papers. There is an unavoidable repetition noticeable which is a natural outcome of their original purpose. The book will be chiefly useful to teachers in the United States, since a large part of it is concerned with essentially American problems. To the British student of education who has kept abreast of recent pedagogic publications in this country the volume will be valuable for its presentment, by such an experienced authority as Professor Hanus of Harvard, of several much-discussed questions concerning the aim and tendencies of secondary education. We are especially pleased with the essay on the permanent influence of Comenius.

PRIZE COMPETITION.

No. 8.—Answers to Geography Questions.

WE offer, this month, two prizes of books, each of the published value of half-a-guinea, to be chosen from the catalogues of Messrs. Macmillan & Co., Ltd., for the two best sets of answers to the Junior Cambridge Local Geography Test Paper on p. 395.

One prize will be awarded to the best set of answers amongst the papers sent in by girls, and one for the best paper amongst the replies received from boys. The rules for the competition are as follows:—

(i.) Every paper sent in must be accompanied by a coupon (p. iv.).

(ii.) No paper received *after* November 10th, 1899, will be considered.

(iii.) The decision of the Editors is final, and will be published in the December number.

(iv.) Every paper sent in must be endorsed by the form master or mistress, certifying it to be the unaided work of a boy or girl under sixteen, written in class time, without consulting text-books.

(v.) Replies should be addressed to the Editors, THE SCHOOL WORLD, St. Martin's Street, London, W.C.

If in the opinion of the Examiner who looks over the papers the prize answers are of sufficient merit, they will be printed in the December number.

We hope teachers will co-operate in this attempt to develop an interest in Geography on the part of candidates for the Junior Cambridge Local Examination. They can do this by setting the test paper as a class exercise for those of their forms preparing for the examination, and afterwards sending the best set of answers for the purposes of this competition.

OUR CHESS COLUMN.

No. 10.

BLACK wins the game given last month by playing as follows:—11—Q—B6 ch; 12—PxQ, B—KR6 mate. (White's sixth move was very weak.)

THE SCHOOL WORLD Chess Column continues to attract a good deal of attention in Australia: it has been honoured by several friendly notices in the *Australasian*, and the chess editor of that well-known paper informs me that a certain New Zealand contemporary has "lifted" one of these notices *en bloc!* It will be remembered that Master A. B. Craig, one of our Australian readers, sent in a correct solution to the first problem. Unfortunately it was too late to be considered by us, but "Hobart," the genial author of the *B. C. M. Guide to the Openings*—a book which I can unreservedly recommend to young players—wrote to his friend, the chess editor of the *Australasian*, as follows:—"I was much interested by your Chess Notes. Master Craig deserves encouragement, and his youthful ambition should not suffer by reason of mere geographical position. So, if you think there is no danger of establishing an inconvenient precedent, will you send him the copy of the *B. C. M. Guide?*" This the editor has gladly done, and the thanks of everybody concerned are due to "Hobart" for his generous action.

Boys should never refuse to play against players stronger than themselves. Don't mind being beaten over and over again; the practice is excellent. I have just had the honour of

playing two games with one of the Masters who took part in the late London Tournament, and, in spite of the severe beating I received in each case, am eagerly looking forward to further meetings.

Let me also advise young players not to refuse the odds of a piece when offered by a strong player. Handicap tournaments are of great service in this respect; it is a very easy matter to arrange the odds. By the way, have any of my readers heard of the gentleman who said that he was once such a weak player that he could give himself the odds of a knight and yet lose!

As this is the commencement of the season, it may not be out of place to name a few chess accessories that will prove useful. For text-books get the "B. C. M. Guide" mentioned above, and "How to Play Chess Well," price 3d. and 4d. (cloth). This and the following may be obtained from the British Chess Company, The Rock Mills, Stroud:—Score sheets, 1s.-2s. per 100, from whom boards and men of every variety may also be obtained. They will gladly send their catalogue to any address. Messrs. De La Rue have a very good pocket chess-board and men, of which our prize-winners uniformly speak in terms of praise; it costs half-a-crown. For ordinary use many makers produce good sets at a moderate price; avoid the "cheap and nasty" variety, and on no account purchase sets with much-befrilled bishops, &c. The plainer the pieces the better.

I am offering two monthly prizes throughout this season—one to school clubs, the other to individuals. The conditions appeared in the September issue.

Owing to the change in the date of publication I am unable to announce the winners of our last competition until next month. In future all postcards must be received by the 16th inst.

I now give the game for this month's prizes—

	White.	Black.
1.	P—K4.	1. P—K4.
2.	Kt—KB3.	2. Kt—KB3.
3.	Kt x P.	3. P—Q3.
4.	Kt—KB3.	4. Kt x P.
5.	P—Q4.	5. P—Q4.
6.	B—Q3.	6. B—Q3.
7.	Castles.	7. Castles.
8.	P—B4.	8. P—QB3.
9.	P x P.	9. P x P.
10.	Kt—B3.	10. Kt x Kt.
11.	P x Kt.	11. B—KKt5.
12.	R—Ktsq.	12. Q—B2.
13.	P—KR3.	13. B—KR4.
14.	B x P ch.	14. K x B.
15.	Kt—Kt5 ch.	15. K—Kt3.
16.	P—Kt4.	16. B—B5.
17.	R x P.	17. Q x R.
18.	B x B.	18. R—R sq.
19.	Q—Q3 ch.	19. K—B3.
20.	R—K sq	20. B—Kt3.

Which is the quickest way for White to win?

Rules.

I.—Write on postcards only.

II.—Give name, date, and school address.

III.—Answers must reach

The Chess Editor,
The School World,
St. Martin's Street,
London, W.C.

on or before the 16th inst.

CALENDAR.

[*Items for the November Calendar should be sent in by October 17th.*]

October, 1899.

Tuesday, 3rd.—Exam. for Diploma in Teaching: Royal University, Ireland.

Wednesday, 4th.—Schol. Exam. St. David's Coll., Lampeter.

Thursday, 5th.—Entrance Schol. Exam. Dundee Univ. Coll.

Monday, 9th.—Oxford Exams. for Women. First Pub. Exam.
Prelim. Exam. for Candidates for Holy Orders.

Tuesday, 10th.—Prelim. Exam. Pharmaceutical Society.
Matriculation, St. David's Coll., Lampeter.
Schol. Exams. and Exams. in Music, Royal University, Ireland.
Scholarship Exams. in Natural Science and History at Magdalen College, Oxford.

Wednesday, 11th.—Entrance and Schol. Exams. Durham University.

Thursday, 12th.—Enter for Int. B. Mus. Exam. London University.
Apply before this date to compete for Assistant Surveyorship of Taxes (p. 392)

Saturday, 14th.—Last day for returning claims for fees, Interm. Ed. Board, Ireland.

Tuesday, 17th.—Entrance Exams., Edin. University.
Return forms for Exam. in Teaching, London University.
Allocation of Bursaries, St. Andrew's University.

Thursday, 19th.—Return forms for B. Mus. and D. Mus. Exams. London University.

Saturday, 21st.—Scholarship Exams. Oxford County Council.

Monday, 23rd.—B.A. and B.Sc. Exams. begin, London University.

Tuesday, 24th.—Return forms for Coll. of Preceptors' Exams.
Scholarship Exams. in Classics and Mathematics at Hertford College, Oxford.

Friday, 27th.—Return forms for Licentiate Exam., Royal College of Physicians, Ireland.

Saturday, 28th.—Return forms for Cambridge Teachers' Training Syndicate Exam.

Tuesday, 31st.—Return forms for (*a*) L.R.A.M. Exam. Royal Academy of Music; (*b*) Cambridge Higher Local in December; (*c*) for Associate and Fellowship Exams. of Surveyor's Inst.
Scholarship Exams. in Classics, at New, Magdalen, and Corpus Christi Colleges, Oxford.
Apply for permission to compete in combined Exam. for Entrance Schols. at various Cambridge Colleges.

The November number of The School World will be published on Wednesday, October 25th.

The School World.

A Monthly Magazine of Educational Work and Progress.

Editorial and Publishing Offices:
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Contributions and General Correspondence should be sent to the Editors.

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The Editors will be glad to consider suitable articles, which, if not accepted, will be returned when the postage is prepaid.

All contributions must be accompanied by the name and address of the author, though not necessarily for publication.

The School World

A Monthly Magazine of Educational Work and Progress.

NO. 11. NOVEMBER, 1899. SIXPENCE.

THE IDEAL ASSISTANT-MASTER.

By Rev. CANON FOWLER, M.A.
Headmaster of Lincoln School.

IN days not long past it was a common saying that the "fool of the family was usually sent into the Church." This arose from the abuse of patronage by families in high position, which led to the presentation of family livings to younger sons who had neither inclination nor fitness for discharging the duties of a parish clergyman. Matters are different now, but it really seems at times as if the phrase might be applied with reason to the scholastic profession, a profession which in a peculiar degree requires inclination, aptitude and keenness for work in all who enter its ranks. In fact, it is often said that a schoolmaster, like a poet, is born, not made, and there is a great deal of truth in the saying. Granting, however, as we must do, that so many incapables become, or try to become, schoolmasters, we are naturally met by the question, What is the reason of this? The answer, I think, is very obvious. For many years past a tradition has existed among a large section of the community that a boy, if possible, should go to a large public school, and then to Oxford or Cambridge. And here let no misunderstanding arise: we owe a very great deal to this tradition; there can be no better training for a boy, if his parents can afford it, and *if* the boy himself will at an early period mark out for himself a definite aim in life afterwards. As it is the father strains every effort, denies himself, stints himself, cramps his daughters' education perhaps, to educate his son as he himself was educated. The boy goes to a large public school, he passes through the ordinary course, he has a pleasant time; but never settles what he wishes to turn his hand to afterwards. He then, in the natural course of events, goes to the university, where he has a still more pleasant time, until in the last two or three months he begins to realise that the time is drawing near when he will have to shift for himself, and that he has no idea as to the course he means to take. He does not wish to take orders: he is past the age at which he can devote himself, in the ordinary way, to other professions or avocations in life, even if his father can afford it: there is only one course remaining, and that is to become a schoolmaster. It is in this way that so many drift into the profession, and the only wonder is that so large a number succeed as well as they do. Of course, the training of the sixth form in a large public school under a good headmaster, and a life at the university in which definite and steady reading is tempered by a lively but not too absorbing interest in athletics, is of itself one of the best preparations for a schoolmaster's life; and, after a little experience, a man who has gone through this training will make an excellent master in a large public school, or a grammar school of standing. But the number of masterships in these is limited, and there are hosts of men who find their previous training an absolute disadvantage to them for the ushers', and may we not too often say nursery-maids' work, which is assigned to them, for it has shown them how different things might be if only their lot as schoolmaster was cast in different places. They have never had any love for the work, to begin with, and their first experiences upset and discourage them; but they must go on or starve. Can any ideals come out of these?

We have, however, in the present article, to deal rather with those men who really have their heart in their work, who have made up their minds for years, perhaps, that they will be schoolmasters, and who have worked with the especial object of teaching. It is, of course, among these that we must look for the ideal assistant-master, or rather for the man who in most respects comes up to the impossible ideal. And in considering the matter we must remember that the ideal assistant-master of the large public school, or of the grammar school, or of the preparatory school, will be very different, and that we may, too, regard him from the various points of view of his headmaster, his colleagues and his boys, and also, to a certain extent, of the parents of those over whom he has charge.

The subject, then, being so wide, we have only space for a few generalities, such as power and methods of teaching, discipline, and, the greatest qualification of all, without which neither good teaching nor true discipline is possible, a knowledge of boys' nature, and tact in dealing with individuals.

Now with regard to teaching, my own experience has been that men of brilliant attainments are not, as a rule, good teachers of ordinary boys.

Of course, it is different if they are headmasters' assistants and are taking high work, but with ordinary boys they are apt to start on the supposition that their pupils know a good deal of their subject: things seem so simple to themselves that they cannot enter into the difficulties of others, and the consequence is that they get impatient, and the boys who are being taught by them become discouraged and go backward rather than forward, to the discouragement also of the master, who may really be putting his whole energies into his work. I may be wrong, but I think that this is a commoner failing with mathematical and natural-science masters than with others. A young master does not always realise the fact that, when he has worked out a sum or problem before his form, the ordinary boy invariably says, "Yes," if asked whether he understands it, and that it is of no use to be content with the mere affirmation: it is only the ideal master who persists until he really fathoms the depths of his boys' ignorance and then sets them on the right way to such knowledge as they are capable of grasping. This, of course, opens the vast question of methods. A discussion of these might fill a volume. Far too much time is wasted over the working out (mostly on paper) of elaborate and impossible curricula. But what is wanted is a few subjects thoroughly well taught by a master with a bright, alert manner, who has the power of making his subject interesting by illustration and an occasional spice of humour. I do not believe that there is any subject in which the interest of boys cannot be more or less aroused by such a teacher. What, for instance, can be a drier subject, apparently, to teach, for the first time, than the definitions of the first book of Euclid, and yet I have known a form of small boys thoroughly interested and wanting Euclid again, because the circle, for example, was illustrated by a waggon drawn with wheels with equal spokes and another with unequal ones, and the square and rhombus by two diagrams of high hats, one upright and the other knocked on one side, the position only and not the length of the sides having been affected; and instances might, of course, be indefinitely multiplied. Illustrations, however, must never degenerate into desultory talking. Many an hour is thus wasted by an incompetent master, who is only too readily encouraged by his boys to go off on irrelevant subjects, and to let them down easily with the lesson in hand.

And this, of course, leads to the all-important matter of discipline. A man may be Senior Wrangler, Senior Classic, or have obtained any amount of University scholarships, but if he cannot keep discipline he will be absolutely useless as a schoolmaster; he may be a good teacher and fully capable of imparting knowledge, as proved by his work with individuals, an enthusiast even, but without the ability to enforce discipline he will surely fail. It is a peculiar power. You find it present at times in men with very slight physical advantages, and you find it strangely wanting in strong and big athletic men, to whom you might think the keeping of a few small boys in order would be the simplest thing possible. And further, it must be noticed that the "maximum of discipline with the minimum of punishment" is now the ideal of all headmasters of any standing. The old days of keeping discipline in school with the cane have nearly vanished; corporal punishment is becoming rarer and rarer, and is only kept for grave offences, and quite rightly, for if a boy is thrashed, as he used to be, for a false quantity, what is left for lying, vice and bullying? "Lines," too, are falling into disrepute, as encouraging carelessness and spoiling handwriting. To be always sending boys to "detention" or "imposition school," where these exist, is looked upon by headmasters and colleagues as a sign of weakness; to make boys stay in and learn by heart does not commend itself to form-masters after a hard day's work. What, then, is left? Not much, certainly, beyond the fact that the assistant-master must do as best he can with as little punishment as possible. It is expected now-a-days. If one of my assistant-masters is seeking promotion, one of the first questions I am usually asked is: "Can he keep discipline without punishment?" or words to that effect; and it is not a hard thing to do for one who really knows something of boys' nature. The tongue is a great weapon, much worse than the cane, if skilfully used, but the criticism or the sharp remark must be well deserved and to the point, and must not descend into the unkind sarcasm which provokes and wounds and does more harm than good. I well remember the sarcasm with which my old tutor in my old house at school used to bring down the laugh on my unlucky head, and yet I feel nothing now for him, as, indeed, I felt then, but affection and respect for his thoroughness of character and kindness of heart. I cannot remember his punishing any of us, but we feared his tongue too much to risk the chance of it; at the same time, we knew that the other qualifications were behind, and in this lay the whole secret of his influence. The ideal assistant-master will soon learn the uses and limitations of the tongue, and the previous qualifications necessary before it can be used with any effect whatever. And here I must say that I do not wish to be misunderstood as underrating the necessity for occasional short, sharp punishment, but I most emphatically say that it ought to be, and can be, reduced to a minimum, and that a master who has everlastingly to be punishing and nagging at his boys ought never to be a schoolmaster at all.

There are one or two apparently minor points that require to be touched upon; and a very important one is that the ideal assistant-master should have no peculiarities of dress, speech, or manner. In one of our greatest public schools I have known a comparatively new master lose influence to a large extent by appearing in school with a coloured shirt, which was voted "bad form." It may seem absurd, ut anyone bacquainted with the traditions of such a school

knows well on what small trifles popularity hangs. The ideal master should be neat in dress and person, but not too particular; if untidy, he will be regarded as no gentleman, but, on the other hand, if at all over-dressed, the feeling will be quite as strong against him. As to speech and manner, happy is the man who has no peculiarity in either that can be imitated or taken off, for taken off it assuredly will be, and if the fact enables boys to "draw" him, his existence will soon be made miserable. Should he, however, be good-humoured and not see too much (though, of course, checking any open impertinence), his boys will vote him a "good sort," and soon forget that he has any peculiarities at all; at the same time, a man with any such drawbacks can hardly be considered an ideal.

I have purposely not dwelt on the relations of the assistant-master to his chief. Loyal co-operation and mutual forbearance are absolute necessities, and an assistant who feels he can no longer feel respect for his chief, although he may have much right on his side, should at once seek another post. There is, however, a very important part of the subject before us which must briefly be touched upon, and that is the question of relations which ought to exist out of school between boys and assistant-masters. One thing is certain, and that is that the ideal master will not hold himself aloof, but will throw himself, heart and soul, into the general outside interests of the school. If he is young, he will play in such games as he may, by general school custom, take part in, and the greater his prowess the greater his general influence in the class-room; if he is older, there are many matters in which he can show a real interest which will win his boys' hearts; but, while friendly, he must not be too familiar: he must, above all things, be most careful not to make favourites either in or out of school. The boys themselves, if they are worth their salt, will resent it, and it only does them harm with their companions. A favourite, rightly or wrongly (mostly rightly) is another name for a sneak, and a master who is in the least degree suspected of encouraging sneaking may as well give up his post at once. A young master, however, should be very careful how he treats the older boys; they are wont to accept his overtures, and to regard them as attempts to curry favour, and to think of him accordingly. This has been occasionally one of my greatest difficulties with assistant-masters; they can never grasp the fact that it pays in every way to be strict with the older boys, that the older boys appreciate it, and that, if they are justly strict with elders, they can be more lenient with youngers; and, further, that when the youngers have, in two or three years, grown up, they will find they have, through this course of action, satisfactorily solved the question of discipline without punishment.

I am afraid that I have treated my subject rather roughly and fragmentarily, but it is one that refuses to be satisfactorily reduced to headings. In conclusion, however, I would emphasise the fact that, beyond all scholarship, beyond all ability to keep routine discipline and to impart routine knowledge, there must be a real earnestness, a real enthusiasm for the work. One can have no patience with the mere money-making house-master who described his house as "an inn where he was always sure of his quorum of guests." There must be a real knowledge of boy nature, and a ready tact to make use of that knowledge; there must be a full recognition of the fact that boys are like the keys of a piano, and that they will give out different notes: they cannot be expected to give out the same, and must be played upon and strung up more or less tightly accordingly. And, further, the ideal master will show that he recognises that they have souls as well as minds and bodies; he will not, certainly, be always forcing religion upon them perfunctorily in season and out of season; there is nothing boys resent more, as it savours to them too often of hypocrisy; but by a few words in season (for which he will find plenty of opportunities), and by his general bearing and character, he will show what he himself feels, what he himself is. There is no more ideal master than the man who makes his boys, they can hardly say how, look up to him as their own ideal of what is right and manly and honourable.

ON THE TEACHING OF ENGLISH READING.

By NELLIE DALE,

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PRELIMINARY CONSIDERATIONS.

THERE are already so many systems for the teaching of English reading that it may seem presumptuous to propose another. The difficulties of the language naturally lead us to approach the subject with great care. The study of the child convinces us that its early teaching is not a task to be taken up lightly; that its environment must be, as far as possible, suited to its requirements; and that the prospect of making intelligent men and women is vastly improved or irretrievably impaired by the care devoted to children in their tender years. We therefore realise that there must be nothing mechanical about this early teaching.

It is true that the power of reading mechanically can be, and is, obtained in a longer or shorter time by any or no method. It is equally true that much may be lost and much harm done in the process, for the intelligence may be blunted and a distaste for learning caused by the mishandling of this subject. If we wish to train the child to observe for itself and to use its own powers, we must give careful thought to the learners as well as to the subject. For though a method may satisfy all the requirements of logic,

there are many other requirements which we must bear in mind when dealing with little children.

Previous Unconscious Preparation.

There is no denying that the subject is fraught with seemingly insuperable difficulties, so many are its irregularities and contradictions. Can the little learners really make their way through these difficulties? They are indeed exceptionally equipped for the journey that is before them, for have they not been unconsciously preparing themselves for it by their infant cries, by their imitation of sounds and their association of these sounds with certain objects, by the articulation of the sounds which combine to make a word, and by the utterance of these words consecutively in sentences? Thus the gradual growth of their intelligence is accompanied by a training of the organs of speech, of the ear and of the eye. We shall be following the dictates of reason if we base our teaching on the foundation supplied by this training, which is none the less real from having been unconsciously acquired.

The Preparing of the Way.

A methodical training must now be gradually and unobtrusively substituted for this unconscious knowledge. For this purpose it will be necessary to make a selection from the vast number of words in our language. In doing this we shall be guided by two considerations: the words taught first must be familiar to the children and simple in form. In most cases these conditions will coincide. The child's sphere of interests is very small indeed, its ideas are very simple and the words that it requires to express them are consequently simple in meaning. It will be necessary, however, to reduce still further the number of words thus selected by eliminating those which present difficulties of spelling, acquaintance with which is better postponed until a later stage.

The need of gaining the sympathies of the children will convince us that reading must not be regarded as a subject standing entirely by itself: on the contrary, we shall find that, with the simplest notions of arithmetic as helpmates, the study of the mother tongue can be made the centre of all the other subjects suited to the child mind. These will be chosen for the purpose of stimulating thought and training the observation rather than for the accumulation of tangible knowledge. Thus the child's interest in Nature will be developed no less than its human sympathies.

The Learner's Equipment.

Let us now consider what the children bring to the work. A certain training of the organs of speech, of the ear and of the eye, has already been mentioned, but there is much besides which will at once give life to the lessons and lighten the work of the teacher by illuminating the path which the little ones can most safely tread; for they are endowed with readiness to be interested in all around them, the desire to do real earnest work, the capacity for taking infinite pains over what is interesting to them, the instinct of self-help and delight in conscious power, superabundant energy finding its outlet in endless activity, the spirit of adventure which leads them to make discoveries, the love of colour, delight in pictures, a vivid imagination, keen interest in each other, love of fun, and a respect for order which shows itself in their play by their strict adherence to the rules of the game. So varied and so valuable are the qualifications of the little ones confided to our care that great is the promise, no less great is our responsibility.

First Steps towards Reading.

From these general considerations we will now pass to the actual teaching of reading.[1]

Simple stories are told and the children are encouraged to find out the initial *sounds*[2] of familiar words, which they readily do. The sounds obtained in this way are reduced to order, but here we proceed gradually, and our first steps in this direction will be to lead the children to realise by their own observation[3] the fundamental difference between the two large classes of voiced sounds (*e.g.*, *b*, *v*, *th* in "this") and voiceless sounds (*p*, *f*, and *th* in "thistle").

When the children have acquired a certain facility in recognising sounds, we direct their attention to the particular organs of speech used in uttering those sounds (*e.g.*, they notice the use of the lips for *p*, the passage of the breath through the nose for *n*). They will be led to the discovery by observing each other as they repeat the sound, and by making the simplest experiments (*e.g.*, placing a finger in the mouth to feel what the tongue does). The child has now gained the consciousness that speech consists of individual sounds, and that these sounds are produced in various ways.

We shall proceed to take the sounds in a definite order, and now, and not till now, will the symbols be shown. The symbols are in ordinary type, the difficulty which arises from the same symbol representing different sounds being to a certain extent overcome by the use of colour.[4] This employment of colour will also tend greatly to strengthen the appreciation of sounds. Each symbol, as it is learnt, is hung up by the children[5] in the tabulating frame, which has places appropriate for all the sounds of the language.

This gradual classification of the sounds by the children will help still further to overcome the difficulty arising from the same symbol repre-

[1] It is assumed that the children have had no previous teaching.

[2] The teaching of the names of the symbols representing the sounds is postponed until a much later date.

[3] They prove the difference between voiced and voiceless sounds by pressing the hands close to the ears, or holding the hand in front of the mouth, or placing a finger on the windpipe, as they utter the sound.

[4] For the *vowels* we use *red*; for *voiceless* consonants *blue*; for *voiced* consonants *black*; and for *silent* consonants *yellowish-brown*.

[5] A suitable frame, designed according to my plans, has been published by Messrs. J. M. Dent & Co.

senting different sounds (*cf.* *c* in "cat" and *c* in "mince").

Each sound and symbol is still further impressed upon the children's minds by their printing the symbol and drawing animals and other objects, the names of which begin with the sound represented by that symbol.

It will be noticed that the sounds are always taught in connection with words.

WORD BUILDING.

When a few sounds have been learnt in this way, the children use them for building a number of words. The knowledge they have already acquired will enable them to do this in the following manner. The teacher tells a story introducing the word (*e.g.*, *cap*). The children repeat this word in chorus, discover the sounds that it contains, and place the symbols representing those sounds in the building part of the frame. The word thus grows up under their hand before they have seen it in its printed form. To impress this upon their minds they print and illustrate the word. When they have built familiar words with the symbols already in the frame, a new symbol is taught, and used for building additional words. They proceed in this manner until all the simple consonant sounds and the short vowel sounds have been learnt.

THE TRANSITION TO CONTINUOUS PASSAGES IN BLACK TYPE.

Thus far they have built words introduced in stories told them. We now pass on to the reading of printed subject matter in ordinary black type. Here again they are able to master each word for themselves, proceeding in this case from the symbols to the word (*cf.* the building of *cap*, mentioned above). Our care must be to present them with words containing *short vowel sounds*, though the length of the word will be of little moment if we introduce long words gradually. Nor need we hesitate to give words which have not been built or seen previously by the children. Plenty of practice in attacking fresh material of a kind likely to interest them is what they now require. Passages are not read a second time, as the purpose for which they were written has been effected, and there is also the danger of the children reading by heart. The double consonant sounds are learnt by the children during this "practising" time, and they have many opportunities for the exercise of discrimination (*cf.* *s* in "consented," and *s* in "present").

LONG VOWEL SOUNDS.

When the power to read this "prepared" language fluently has been acquired, the children can pass on to the attack of the *long vowel sounds*. The experience they have gained will make this the least formidable part of their work. But we must continue to select with great care the words which they will build, introducing only one fresh difficulty at a time, and paying especial attention to the order in which groups of words are presented to them. We shall lead them to discover as much as they possibly can, giving the least possible amount of help. If the particular difficulty in a word is made the centre of interest, the children will readily manage all words containing that difficulty.

SYLLABLES.

The question of *syllables* requires some notice. A few words of two syllables are introduced at a very early stage, and words of three and four syllables are gradually given. Care, however, is taken not to break up the word into sections for the children. They realise the number of parts into which it divides by means of what we call "stepping." They give all the sounds in the word, taking a step forward as they utter each vowel sound. Thus, though they keep the word as a whole, they *feel* the number of syllables in it. The children take great pleasure in this stepping of words, which they do either individually or in line. Long and difficult words are invariably gained by them in this manner.

FESTINA LENTE.

It is very important that the early work of the children should not be hurried. This will be best avoided by allowing them to take as active a part as possible; they will then show the pace at which they can proceed. It is equally important that we should refrain from telling. It may seem easier for the teacher to supply information than to let the children find out for themselves, but this supplying of the ready-made cannot fail to check the development of power in the children. Let us allow them to get a true grasp of the elements of the language, and they will surprise us by the ease with which they will manage long, regular words (*e.g.*, "punishment," "majesty," "incandescent"). Nor will the anomalous words terrify them; they will the rather arouse their sympathetic interest.

But it is impossible to enter into further details. Many of the points touched upon have been treated more fully in my little book "On the teaching of English Reading," written as a companion to "The Walter Crane Readers" (J. M. Dent & Co.). They are the outcome of my work with the little children who have been such interesting teachers, and to whom I owe more than I can possibly express.

The Gymnastics of Breathing.—The systematic teacher of reading . . . . . begins with the gymnastics of breathing; with such exercises as regulate the inhalation of breath, strengthen the mechanism of the lungs, and control the exit of breath in the formation of sound. Incidentally, and in immediate consequence of this, the muscular capacity of the chest and abdomen is increased astonishingly, and with it, of course, the capacity for storing and using the very fuel of life.—P. A. Barnett, "Common Sense in Education" (Longmans).

CHAPTERS IN SCHOOL HYGIENE.

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VI.—Exercise, Games, and Leisure.

IN the complete scheme of true education, the training of the body is in its way as important as that of the mind, and demands not less continuous care and watchfulness. Although every form of muscular activity is necessarily an exercise of the parts involved, it is convenient to restrict the term to those specially regulated and practical movements which are included under gymnastics and drill. These both have the advantage of practising, and therefore of strengthening and training, certain muscles and groups of muscles which are ordinarily less often called into play, and which are consequently apt to be less usefully and vigorously developed. A realisation of this fact indicates the need of discrimination in the selection of the particular exercises most suitable to particular individuals, in order that what is lacking in local physique may be made good, and that faulty tendencies of development may be corrected; and also the need for intelligent supervision of the exercises themselves, so that relatively feeble tissues may not be overtaxed or otherwise damaged. When, as ought always to be the case, all new boys undergo a thorough physical examination on their entry into the school, each may subsequently receive, under a capable, intelligent gymnastic instructor, the appropriate physical tuition which his weakness or his incipient deformity requires. Such a course of regulated gymnastic exercise, carefully adjusted to the special needs of each individual, should be compulsory for the first three to five terms at all events; and when properly initiated and carried out, its results amply justify and reward the trouble entailed. But the whole course of gymnastic training calls for careful supervision throughout. Fatigue is speedily induced in muscles unaccustomed to regular exertion; and it must never be forgotten that the only safe and rational method of training is by means of repeated exercise neither so violent nor so prolonged as to produce weariness. Further, there is always some risk lest enthusiasm and a yearning for display should lead to an unwholesome substitution of what may be called "trick" feats, in place of the really valuable all-round training. Nor must it be forgotten that the exercise taken in the gymnasium is not exercise in the open air, and is by so much the more fatiguing as well as less health-giving. The gymnasium itself should be a lofty, well-lighted building, with a boarded floor, amply ventilated, and kept scrupulously clean. The gymnast's clothing should be of the simplest, and so arranged as not to confine any of the movements of the body; approximating, indeed, as nearly as may be to that nudity which the word itself suggests as appropriate to exercise at once active and effective. If an adjacent bath-room be not available, dressing-rooms should be at least provided; and it should then be an invariable rule that the whole body-surface be vigorously rubbed down with a rough towel directly the exercise is finished, and before ordinary attire is resumed.

Some of the advantages attendant on military drill have been alluded to in a previous article. Here it may be added that drilling can, with rare exceptions, be carried on in the open air; and that it can be, and is commonly, combined with several forms of valuable gymnastic movements which add materially to its value as a means of physical training.[1]

School Games.

School games differ from mere gymnastic exercises in two obvious particulars of special value in respect of the nature and the method of the physical training which — when properly regulated and supervised—they so admirably help to secure: the muscular activity displayed is more generally spontaneous in its character, while the movements are more varied, more various, and more irregularly intermittent; and they are carried on in the open air. At the same time they tend to the development of the individual's courage, resourcefulness, associated helpfulness, cheerfulness under difficulties and good temper in defeat, as well as modesty when successful: the player's acquired knowledge of his own powers and of their limits begets self-reliance while checking rashness; and with it all comes a tolerant regard for those inferior to himself, and an ungrudging admiration of those whose powers surpass his own. Such results should serve to qualify the diatribes of those who sometimes describe what they call the "athletic craze" as a seriously undesirable feature of English school life, and of those who somewhat hysterically inveigh against the "barbarism" and "cruelty" of the rougher class of school games. An impartial comparison of the typical English and continental schoolboy is not to the disadvantage of the former; and the mother-land has no need to regret that part of the training of her sons whose world-work owes so much of its honest thoroughness to the lessons learned—for the most part quite unconsciously—during the hours of what we, happily for ourselves, speak of as merely "play."

How to Obtain the Best Results from School Games.

But if the best results are to be obtained from school games, their essentials must be properly

[1] It may be noted that the members of a School Volunteer Corps cannot remain ignorant of the dangers which attend the mis-handling of a rifle; they thus acquire a knowledge which—were it more widely diffused—would do much to lessen the yearly total of accidents that are mainly traceable to an ignorant stupidity in the use of firearms.

taught, and they must be properly supervised. The first point, thanks to the system which obtains throughout our schools, presents no serious—at all events, no insuperable—difficulties. The second point—which, indeed, to some extent includes the first—demands more anxious and continuous care, not the less difficult to carry out successfully because the requisite supervision ought to be so exercised that those subjected to it are not directly conscious of its existence. To this end it is necessary at the outset that all the members of a school should be carefully classed or "graded" according to their physical abilities (*not* according to age merely), as indicated by their physical examination on entrance, checked from time to time by their progress in individual development. Only thus is it possible to avoid the evils and disappointments which attend the indiscriminate mingling of old and young, strong and feeble, in a competition of bodily prowess. In such a *mêlée*, the weakest must inevitably go to the wall, and that repeatedly. The game approximates to a sort of scuffle, in connection with which a latent strain of bullying easily develops, with deplorable results. Both the morals of the players and the method of the play degenerate. The stronger develop a sort of arrogant slovenliness, as the result of successes too easily achieved in the absence of effective competition; while the very hollowness of their victories robs the contest of its healthy zest. The weaker, disappointed and disheartened by the drudgery of apparently inevitable failure, come to dislike the game and to lose interest in it—until, maybe, such time as their increasing strength enables them to repeat on their juniors the miseries of their own earlier experience.

EFFICIENT SUPERVISION.

Although boys need—especially at the beginning of their school career—to have their amusements regulated and arranged for, they naturally resent and are in no wise bettered by any fussy or grandmotherly interference with their play. Yet they will welcome and are quite ready to be guided by frank and helpful criticism, especially if it come from a master whom they recognise as being himself a proficient authority on the matter. Indeed, the first aim of efficient supervision is to see that the games are carried on along the right lines, while the players are insensibly educated in the exercise of method, discipline and authority. But supervision must be continuous—not merely to guard against both slovenliness and unnecessary roughness, but also to prevent and detect any tendency to "shirking." In every school there will be some few boys who do not take kindly to games of their own will—until after they have learned their charm by means of the necessary compulsion: they are generally sufficiently interested in the doings of their schoolfellows to find it no hardship to watch a game from start to finish, but they shirk the play themselves. Such boys must be made to play in the interests of their own bodily health at the moment, to the abundant advantage of their future well-being, and for the sake of their schoolfellows at large—for there is no kind of individual more insidiously harmful to himself and more detrimental to the welfare of the school community than the "loafer." Vicarious exercise often possesses an insidious attraction for the wilfully incompetent, which they attempt to justify by strenuous professions of interest in that which they decline to practise. But people whose devotion to athletics is mainly shown by their fondness for watching games which are played only by the specialised few have—for their own part—entered on the down grade of physical culture.

It is true that all boys are not likely to excel in all games, and that to some certain forms of physical exercise may be absolutely injurious. But the scale between football and fives, or fencing, for instance, is long enough to furnish at least some form of exercise not too exacting for the most feeble lad who is fit for school life at all. At the same time, it must be admitted that the problem furnished by these feeble folk is not at all a simple one, while it is becoming more insistent every year. During the last two decades there has taken place a very marked improvement in the standard of physical care and comfort obtaining in all boarding schools throughout the country, with the result—as a set-off to many obvious advantages—that each school receives year by year an increasing proportion of pupils whose physical disabilities would have sufficed to prevent their being sent to school at all, under the conditions of school life which were the rule a generation or two previously. The primary result is a dilution of the *average* physique of the school, and on this arises the question as to whether the physical training of the stronger majority is to suffer by lowering its standard to the plane suitable for their physical inferiors, or whether the latter are to be trained in a group by themselves—obviously stamped as inferior, and robbed of much of the stimulus afforded by healthy emulation. It is, inevitably, just those schools which are most careful of their pupils' health which attract the largest number of these doubtful acquisitions. And this result may perhaps be regarded as another example of the way in which any persistent interference with the operation of natural laws tends to bring about a new set of conditions—very likely to be disconcerting and retributory in character, if the interference which evoked them has been unduly hurried or too partial in its operations. The hygiene of English school life, indeed, is being improved to a level appreciably above that of the average English home, and until English parents set their households in better sanitary order (beginning with their nurseries) many of their sons and daughters must suffer from an acquired incapacity to share in the physical advantages proffered by their schools.

TRAINING.

Athletic competitions must not be passed over in silence. Broadly speaking, the life of a healthy boy at school should be such that he is always "in training" for any exercise which he can be reasonably called upon to undertake. But, in its more technical sense, "training" for sports is not harmful, if it be not attended by absurd restrictions. The best practical test is that, if a lad be in good condition to begin with, his weight should have increased rather than lessened by the end of the few weeks of regulated diet and practised exercise. Besides strengthening the qualities of temperance and self-denial, this probationary period affords opportunities of noting any signs of the candidate being unequal to the physical task before him, and the slightest of these should be carefully watched for, especially in the case of the severer forms of exercise, and of races over any distance.

Appropriate clothing—flannels (or their equivalent in the case of football)—should be worn during games, and this should be changed immediately afterwards. Adequate provision should be afforded by one or more properly constructed drying rooms for efficiently dealing with wet boots and garments.

THE USE OF LEISURE.

Waking life, however, is not wholly "work" and "play." For even the youngest there must, usefully, be times of leisure. And, for older folk, the ability to employ one's periods of leisure with pleasure to oneself and without discomfort to one's neighbours is no despicable advantage. This quality may be largely taught and trained during school life. And for this purpose every schoolboy should have at his disposal certain times which he is free to devote to the interests of the hour or to the prosecution of one of the many hobbies which indicate his tastes and may foster latent talents. As far as possible the initiative should be left to the individual; its prosecution may be aided—sparingly—if help is asked for; but the boy should be made to learn to develop his own resources in the matter, as far as may be, and should not be encouraged to lean on the initiative of minds other than his own. Even out-of-the-way tastes should not be checked merely because they are unusual, or unless they are in some definite direction objectionable; for originality, within all reasonable limits, merits cordial recognition. It was no doubt necessary that the ambition of the budding agriculturist who had, with great ingenuity, established a mushroom bed in his dormitory chest of drawers should be severely discouraged; but, as a general rule, it may be said that the greater the legitimate variety and the more marked the originality of the spontaneous amusements of a boy's leisure hours, the more healthy and the less cramped has been his intellectual training.

THE POSITION AND TEACHING OF GERMAN.

By E. L. MILNER-BARRY, M.A.

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II.—Elementary Instruction.

ONE of the main reasons why our own language is so easy for foreigners to master is the simplicity of our grammar—the paucity of our inflections. Conversely this lack of inflection in our own language is one of the difficulties which beset our acquirement of a modern foreign language such as German, and there is no doubt that at the outset beginners are disheartened and disgusted by a prolonged struggle with the German accidence, commenced in childhood, continued in youth, and then abandoned, leaving in the mind of the pupils a deeply-rooted prejudice, which in later years is too often transferred from the language to the country and its inhabitants. Fortunately no statistics are available to tell the tale of those whose progress in German might be thus summed up.

THE CLAIMS OF GRAMMAR.

Living languages no less than dead languages have a grammar which must be mastered; but we often fail in our teaching of it because we strain ourselves to master the unessential as well as the essential, and the result is a medley of grammatical rules and exceptions to rules befogging the mind of the pupil and exhausting his or her interest in the subject at the very outset.

We ought, then, to attempt to reduce the teaching of grammar as grammar to a minimum, to let the theoretical and practical go hand in hand, to proceed almost directly to translation and re-translation, and build up for our pupils the structure of the language by deducing the grammar from the living language itself. Even in the earliest teaching, let our grammar consist not of isolated words but of word-groups—not *ich bin, du bist, er ist, ich habe, du hast, er hat*, but *ich bin sein Freund, du bist träge, er ist unartig, ich habe einen Freund, du hast den Hut, er hat zwei Bücher*, &c., &c.

THE TREATMENT OF THE NOUN AND ADJECTIVE.

There are, however, in the apparently complex system of rules which go to make up the grammar of the language certain fundamental principles which we must impress on our pupils from the beginning; and here, I think, we should do well, while keeping philology strictly in the background, to call in the aid of our own language, and illustrate the teaching of the German nouns and verbs by laying stress on the marked similarity in the structure of the two languages. In teaching historical English grammar many must have experienced how much easier the subject becomes for pupils who have a knowledge of German; simi-

larly, in dealing with German even in its elementary stage we should never fail to illustrate largely by reference to our tongue. For instance, in the treatment of the declension of nouns which so often proves a stumbling block, a scheme should be written on the board for pupils to copy. The following outline might prove useful:—

STRONG.	WEAK.	MIXED.
(*A*) *Normal*:—	(*D*)	(*E*)
(*m*) Tag Tage =(e)s	(*m*) Graf Grafen =en	(*m*) Name Namen =ns
(*m*) Gaſt Gäſte =(e)s	(*f*) Frau Frauen —	(*n*) Bett Betten =(e)s
(*f*) Stadt Städte	(*m*) Haſe Haſen =n	
(*B*) *Contracted*:—	(*f*) Blume Blumen —	
(*m*) Vater Väter =s		
(*n*) Zimmer Zimmer =s		
(*C*) *Extended*:—		
(*n*) Dorf Dörfer =(e)s		
(*n*) Kind Kinder =(e)s		
(*n*) Herzogtum Herzogtümer =s		

The terminology should be carefully explained, and attention may be at once directed to the presence of the modification. Instances may then be given of parallel inflections in English—*man, man's, men;* as an example of a strong noun with modification, *child, children*, for comparison with *Kind, Kinder, ox, oxen*, to illustrate *Graf, Grafen*. Then some simple rules should be given pointing out what classes of nouns belong to the various types and the usual genders to expect, and the rules formulated should be applied to the nouns occurring in translation from the Reader, and lists of them made.

The treatment of the adjective will follow, and the same terminology should be retained.

STRONG.	WEAK.
Guter Hund Gute Hunde &c.	der gute Hund die guten Hunde &c.
MIXED.	PREDICATIVE.
ein guter Hund einen guten Hund &c.	Der Hund iſt gut. Die Hunde ſind gut.

The predicative form of the adjective should be explained, and the attention of the pupils directed to the difference in the treatment of the predicative adjective in French. The resemblances between the declension of the adjectives and nouns will be obvious to the pupils, and the teacher should not fail to explain to them the logical reason underlying the threefold division. The comparative and superlative may be taken next, and the table extended to include their inflected forms; *am höchsten, am besten*, being of course placed in the predicative division.

THE CONJUGATIONS OF THE VERBS SHOULD BE TAUGHT CONCURRENTLY.

In dealing with the verbs it is important that the tenses of the various types should be taught side by side; this will help to make clear the peculiarities of the modal auxiliary conjugation; the terminology—strong, weak, and mixed—should again be used, strong for the verbs with vowel gradation, *nehmen, nahm, genommen*, weak for those which add *te*, or *ete* to the stem in the past tense, *loben, lobte, gelobt*, while the term "mixed" should be applied to the modal auxiliaries *mögen, mag, mochte, gemocht*, and *not* to verbs of the type of *brennen, brannte, gebrannt, denken, dachte, gedacht*, which are merely weak verbs with vowel mutation.

STRONG.		MIXED.		WEAK.	
PRESENT.					
Indic.	*Subj.*	*Indic.*	*Subj.*	*Indic.*	*Subj.*
ich gebe	gebe	mag	möge	lobe	lobe
du giebſt	gebeſt	magſt	mögeſt	lobſt	lobeſt
er giebt	gebe	mag	möge	lobt	lobe
wir geben	geben	mögen	mögen	loben	loben
&c.					
IMPERATIVE.					
gieb		möge		lobe	
PAST.					
gab	gäbe	mochte	möchte	lobte	lobte
gabſt	gäbeſt	mochteſt	möchteſt	lobteſt	lobteſt
gab	gäbe	mochte	möchte	lobte	lobte
gaben	gäben	mochten	möchten	lobten	lobten
&c.					
PAST PARTICIPLE.					
gegeben		(ich habe) gemocht (ich habe geben) mögen		gelobt	

A scheme of this sort will give pupils at a glance the essential principles of the German conjugations, and their reasoning powers will be called into play far more by mastering these essential principles than by the mere repetition of forms which seem to have no logical connection. The forms given should be compared with the corresponding English tenses, and any striking differences noted, *e.g.*, the participial augment *ge* in German, and the greater frequency of vowel change in the German strong verbs. By treating in the same way other strong verbs, such as *werfen* and *halten*, all possible changes of vowel in a strong verb may be shown, and in a subsequent lesson attention directed to subjunctive forms of the type of *würfe* and to the principle underlying the use of the present or past tense of that mood. The apparently irregular conjugation of the modal auxiliaries will be readily grasped by pupils when they are told to compare the present tense of *mögen* with the past tense of *geben* and the past tense of *mögen* with the past tense of *loben*. The formation of the compound tenses should be treated next, the pupils being taught to recognise how these tenses are put together.

The formation of the future and conditional tenses will serve as an example.

	Future.	Conditional.
Present.	ich werde arbeiten	würde arbeiten
	ich werde gehen	würde gehen
Past.	ich werde gearbeitet haben	würde gearbeitet haben
	ich werde gegangen sein	würde gegangen sein

Rule.—Future formed by adding the present indicative of *werden* to the present or past infinitive; conditional formed by adding the past subjunctive of *werden* to the present or past infinitive.

The Choice of a Grammar.

Personally I am of opinion that, in the elementary stages of the language, it is an open question whether or not a grammar should be placed in the hands of the class. Much will depend on the experience of the teacher; naturally as his experience increases he will rely more and more on himself, and his teaching will become more and more direct. He will teach the elementary part of the language by word of mouth, and will then decide on the book which is to form the basis of future instruction; but to those who wish to utilise a book from the outset I would recommend either *Siepmann's* German Primer (Macmillan & Co.), the German Grammar Writers and Readers in the "Parallel Grammar Series" (Sonnenschein & Co.) or *Prof. Rippmann's* edition of *Alge's* "First German Book" (Dent & Co.) for those who wish to try the new method.

Phonetics and Pronunciation.

The elementary instruction in grammar should be accompanied by a systematic and careful training in pronunciation, and here we come to a debatable point—a point which is still under discussion even in Germany, the home of the new method. How far is the science of phonetics to be utilised in the teaching of pronunciation? Up to comparatively recent years this science was much neglected, and a knowledge of it was not considered essential to candidates even in advanced modern language examinations, but it is now gaining ground, and we may well hazard the prophecy that the coming generation of modern language teachers will have acquired a knowledge of the phonetics as well as of the philology and literature of the language they teach. Even as it is there is evidence that a number of English teachers already employ phonetics,[1] while others are acquiring the subject by attending German holiday courses, especially those held at Marburg. It may be open to question whether it is desirable that the teaching of modern languages at present should be introduced by utilising a phonetic script, and it would appear necessary that as a prelude to this we ought to re-organise the early teaching of our own language. But every teacher should master for his own benefit and for that of his class the elements of this subject; until he familiarises himself with it, he can never hope to impart a correct pronunciation to others, even though his own pronunciation of the language be faultless.[1]

Defects of our Examination System.

We have sinned in our neglect of phonetics, but we have been far more culpable in omitting to make full use of reading aloud and dictation as a help to the acquirement of the living language; and here, I think, our examination system is largely to blame. Our methods of examination in modern languages in the past have been closely modelled on those in vogue in testing a pupil's knowledge of Latin and Greek, with this striking difference that while in the dead languages we exacted some knowledge of the quantity of vowels, &c., in the modern languages we left this part of the subject severely alone. Our pupils would probably be able to read Latin and Greek creditably, but would break down hopelessly if they had to submit to a like test in French and German. The preparation of a set book which has to be got up in a limited time for elementary examinations is one of the blots on our system, and has contributed in a striking way to the neglect of the study of what is really vital—the living language. To remedy this we must strive to substitute inspection for examination in the earlier years in which our pupils are attempting to acquire modern languages.

(To be continued.)

[1] (*cf.* the Interim Report of the Sub-Committee of the Modern Language Association on Phonetics, *Modern Quarterly of Language and Literature*, April, 1899, p. 318, *sq.*

[1] A useful text-book is *Rippmann's* edition of *Victor's* "Kleine Phonetik," (Dent & Co.).

THE TEACHING OF ANALYSIS.

By E. W. Hurst, B.A. (Lond.)
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PRACTICE in the analysis of sentences has, at every period of school life, an educational value the importance of which it would be difficult to over-estimate. In the lower forms of a school simple exercises of this kind have a fascination for boys and girls that is akin to the feeling produced by the correct working out of an arithmetical calculation, and the knowledge of sentence construction is certainly of greater value in after life than the recollection, *e.g.*, that twenty-four grains and some seventeen hundred cubic inches are the equivalents of a penny-weight and a cubic foot respectively. Again, the disintegration of the various elements of a long and complex passage from a standard author affords senior pupils that intellectual enjoyment which is surely one of the most important factors in the acquisition of knowledge.

My object in the present short series of papers is to help teachers who are not satisfied with the existing text-books on the subject in the arrange-

ment of their lessons and in grappling with some of the difficulties that always present themselves.

THE SIMPLE SENTENCE.

Having explained the terms, Sentence, Subject, Predicate, the teacher should show that although two words may constitute a sentence, we can, in such cases, construct longer sentences by making:

(1) *Additions to the* SUBJECT.
(2) *Additions to the* PREDICATE.
(3) *Additions to any of these additions.*

THESE ADDITIONS ARE KNOWN AS ADJUNCTS.

Thus, take the sentence, "Stars set."

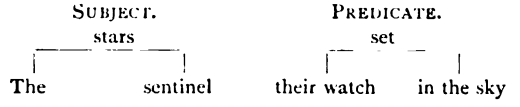
By adding Adjuncts to the Subject we may construct such sentences as

The stars set,
The sentinel stars set,

And, by adding successive Adjuncts to the Predicate, we may finally obtain Campbell's sentence in "The Soldier's Dream"; thus:—

The stars set.
The sentinel stars set.
The sentinel stars set *their watch.*
The sentinel stars set their watch *in the sky.*

Numerous exercises of a similar nature should then be given until the pupils have a clear idea of the construction of simple declarative sentences. Afterwards the analysis of such sentences may be set out in the following manner.



The pupil should in the next place be made familiar with the various kinds of Simple sentences; this involves acquaintance with the fact that, especially in poetry, the usual prose order is frequently broken. We have now learnt that any sentence may be divided into two parts—Subject and Predicate.

THE PREDICATE MUST BE A FINITE VERB OR MUST CONTAIN ONE.

Gerunds, participles, and verbs in the Infinitive mood cannot, by themselves, form Predicates. The learner will not have proceeded far in this preliminary stage before he finds that certain kinds of word-combinations play an important part in the construction of sentences, *e.g.*, *in the sky* in the sentence previously quoted. This leads to a consideration of the nature and functions of PHRASES. *The principle of substitution* should be adopted in order to show the identification of phrases with the parts of speech. For instance, instead of "my life was *careworn*," we may say, "my life was *full of care*," using the Adjectival phrase in place of the adjective. The distinction between Adverbial and Prepositional phrases should be clearly indicated; many text-books are very vague on this point. Remember that a Prepositional phrase must end in a preposition, *e.g.*, *for the sake of.*

THE OBJECT.

The next lesson will be on the OBJECT. This is a difficult part of elementary analysis. The teacher should first explain what is meant by "voice," and lead up to the following conclusions:—

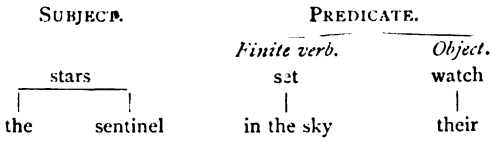
(1) When the Subject denotes the doer of an action, the Finite verb is in the active voice.

(2) When the Subject denotes that on which the action takes effect the verb is in the Passive voice.

(3) Not every sentence can be written in the Passive form.

(4) Only Transitive verbs can be used in the Passive voice.

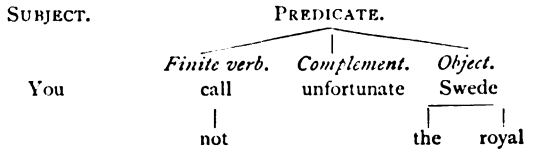
(5) The word that denotes the person or thing on which the action expressed by an Active Transitive verb takes effect is called the Object of the sentence. This evidently applies to *watch* in our previous sentence. Hence, a certain kind of Predicate-adjunct is known as the Object; *their* is its Adjunct in this instance. We can now make our analysis somewhat more minute.



A FINITE VERB IS OF COMPLETE OR OF INCOMPLETE PREDICATION.

There is no meaning in "A boy's will is"; *is* is a verb of incomplete predication. The predication is completed when we say "A boy's will is *the wind's will.*" The word, or words, thus used to complete the meanings of certain verbs are called COMPLEMENTS. Similarly, *king* is the Complement in "They appointed him king." The teacher should now give instances of (1) Intransitive, (2) Transitive verbs of incomplete predication, and then introduce this new Predicate-adjunct in his analysis form.

Example: "Call not the royal Swede unfortunate."



The fact that the verb *be* cannot be followed by an object will probably have to be insisted upon again and again at this stage; it is an error into which young pupils are very liable to fall.

FUNCTIONS OF ADJUNCTS.

It is now time for the teacher to explain the *functions of adjuncts.* This explanation, I have found, can be made easy and interesting by the use of the two terms in logic, *connotation* and *denotation.* I will give an illustration: a bicycle may be defined as a two-wheeled machine propelled by the rider;

this is what the term *connotes;* these conditions are the essentials of a bicycle; a term connotes qualities, but denotes objects. Thus *bicycle* denotes every kind of "two-wheeled machine propelled by the rider"—Safety, ordinary, cushion-tyred, pneumatic-tyred, &c., &c. Now, if I speak of "*good* bicycle" it is evident that by the addition of the Adjunct, *good*, I increase the connotation (by one quality), and decrease the denotation (by excluding all bicycles that are not good). This is, in general, the function of an Adjunct, *to increase the connotation and decrease the denotation of a term.* In the analysis of sentences we must make the connotation of Subject, Object, &c., as small as possible and the denotation as large as possible; in other words, we must separate the Adjuncts from the parts of the sentence to which they belong. This involves a certain amount of care. In the sentence, "Our handsome aunt's donkey brayed," *donkey*, the subject, has not three adjuncts, (1) our, (2) handsome (!), (3) aunt's, but *our handsome aunt's* forms a single Adjunct. Similarly, "Not a soldier discharged his farewell shot," *not a* is the Adjunct to the Subject, *soldier*; a beginner might be tempted to describe *not* as an Adjunct to the Finite verb, *Discharged.*

The following tabular form may henceforward be adopted for the analysis of sentences. "Men of bad character frequently render the best acts of their superiors quite worthless."

Subject.		Predicate.					
	Adjuncts.	*Finite verb.*	*Complement.*	*Adjuncts to Finite verb.*	*Adjuncts to Complement.*	*Object.*	*Adjuncts.*
Men	of bad character	render	worthless	frequently	quite	acts	(1) the (2) best (3) of their superiors

I have now described the functions of all the parts of a Simple sentence, leaving the teacher to supply his own exercises. These should, of course, be made as interesting as possible without decreasing their efficiency. Pupils may sometimes be asked to find quotations from the poets, or from well-known prose writers, illustrating various constructions, or examples may be given to them in which, by the substitution, for instance, of a phrase for a word, the sentence becomes a familiar quotation. The fresher the exercises the better.

In the next place, it is advisable to deal with what is perhaps the most difficult part of analysis, viz:—

Clauses.

Experience with my classes has proved that this obstacle to progress can be surmounted with ease and profit by adopting once more "*the principle of substitution.*" Take the sentence, "Home-keeping hearts are happiest."

This is a Simple sentence, because it contains one Subject and one Finite verb; *home-keeping* is an Adjectival phrase.

By substitution we can express the same thought in a different way; thus, "Hearts that keep at home are happiest."

Here for the *phrase* we have substituted a sentence,—*that keep at home.* It has the same meaning as *home-keeping*, but is more than a phrase, inasmuch as it contains a finite verb. It is a sentence in a sentence, and such sentences we call *clauses.*

There are, as a rule, as many clauses in a sentence as there are Finite verbs, but sometimes not all the verbs are expressed. There are two clauses in: "It is the heart and not the brain."

On the other hand, the conjunction *and* does not necessarily imply the existence of two clauses. "Lust and light are deadly enemies" is a Simple sentence with a Compound Subject.

Co-ordinate and Subordinate Clauses.

"Co-ordinate" means "of equal rank"; "subordinate," "of inferior rank." Now the most important part of a Simple sentence is its Finite verb, any other word or phrase in the sentence may be said to be subordinate to it. Consequently, any clause which is substituted for such word or phrase in a Simple sentence must be a Subordinate clause. In this way, *when the day broke* is a Subordinate clause in the sentence, "He came when the day broke," because a phrase can be used instead of it; thus, "he came *at day-break.*"

Furthermore, *at day-break* is an Adverbial phrase; therefore, *when the day broke* is an Adverbial clause. The teacher should apply similar methods to Noun and Adjectival clauses.

In the case of Co-ordinate clauses no such substitution is possible; the meaning of the term implies that, if a word or a phrase could be substituted, it would be of the same importance as the Finite verb in the simple sentence. But this is impossible; the Finite verb is the *most* important part.

No word or phrase can be substituted for a Co-ordinate clause; either a word or a phrase can be substituted for a Subordinate clause. Of course, for "This is a good plan," we might read "This is a plan, and it is good"; here, "it is good" is not a Subordinate clause. But the best and most natural substitution is "This is a plan which is good," where "which is good" is a Subordinate clause.

(*To be continued.*)

ENGLISH HISTORY, 449-1509.

TWO HUNDRED TERMS AND TOPICS ARRANGED ALPHABETICALLY.

By C. S. FEARENSIDE, M.A.Oxon.

TEACHERS preparing classes for the Cambridge Local Examination next month may find the underwritten lists of words useful in their revision work in English History. Some suggestions for use are given in the somewhat similar list published for the Oxford Local in the June issue of the SCHOOL WORLD.

The present lists differ from the June lists mainly in being based exclusively on a careful analysis of the Locals Papers, Senior and Junior, of the last twenty years or so: they form, in fact, a fairly complete blank *index nominum* (not *rerum*) to those papers. They are not so much designed to forecast "questions likely to be asked" as to indicate those historical points which a large and varied number of persons, whose favourable judgment is widely sought and respected, have considered to be worthy of attention. It is necessary, however, to state that the lists do not contain a fair proportion of words having historical associations with the period 449-1066, which has seldom been prescribed by the Local Examination authorities either at Oxford or at Cambridge. Some rectification of this defect will be attempted in the December issue.

(1) The "Junior Topics" contained in the first column include all the proper names found in both sets of *Junior* Local papers 1881-1898, *except names of kings since* 1066. The words distinguished by an obelus (†) appear more than once in Junior *Cambridge* Local papers.

(2) The "Senior Terms" contained in the second column include most of the technical terms used in both Senior and Junior Locals Papers. Those distinguished by an asterisk (*) have been explicitly "set" for definition or explanation: the others occur only incidentally, but their very appearance in the papers seems to imply an expectation—not always realised, I fancy—that the candidates know their meaning. Some of the entries may appear trivial; but I have frequently found boys going in for the Senior Grade freely confusing such terms as "battle," "campaign" and "war." The advice given by several writers on geometry in these columns that Euclid's definitions should not be learnt *en bloc*, but rather as they turn up in use, applies also, I imagine, to these technical terms in the sphere of History.

Words printed in *italics* are found in both Oxford and Cambridge *Junior* Papers: words printed in dark type are found in all four sets of papers—*i.e.*, Oxford and Cambridge, Senior and Junior.

JUNIOR TOPICS.	SENIOR TERMS.
1. Agincourt.	Act.
2. Amiens.	Administration.
3. Anjou.	Aids.
4. **Anselm.**	Appellant.
5. Arras.	*Archbishop.*
6. Arthur of Brittany.	Assize.
7. Assize of Arms.	*Attainder.
8. *Bannockburn.*	*Baron.*
9. †*Barnet.*	**Battle.**
10. *Barons' War.*	**Benevolences.*
11. Beaufort.	Bishop.
12. Bec.	Borders.
13. **Becket.**	*Burgess.
14. Bedford.	Campaign.
15. *Black Death.*	Cardinal.
16. *Black Prince.*	*Chancellor.
17. Boniface VIII.	Charter.
18. Boroughbridge.	**Church.**
19. *Bosworth.*	Civil.
20. Bouvines.	**Claim.**
21. **Bretigny.**	Classes.
22. *Calais.*	*Clergy.
23. Canute.	Congress.
24. Caxton.	Conqueror.
25. Château Gaillard.	**Conquest.**
26. Chaucer.	Constitutional.
27. **Clarendon.**	**Constitutions.**
28. *Crecy.*	Court.
29. *Crusade.*	Criminal.
30. David of Wales.	Crown.
31. **Domesday Book.**	Deposition.
32. *Dunbar.*	Duke.
33. Dunstan.	Dynasty.
34. Edgar.	*Earl.
35. *Evesham.*	*Emperor.
36. Falaise.	*Eyre.
37. Falkirk.	***Feudal.**
38. Good Duke Humfrey.	*Friar.
39. Good Parliament.	Genealogy.
40. Grosseteste.	*Hide.
41. Hastings.	*Homage.
42. Hexham.	Independence.
43. Hubert de Burgh.	Insurrection.
44. Hundred Years' War.	*Jury.
45. **Ireland.**	*Justice.
46. *Joan of Arc.*	*Justiciar.
47. John of Gaunt.	King.
48. **King Maker.**	*Knight.
49. Lambert Simnel.	Labourers.
50. **Lancaster.**	Lawyer.
51. Lanfranc.	Legate.
52. *Langton.*	Liberty of the Subject.
53. *Lewes.*	Lord.
54. †**Lollards.**	*Maintenance.
55. **Lords Ordainers.**	*Manor.
56. Mad Parliament.	Marshal.
57. †**Magna Carta.**	Mise.
58. Maid of Norway.	Monarchy.
59. *Margaret of Anjou.*	*Monk.
60. Merciless Parliament.	*Mortmain.
61. Model Parliament.	National Council.
62. Morton's Fork.	Nobles.
63. **Normandy.**	Opposition.
64. †Northallerton.	*Orders.
65. Northampton.	Overlordship.
66. Offa.	**Parliament.**
67. Oldcastle.	**Party.**
68. Orleans.	Peasant.
69. *Oxford.*	*Peer.
70. Peckham.	*Pipe-rolls.

Junior Topics.	Senior Terms.
71. Pecquigny.	Plantagenet.
72. †*Perkin Warbeck.*	*Poll-tax.
73. Piers Gaveston.	*Pope.*
74. *Poitiers.*	*Port-reeve.
75. Poyn'ings' Law.	*Præmunire.
76. *Provisions of Oxford.*	*Prince.*
77. *Robert of Normandy.*	Privilege.
78. Roger of Salisbury.	Procedure.
79. *Runnymede.*	*Protector.*
80. St. Albans.	Rebellion.
81. **Scotland.**	Reform.
82. †Senlac.	Restoration.
83. †*Simon de Montfort.*	Right.
84. Sluys.	Saint.
85. †**Star Chamber.**	*Scutage.
86. *Tenchebrai.*	*Sheriff.
87. Tewkesbury.	Siege.
88. Thomas of Lancaster.	Social.
89. *Towton.*	State.
90. Troyes.	Statesman.
91. *Wakefield.*	Statute.
92. **Wales.**	Taxation.
93. *Wallace.*	Title.
94. **Wars of the Roses.**	*Treason.
95. **Warwick.**	*Treaty.*
96. **Wat Tyler.**	Trial.
97. Winchelsey.	*Villan.
98. Winchester.	**War.**
99. **Wyclif.**	*Witenagemot.
100. **York.**	*Yeoman.

THE QUANTITATIVE SHIBBOLETH.

A Plea for the Simplification of Science Teaching.

By Harold Picton, B.Sc.(Lond.)

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In the old days practical chemistry was either "test-tubing" or "gas-making," usually the former, while practical physics was almost unheard of. Chemistry was an affair of colours and smells; physics of text-book problems. We have advanced since those days, and there has been much mutual congratulation on the work of our school laboratories, but it seems to me that we are now in danger of another mistake. Chemistry and physics now, alike, too often mean quantitative manipulation and numerical result. The burette, the balance and the half-metre rule reign supreme, and so far has our "advance" gone that the mere statement of this fact will to many seem equivalent to the highest praise. But the ability to use instruments with care and accuracy is not the one qualification of either chemist or physicist, and, most assuredly, it is not the only lesson which science has to teach.

Some time ago I noticed that a reviewer praised a school book by saying that it should serve to convince boys that science is measurement. I should object that science *is not* measurement, though it often *applies* measurement, and that, when you had succeeded in convincing your boys that it was, you would have made them heartily sick of your subject. Dexterous and quantitative manipulation can be learned in the manual room, and the manipulative results are far more useful, educationally, than burette practice. In fact, "buretting," if the barbarism may be allowed, is just as evil as "test-tubing." A boy can learn by rote how to carry out a careful quantitative experiment and know scarcely at all what he is doing. Mental training is, indeed, not one whit more ensured by these methods than by the old ones. They are tempting because they are easily recorded and can be easily examined. A long list of results with a low percentage error will sway the judgment of a certain type of inspector. But if we are at all artists in our work I do not think that these results will, in the end, satisfy us. We shall probably determine to approach quantitative results much more gradually, and I think we shall find that the cream of our educational work has been skimmed before we reach them.

What is often lost sight of is the comparative lateness of the development of quantitative reasoning in science. Only in the work of Black and Cavendish do we reach *continuous* application of quantitative methods. I think we may conclude that in the individual experience quantitative scientific reasoning will come late.[1]

To illustrate the above remarks I will next jot down, in the form of notes, some typical observations which I think boys should make in chemistry. The experiments are very commonplace, but my point is that often now not enough is made of them.

The observations which follow are supposed to be made by boys of 12.[2]

The problem proposed is to find out what happens when substances burn.

(1) Light a candle. Observe carefully. Describe the flame. (It is not the same all over, &c.) What is happening to the candle? Getting less. How is that? Either it is changing into nothing or into something that we can't see. Do things usually change into nothing? Mention any "stuff" that we can't see. (Air is supposed to have been proved to be a "stuff.") If the candle changes into something we can't see, where has that something gone to? The air. Then probably the air will be altered. How find out? This leads up to burning in a small space of air.

(2) Burn candle under bell-jar. Observe results.

Conclusions.—Air is changed; drops of some colourless stuff formed which seems like water. If the air had not been changed for how long would you expect the candle to burn? If we used a bigger bell-jar what difference should we notice?

(3) Burn two candles simultaneously under bell-jars of different sizes.

(4) Raise bell-jar before candle goes out.

We learn from these experiments that a candle needs air to burn in, and, while burning, it changes the air in some way and little drops of a colourless liquid are formed.

[1] Mensuration is on a different footing; it is not science at all. The earlier stages belong to concrete arithmetic, which we still terribly neglect; the later stages are best taken as a part of school mathematics.

[2] So far as I know, Mr. Temple Orme is the pioneer of the application of these methods in his remarkable little book, "The Rudiments of Chemistry."

Every point in the argument should be entered in pencil at the time of the experiment and afterwards copied out. The teacher had better *at first* dictate the form of entry.

At this point the general scientific method of classification and arrangement can, without naming it, be led up to. What more can we try with the candle? Probably no good suggestions will be forthcoming, but if they are, then follow them out. Otherwise say we cannot get any further with this one example of burning, therefore let us try other cases and see whether our results will help each other. In science we never stop too long over single cases. What shall we burn? A list of appropriate substances might be given and the boys allowed to choose from that. Slight modifications of method will meet different cases, but it is very likely that the choice will be phosphorus. If so we shall proceed:

(5) Burn a small piece of phosphorus in the open air. Observe carefully all that happens. What shall we try next?

(6) Burn under well-ground bell-jar. Examine (*a*) residual gas, (*b*) white powder. Compare the residual gas with that left after burning a candle.

Air has been again changed. Now lead up to the question in what *way* has the air been changed. Has something been taken away or added? In what way can we find out? We shall be led thus to

(7) Burn phosphorus under jar standing in water.

(8) Burn phosphorus in flask and weigh resulting powder.

Conclusion.—*Perhaps* powder contains phosphorus and part of the air.

Experiments 1 and 8 are examples of imperfect quantitative reasoning. But the reasoning remains for the most part qualitative.

(9) Did the *candle* take something from the air? Burn over water and observe gradual shrinkage. A fairly stiff problem here presents itself. If the candle takes away part of the air, where does that part go to? We have no powder formed. If the problem proves too stiff leave it unsolved.

(10-14) Proceed next to other cases, as magnesium, copper, iron, lead, mercury. Notice properties of the "calces." Notice also that some substances do not change on heating in air.

(15) At this point get the boys to devise some new method for observing the action of such a metal as copper on the air. Place copper in round flask. Cork tightly or seal up. Heat. After cooling, open under water.

Both phosphorus and copper take away something from the air. Do they take away the same amount?

Here naturally follow our first complete quantitative observations. We could lead up to the three following:—

(16) Burn phosphorus in closed round flask. Open under water. Measure water that has entered. Measure total capacity. Determine volume lost. Calculate result in percentages.

(17) Similarly with copper, iron, &c.

(18) Graduated tube and stick of smouldering phosphorus. Approximately the air loses the same proportion in each case. What was taken away? Where is it? Can we get it back?

(19) Heat often changes things—*e.g.*, wood. Try heating the "calces." Let different boys heat different ones. Discovery of the fact that calx of mercury changes and gives us back mercury.

(20) Is anything else formed in the last case? Repetition of heating of calx of mercury by the whole class, changes of colour, &c., being carefully noted. It gives us mercury and a new gas. We must collect some of the gas.

Two lessons (21-2) should here be devoted to glass-bending, cork-boring, &c. Oxygen should then be collected and its properties observed.

(23) Burn phosphorus, magnesium, &c., in oxygen. Observe that the same calces are formed as on combustion in air. What, then, are they made of? They are called oxides.

(24) Finally, air should be synthesised from oxygen and nitrogen.

In the next stage of the combustion course, which would begin a new term, charcoal is burned and the properties of the gaseous "calx" noticed. Hydrogen is prepared and burned, the water collected and its properties (already known) used for identification. The combustion of the candle is then repeated and fully explained.

Given 1½ hours per week, the combustion course should be completed in a year. The first week we should take practical work with pencil notes. The second week we should talk over methods and results, and fair copies of notes would be written.

A new subject for research would be offered by the difference between chalk and quicklime. In this we could follow, in the main, Black's own course of reasoning, both qualitative and quantitative.

After this it would, I think, be well to enter upon a Priestley epoch in our work and observe a considerable range of reactions and products. For instance, take the actions of the three common acids on metals and other substances, observing, as far as possible, the properties of all the products, whether solid, liquid, or gaseous, and in this connection several useful bits of research could be worked out. Take, for instance, the composition of muriatic acid. We prepare it, try to collect over water, next over mercury, next by downward displacement. Observe the action of the solution on zinc, iron, magnesium, copper. From the first three observations the suggestion arises that the gas contains hydrogen. But might not the hydrogen come from the water or the metal? Note that more than one metal can be used. Next pass the *gas* over heated magnesium. Try also the action of sodium on the dry gas. If hydrogen is present in the muriatic acid gas, certainly there must be something else too. It does not behave like pure hydrogen. What is the something else? How can we take away the hydrogen from it and get it alone? What would take away the hydrogen? Try oxygen. Try also oxides. Finally arrive synthetically at the composition of the gas, which we may now call hydrogen chloride or hydrochloric acid.

Later on the amounts of gas evolved, equivalent weights of metals, &c., may be observed, but these observations are of little use and less interest unless led up to by many general observations. In fact,

they must present themselves as a *necessary* part of the enquiry.

The above will suffice to indicate general methods. It is important to bear in mind that at no stage ought we to aim at a manipulative accuracy which is quite out of proportion to the accuracy of thought. The thought and manipulation should develop *pari passu*, or we shall have the relationship unnatural and finally disconnected. There is, too, the important fact that an unnatural accuracy of this kind—an accuracy the *need* of which cannot be understood—is necessarily infinitely wearisome. If we were compelled daily to weigh our potatoes to milligrams, and could see no sufficient reason for doing so, we should feel rebellious. So does a boy of 14 who cannot see that an error of one per cent. is serious. It is not, *for him*.

THE TEACHING OF ENGLISH LITERATURE.

By J. A. Nicklin, B.A.

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King Richard II.

III.—Construction.

ONCE more we must retrace our steps. Having first read the play for the plot, and again for a study of the characters, we have now to examine it a third time for a consideration of its dramatic construction — an examination which will require us to review some of the results of our first and second reading. Dramatic construction depends on plot and character-building, with some definite end to which both should conduce. But let us, before we proceed to any detail, remind ourselves of the general intention, as we originally stated it, of the play. That intention is, we said, first a study in psychological history—what are the moral crises through which a king will pass on his way from absolute power to absolute ruin ?—secondly, a study, one might say, in the philosophy of history —what are the causes (as conceived by an Elizabethan) which produce civil war ?

It will give us some insight into Shakespeare's handling of a dramatic theme if we look at the material which he had to work upon and the liberties which he took with it. Without burdening ourselves with *prolegomena*, we may take it that Shakespeare's authority—practically his sole authority—was Holinshed, whom he has followed, with certain exceptions to be made, undeviatingly in matter of history, only filling in the canvas, where it is bare, with imaginative accessories. Shakespeare's deviations from historical authority fall under these two heads:—(1) alterations of chronology; (2) the attributions of unhistorical qualities to his characters.

Chronological Inaccuracies.

In the matter of chronology, the chief inaccuracies relate to the term of Bolingbroke's exile, and the proceedings of the Parliament which deposed Richard. In Scene IV., Act I., Aumerle returns to court from escorting Bolingbroke on his way to take ship. Apparently the day of his return is also the day of Bolingbroke's setting out for exile. Immediately afterwards Richard is summoned to the death-bed of old Gaunt at Ely House, and there, as soon as Richard has withdrawn, Northumberland informs the malcontent nobles that Bolingbroke has assembled a force on the coast of Brittany, ready for invasion. It would seem that Bolingbroke has arrived in France, and got together an army and ships, on the very day of his quitting England! As York, in his remonstrance with Richard, has alluded to the breaking-off a match which Bolingbroke had thought to make in France, the abbreviation of time becomes grotesque. On the other hand, the freedom in which Shakespeare has indulged to crowd all the proceedings of Parliament in Richard's deposition, and also the attack made upon Aumerle by Bolingbroke's adherents, into the same day, stands on quite another footing. It is justified, or rather demanded, by dramatic conditions, which do not allow of the slow and interrupted evolution of events that belongs to reality, and look not to chronological order, but only to the sequence of cause and result. In the same way, dramatic exigencies wrought on Shakespeare to make Richard present at these transactions, contrary to the actual fact. It would have been much less satisfactory to represent Richard as merely learning through a messenger what had been done in Parliament.

Unhistorical Qualities of Some of the Characters.

In the liberties which Shakespeare has taken with the characters of the play, it should be noted that he has made the Queen—really a child of eight—a grown woman. This was done that the lovable side of Richard's nature might be drawn out in adversity. The character of John of Gaunt is raised, and the prophetic speech attributed to him is entirely Shakespeare's invention. Shakespeare wished to suggest an older England, when loyalty and law-abiding prevailed, breaking down before, on the one side, an influx of luxuriousness and riot, on the other, the factiousness of the barons. Mowbray is made much older than he was in truth, that his exile may be the more pathetic. Aumerle only begs for his pardon, and does not betray his associates, because Shakespeare wished to develop with some fulness the character of one of Richard's favourites, who should further enlist our sympathies for Richard by himself sympathising with him, and who therefore must not be altogether contemptible. The character of Richard himself is not conceived altogether on the lines of history. He was bolder, more prompt,

more ambitious, and shrewder than Shakespeare's Richard.[1] "He was not an idle trifler like Edward II., nor a shiftless spendthrift like Henry III., but a singularly gifted man, handsome, brave, generous, intelligent, merciful, and able to act boldly and quickly when he chose. His path was never free from difficulty and danger—family quarrels, foreign hatred, and English discontent, a heritage of trouble that came to him with his crown, but he was on the verge of safety when he ruined himself by two or three false steps taken in the interest of his friends rather than of himself or his people. . . . Richard was no brutal or heartless tyrant, and if his luck had not left him, he might have put away the follies, set right the mistakes, into which his youth and his young counsellors had led him, and so reigned more happily than his supplanter. However, he had had his chance and failed, and the English people, perhaps rightly, would not give him another, though he had a few warm friends who could not forget his fair face and open hand, and pitied his fate."

But Shakespeare did not wish to draw the portrait of a statesman who failed, the unsuccessful plotter of a *coup d'état*. His conception, for which he chose Richard as a type, willing to sacrifice some part of historical accuracy to his purpose, was of a spirit too romantic, too much enamoured of the fair shows and pomps of life, to cope with hard, prosaic reality. In fact, he has anticipated the career of a Ludwig of Bavaria. The gain of such treatment is immense. He has made the issue between Richard and Bolingbroke an issue of character—the romantic against the practical—instead of an issue of policy. It is to be noted that Shakespeare has deliberately chosen the last period alone of Richard's rule for representation, in order to maintain this point of view undisturbed. Earlier events would have shown Richard planning with great skill and striking with no little daring. As it is, we see only a king who can be dignified and magnificent, but effective never. A slighter instance of variation from the recorded fact, to harmonise with Shakespeare's preconception of character, occurs in the meeting, with its preliminaries, of Bolingbroke returned to claim his estates, and Richard. The Richard of history, when he saw Bolingbroke, "smiled and said, 'Welcome, fair cousin!'" It was the calm irony of a strong man who saw that the game was up. Shakespeare's Richard sends a formal message through Northumberland. "His noble cousin is right welcome hither." When he meets Bolingbroke, face to face, he cannot contain himself, but breaks into reproaches. Shakespeare makes Richard offer his resignation, anticipating in despair Bolingbroke's demand. The real Richard resigned under compulsion in prison, after a fruitless attempt to escape.

Shakespeare has elaborated the description of the captive king's entrance into London. He puts it in the mouth of a sympathetic narrator. A modern play—we may take the *Robespierre* of Sardou as type—would have represented the scene on the stage. Our attention would be concentrated on the mob and its emotions. Richard would be almost lost in the crowd.

TRAGIC IRONY.

One of the most powerful of dramatic effects is what is known as "tragic irony." We had previously noticed an instance of this where Richard banishes the two dukes, lest "grating shock of wrathful, iron arms might, from our quiet confines, fright fair peace." We can see it in the hurried farewells of the favourites, when they hear of the rising. Bushy is inclined to be hopeful. "Well, we may meet again." Bagot presages otherwise. "We three here part that ne'er shall meet again." The sanguine Bushy was executed. Bagot's resignation to fate did not prevent him from becoming a turn-coat and informer. The same mocking spirit overrules the scene at Barkloughly Castle. Richard's spirits, dashed by ill hap, have risen to a confident pitch each time at the very moment further tidings of disaster are about to be announced. The converse of this effect occurs when some evil is apprehended by a presentiment which is promptly confirmed, as in the scene of the queen and her courtiers.

GENERAL MOVEMENT OF THE PLAY.

Shortly to resume the movement of the play, it opens with a cloud of guilt and factious hate lowering with threats, the guilt of Gloucester's death and the feuds of nobles like Bolingbroke and Mowbray. The king's character appears in a darker and darker light, till at Gaunt's death he is positively hateful. But then we are shown the genuine affection of which he is the object in the queen's heart. As misfortunes gather, we begin to sympathise. We see the strong, decisive actions of Bolingbroke contrasted with the irresolution and self-pity of Richard. Richard's deposition and ill-treatment incline us to favour the conspiracy, till we see by Aumerle's cowardice that Richard's followers are not fit to succeed, by York's horror that the country would not favour the conspiracy, and from the king's cold magnanimity that he is not the man to be easily overthrown. Then we see that the conspiracy will lead to Richard's death. He is shown to us enjoying his first pleasure—a pleasure so simple that it is deeply pathetic—since his captivity. Death follows quickly. When Richard is dead, we see that his murder is not only a crime but a blunder. The conspiracy was already wiped out. Though Henry disowns the act, and all ends with a show of tranquillity, we feel that, out of these crimes of usurpation and murder, a storm is already gathering to devastate England and to shake the usurper's throne.

[1] Professor York Powell, in his "History of England."

TEL MAÎTRE, TEL VALET.

Original French Play in One Act.

By Mrs. J. G. Frazer (Lilly Grove).

Le Dr. Lamart - - - -	Chirurgien.
Jules Delhomme - - - -	Propriétaire.
M. Noirelle - - - - -	Ministre des Finances.
Jean - - - - - - -	Domestique.
Elise (nièce de Jules Delhomme)	
Madeleine - - - - -	Servante.

La Scène se passe à Paris de nos jours.

Le Docteur Lamart, vêtu à la dernière mode est assis dans un cabinet fort élégant : la pièce est ornée de beaux tableaux et de jolies draperies ; beaucoup de bustes sur les consoles. A droite un secrétaire en chêne sculpte au dessus duquel on voit un appareil téléphonique avec sonnerie, tuyaux, &c. Porte au fond ; deux portes latérales. Le Docteur Lamart écrit.

Scène VII.

Jean.—Pardon, monsieur, il y a vingt-sept personnes qui attendent.

Le Docteur.—Eh bien que veux-tu que j'y fasse ?

Jean.—C'est qu'il y en a huit qui attendent dans la salle à manger et le déjeuner de monsieur attend aussi.

Le Docteur.—Cela, c'est sérieux.

Jean.—Ils gémissaient, ils se fâchaient, ils criaient : à quand mon tour ? Alors pour les calmer je leur ai donné à lire les brochures de monsieur.

Le Docteur.—Eh bien ?

Jean.—Ils se sont endormis dessus.

Le Docteur.—Parfait ; le sommeil est réparateur.

Jean.—Et puis cela tue le temps.

Le Docteur.—Tu aurais pu leur montrer le Kal . . .

Jean (*interrompant.*)—Non, monsieur ; je réserve le kaléidoscope comme dernière ressource pour faire patienter le monde pendant que monsieur déjeune (*on entend un timbre*). Encore quelqu'un !

Le Docteur (*à Jean*).—Arrange-toi comme tu pourras, mais sers nous à déjeuner, je meurs de faim.

Jean.—Bien monsieur. (*Il sort.*)

Scène VIII.

Jules.—Ton domestique paraît intelligent et débrouillard.

Le Docteur.—Un vrai trésor, mon cher ; il est capable de me remplacer à l'occasion.

Jules.—Mon ami, je te le répète viens donc demeurer près de moi ; quitte Paris et cette course au clocher . . . Elise t'écoutera tandis que tu nous liras tes sonnets.

Le Docteur.—La perspective est charmante, mais . . . enfin nous en causerons tout en dégustant un Château-Margaux . . .

Jules.—Tes pauvres malades qui t'attendent me font vraiment de la peine !

Le Docteur.—Bah ! tu es bien bon de t'apitoyer sur eux ; mon cher, la majorité des maladies du siècle sont purement imaginaires.

Jules.—En es-tu sûr ?

Le Docteur.—J'en suis convaincu ; à notre époque de surmenage, c'est surtout l'imagination qui produit ces effets sur le système nerveux, et on ne peut les guérir que par l'imagination.

Jules (*incrédule*).—Tu m'en diras tant !

Scène IX.

Jean.—Ces messieurs sont servis.

Le Docteur.—Et les malades ?

Jean.—Que monsieur soit tranquille, monsieur peut compter sur moi.

Le Docteur (*à Jules*).—A table mon ami ! (*Jules dépose le cahier de vers sur le sofa et sort avec le Docteur.*)

Scène X.

Jean (*Il époussète les bustes*).—Monsieur a ses trucs ; je les connais tous ; moi aussi j'ai les miens, mais monsieur ne les connaît pas. L'essentiel dans la vie c'est de se remplir les poches (*il fait sonner l'argent dans ses deux poches*) et la place est bonne pour cela ici ! Monsieur est souvent distrait . . . il fait des vers . . . Il croit que je n'en sais rien . . . Mais je sais tout, moi, grâce à l'appareil acoustique que je me suis réservé (*au public*). Vous allez voir, ou plutôt entendre ce que monsieur dit à son ami : (*Il remonte un ressort dans la paroi*). Monsieur casse un œuf à la coque. C'est bien . . . Son ami lui dit : viens vivre avec nous . . . Monsieur répond : je le voudrais mais . . . je suis sans fortune . . . je n'ai que ma clientèle . . . Son ami lui dit : je suis riche, ma nièce est mon héritière elle aime les vers . . . Le Docteur s'écrie. Ah ! et son ami de continuer : qui sait si Elise n'aimerait pas aussi le poète ? (*Au public.*) Voilà comment je me renseigne, moi ! voilà comment je fais ma police. Si monsieur renonçait à . . . Quel rêve ! . . . Voyons Jean, mon ami, à l'ouvrage ! (*il s'approche d'un placard et en tire une perruque, des lunettes bleues, une robe de chambre chamarrée, une calotte de velours*) (*s'habillant*) là ! me voilà équipé. (*Il ouvre une porte latérale et crie.*) Le numéro un, s'il vous plaît.

Scène XI.

M. Noirelle (ministre) (*très timide portant un paletot sur le bras*).—C'est au célèbre Docteur Lamart que j'ai l'honneur de parler ?

Jean.—(*salue en silence et lui fait signe de prendre un siège.*)

M. Noirelle.—Je souffre de . . .

Jean (*brusquement*).—Pardon (*il prend un registre et prétend écrire*). Votre nom, votre âge, votre profession ?

M. Noirelle.—Louis Noirelle, soixante ans, ministre des finances.

Jean (*à part*).—Ministre des finances ! il me paiera sa visite à double prix. (*Haut*) Et vous souffrez ?

M. Noirelle.—Horriblement . . . là entre les deux yeux.

Jean (*faisant semblant d'écrire*).—Deux yeux, c'est peu de chose. Si monsieur avait dit entre les *quatre-z-yeux* j'aurais cru le cas plus grave.

M Noirelle.—Quatre-yeux ? je n'ai jamais ouï-dire.

Jean.—Oh, nous autre membres de la faculté nous voyons tant de choses extraordinaires ! Nous disons donc deux yeux . . . C'est une névralgie optique oculaire et frontale (*à part*) j'ai bien retenu tous ces mots, monsieur dit toujours comme cela, je connais toutes les formules de monsieur.

M. Noirelle.—Peu m'importe comment vous appelez mon mal, le nom m'est indifférent, mais je vous prie de me guérir, monsieur le docteur.

Jean (*songeur*).—Il y a bien un remède infaillible . . .

M. Noirelle.—Lequel ? Je le prends, quelque désagréable qu'il soit.

Jean (*se tenant le front*).—C'est que . . .

M. Noirelle.—Monsieur le docteur, j'ai une foi absolue en votre science.

Jean.—Grand merci (*on entend un timbre. Jean s'oubliant*). Ah le timbre de Monsieur (*il se lève et s'apprête à ôter sa robe de chambre.*)

M. Noirelle.—Plaît-il ?

Jean (*se remettant*).—Ne faites pas attention, monsieur. Une de nos habitudes à la faculté.

M. Noirelle.—Alors ce remède?

Jean.—Consiste à suspendre un gigôt de mouton frais tous les jours dans votre cabinet d'audience.

M. Noirelle (*se lève et dit avec raideur*).—Monsieur le Docteur, je n'aime pas les plaisanteries.

Jean.—Monsieur le Ministre, je ne plaisante pas, je suis absolument sérieux.

M. Noirelle.—Vous croyez que . . .

Jean.—Je vous ai nommé le remède (*on entend un timbre; Jean s'oubliant encore une fois*) Si monsieur veut que je lui aide à endosser son paletot?

M. Noirelle (*très étonné*).—Plaît-il?

Jean.—Oh, encore une habitude que nous avons à la faculté, nous aidons toujours le patient à s'habiller.

M. Noirelle.—Vraiment?

Jean (*tendant la main*).—C'est 40 francs, monsieur.

M. Noirelle (*intimidé*).—Quarante! je croyais . . .

Jean.—C'est double consultation.

M. Noirelle.—Double?

Jean.—Mais, oui; une névralgie entre les *deux* yeux (*nouvelle sonnerie*). Pardon, monsieur, si monsieur . . . *il tend de nouveau la main et ouvre la porte du fond.*

M. Noirelle (*payant les quarante francs*).—Vous croyez que le gigôt?

Jean.—Frais . . . Assurément. Au revoir, M. le Ministre (*il le pousse dehors*).

SCÈNE XII.

Jean.—Deux louis (*il fait sonner les pièces*). Voilà comment on arrive quand on est dans le train! (*Sonnerie dans le buste de Shakespeare. Jean écoute à l'oreille du buste.*) Ah qu'est-ce qu'il veut ce vieux-là, il m'embête . . . je vais faire comme monsieur . . . je coupe la communication . . . (*Un timbre.*) Bon! encore du monde, redevenons le domestique (*il ôte sa robe de chambre, sa calotte, ses lunettes et sa perruque, les jette dans le placard et sort en courant*).

SCÈNE XIII.

Madeleine habillée en campagnarde avec un grand parapluie bleu; puis Elise.

Madeleine.—Mademoiselle, êtes vous bien sûre que ce soit ici? Ce grand monsieur, tout galonné d'or a dit, entrez là, à droite.

Elise.—Eh bien? . .

Madeleine.—Eh bien, mademoiselle a pris la porte à gauche.

Elise.—Tu sais, ma brave Madelon, que lorsque l'on me dit: à droite il me prend une envie folle de passer à gauche.

Madeleine.—Oui, je sais bien cela, mais mademoiselle, chez un Docteur il faut faire attention.

Elise.—Pourquoi?

Madeleine.—On ne sait jamais; vous auriez pu voir quelque chose d'affreux ici.

Elise.—Par exemple?

Madeleine.—Une jambe coupée, un oeil crevé, une mâchoire. . . .

Elise.—Assez . . . . Au contraire, c'est très joli ici; regarde les beaux tableaux, les jolis bustes (*elle les touche*).

Madeleine.—Mademoiselle, prenez garde . . . . chez un docteur, il ne faut jamais toucher à rien; ils ont un tas de manivelles, de ressorts secrets.

Elise.—Tu confonds les docteurs avec les sorciers.

Madeleine.—Il n'y a pas grande différence, ils se valent, allez!

Elise.—Le Docteur Lamart est un des princes de la science.

Madeleine.—C'est possible, qu'est-ce que cela nous fait, nous ne sommes pas malades? Mais où est donc votre oncle?

Une voix (*sortant du buste de Démosthène*).—Aïe, aïe que j'ai mal, docteur, docteur!

Madeleine.—Miséricorde! . . . (*elle regarde autour d'elle;* sauvons nous, mademoiselle, j'ai peur, on a parlé.

Elise.—Mais non, c'est dans la chambre contigue (*Elle examine le buste de Shakespeare*). Ah Shakespeare, mon poète favori (*elle ramasse le cahier de vers et lit.*) J'ai trouvé des vers —quelle joie! (*elle s'enfonce dans un fauteuil*).

Madeleine.—Mademoiselle, ne lisez pas . . .

Elise.—Laisse moi . . . (*elle tourne les pages*). "Pourquoi gémis-tu sans cesse, O mon âme?" (*Parlé.*) Que c'est beau! (*Elle continue.*) "Et, qu'est-ce que la gloire? un vain nom! et qu'est-ce que la vie?"

Une voix (*sortant du buste de Shakespeare*).—Des pommes cuites! Ah! bien merci, je n'en veux plus de ses pommes cuites; je les jetterai au nez du docteur.

Madeleine (*affolée*).—Au secours, au secours! (*elle se précipite dans l'antichambre.*)

SCÈNE XIV.

La porte du fond s'ouvre. Le Docteur Lamart et Jules arrivent la bouche pleine et la serviette au cou; Jean les suit avec Madeleine. Les portes latérales s'ouvrent et les maladesse montrent; l'un a la joue enveloppée, l'autre a le bras en écharpe, un troisième a la tête bandée, &c.

Le Dr. Lamart.—Qu'y-a-t-il donc? (*aux malades.*) Mesdames et messieurs, si vous voulez attendre encore un petit quart d'heure?

Les Malaaes (*en chœur*).—Non, non, nous n'attendons plus. (*Ils se jettent sur le Docteur.*)

Jules (*dégageant son ami*).—Voyons, mesdames et messieurs.

Les Malades.—Nous souffrons . . .

Le Docteur à Jules.—Mon ami, tu avais raison tantôt; mieux vaut vivre loin des bruits de la ville et de tous les tracas; j'accepte ton offre. (*Aux malades.*) Mesdames et messieurs . . . j'ai l'honneur de vous annoncer que je me retire à la campagne . . . dorénavant je n'aurai plus l'avantage de vous soigner (*Murmures des malades; pendant ce temps Jean a ouvert le placard, et se cachant derrière un paravent a remis la perruque, la robe de chambre, &c.*)

Le Docteur.—Où donc est Jean?

Jean.—Présent, mon cher collègue (*il veut lui serrer la main*).

Jules (*à part*).—Il est joliment dans le train ce domestique là!

Le Docteur (*refusant la main de Jean, et parlant aux malades*).—Messieurs, je vous présente mon successeur, le Docteur Jean . . .?

Jean.—Mon patronymique est Martin.

Le Docteur.—Le Dr. Jean Martin, mon successeur.

(*Elise s'est amusée à retourner les bustes; on entend des murmures et des plaintes.*

Une voix (*sortant du buste de Shakespeare*).—Je ne veux plus de pommes cuites!

Une autre voix.—Le Docteur Lamart est un imbécile!

Une autre voix.—Aïe, aïe, que j'ai mal!

Jules au Docteur.—Viens, mon ami, viens te livrer chez moi à la poésie et à la nature, et faire des vers à loisir; ma nièce nous dira ce qu'elle en pense (*à Elise*) n'est-ce pas fillette?

Le Docteur.—C'est entendu. Je te suis. Adieu, mesdames et messieurs. Docteur Jean Martin, je te laisse ma clientèle. Bonne chance!

(*Il offre le bras à Elise*).

La toile tombe.

SOME NEW PHYSICAL APPARATUS.

I.

IT would be difficult to find more convincing evidence of the increasing popularity of practical instruction in physical and chemical science in schools of all grades than is provided by the sumptuously illustrated catalogues of the numerous instrument makers in all parts of the country. A more definite example of the law of supply and demand could hardly be discovered. This growing importance of the part taken by experimental work in science in British education has caused not only a remarkable cheapening of apparatus, but also the development of an astonishing ingenuity on the part of the manufacturer of the appliances necessary to exemplify scientific principles. Such are some of the conclusions to which a somewhat exhaustive examination of a large number of price-lists and other publications issued by the dealers in scientific appliances have led us. Bearing in mind the large demands upon the time and energies of science-masters and mistresses, a reference to some of the new pieces of apparatus which have been recently put upon the market should not only interest this section of our readers, but also save them a considerable amount of time.

As an example of the diminution in price to which reference has been made, the present cost of a simple and trustworthy spherometer may be mentioned. Until recently a spherometer capable of anything like accurate measurement could only be obtained at a cost of two or three guineas, while now, an instrument measuring to one two-hundredth of a millimetre can be purchased for six or seven shillings from Messrs. J. J. Griffin & Co., and Philip Harris & Co., among others. Though this is but one of numerous similar cases, it must suffice to point our moral.

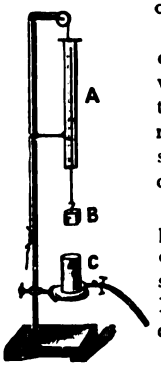


FIG. 1.—Moore's hydrostatic balance.

But the object of these articles is rather to call attention to recent pieces of apparatus which, with the aid of suggestions from teachers and writers, the manufacturers can now supply. And to facilitate reference we shall adopt the plan of dealing with various catalogues in order.

The Hydrostatic Balance, for illustrating the principle of Archimedes and the method of obtaining the relative density of solids, designed by Mr. Moore, and manufactured by Messrs. Brewster, Smith & Co., will repay a careful trial.

A is a delicate spring balance accurately graduated to read grams, and is capable of being lowered or raised by the string shown. B is one of the set of cubes of various metals supplied with the apparatus. C is a glass vessel with fixed mark etched in glass, up to which water, or other liquid, is placed. The vessel is provided with draw-off cock. To use the instrument the vessel C is filled up to the mark, a cube is attached to the balance which at once registers its weight: the balance and cube are then lowered until the cube is immersed in water, when the weight registered will be less than formerly. The displaced water is seen above the mark, and can be drawn off into a graduated measure, and the results checked.

The Cambridge Scientific Instrument Company, in addition to their numerous elaborate instruments for scientific research, have designed several pieces of apparatus specially for students' use, and teachers would do well to acquaint themselves with the firm's Contact Breaker, arranged for simple experiments; their inexpensive Rheostat, the resistance of which can be varied from 0 to 25 ohms; and their Students' Galvanometer, fitted with two coils of total resistance of about 10 ohms.

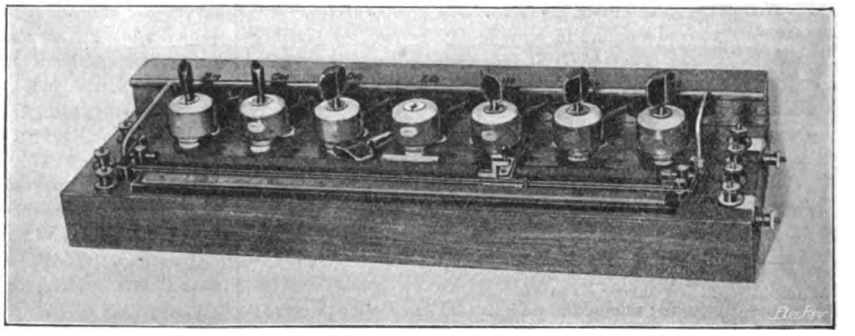


FIG. 2.—A new Wheatstone Bridge.

The new Wheatstone Bridge shown in Figure 2 (which we owe to the kindness of *The Electrical Review*) was patented by Prof. H. L. Callendar, F.R.S., and Mr. E. H. Griffiths, F.R.S. It is designed to get rid of some of the sources of error met with in the ordinary form of bridge. The arrangement consists of a wooden base on which are mounted seven porcelain plug holders, also bridge and galvanometer wires of platinum silver, and the necessary terminals for battery and galvanometer connections, &c. One end of the bridge wire is held by a brass spring, the tension of which can be adjusted in order to take up any looseness in the stretched wire due to shrinkage of the wooden base or to the lengthening of the wires due to change of temperature. This brass spring is adjusted by means of a screw set midway between the fixed end of the spring and the end to which the bridge wire is connected.

A Gas Regulator (Fig. 3), which can be used for maintaining any pieces of apparatus at a constant temperature, is also a very convenient arrangement. It consists of a glass vessel with a narrow tubular neck; this is filled with mercury, and forms

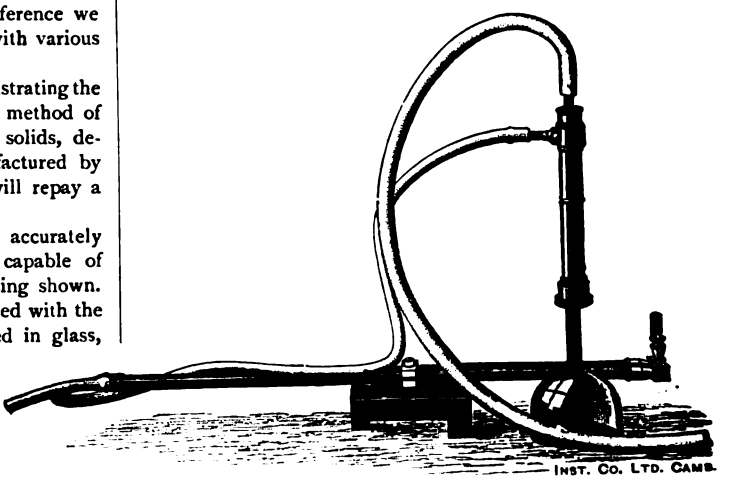


FIG. 3.—A new Gas Regulator.

a very large thermometer. The gas flows through a fine metal tube passing down the narrow cylindrical neck, and as the

temperature rises the gas supply is cut off by the mercury closing the open end of the metal tube. The gas supply can be regulated for any required temperature. Very constant results are obtained with this regulator, and with very little attention. A similar regulator completely made of steel is being fitted in the Natural History Museum at South Kensington—an arrangement which obviates any chance of fire owing to the india-rubber tubing perishing or the glass bulb breaking.

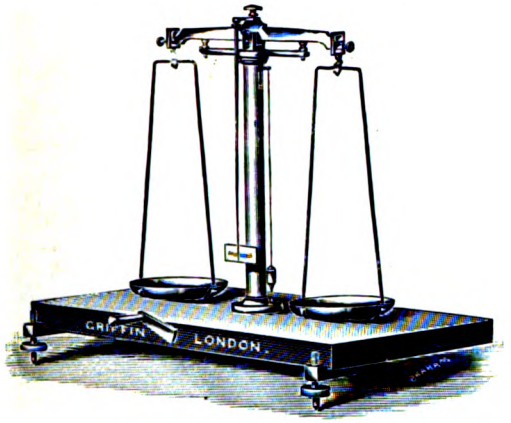


FIG. 4.—A cheap Student's Balance.

Messrs. John J. Griffin & Sons are selling for 24s. a trustworthy Balance suitable for elementary students, which is provided with an accurately-made plummet for levelling, and with removable stirrup suspensions with double hooks for specific gravity work. The Balance (Fig. 4) will carry 100 grams in each pan and turn to a milligram.

The Portable Limelight Apparatus made by this firm is well adapted for the use of lecturers who are called upon to lecture under conditions unfavourable to the supply of coal gas or oxygen. By means of this apparatus (Fig. 5) the two necessary gases can be generated rapidly and safely within five minutes

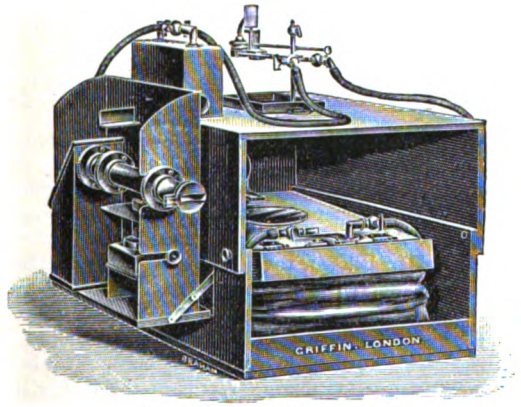


FIG. 5.—A Portable Limelight.

after starting. The oxygen is generated by the decomposition of small cylinders or *cartridges*, which are essentially composed of potassium chlorate and black oxide of manganese. These cartridges are fed, at intervals, through a horizontal metal retort, heated by a spirit lamp placed underneath. The spent cartridges, as they are pushed through, pass into a suitable receiver. The gas generated in this way passes through this cartridge receiver into the lower bellows, and is controlled by a stopcock with a spring lever by means of which the gas can be shut in. By pressing down the lever the oxygen is forced through a valve into the upper or pressure bellows. From the pressure bellows the oxygen passes through a stopcock, part direct to the jet to be burnt as oxygen, and part to a saturator which is supplied with gasoline. From this it emerges as a combustible mixture of carburetted oxygen, and as such flows to the jet. Teachers will also be glad to know that sets of the apparatus described in Prof. Glazebrook's well-known books on "Heat" and "Light" and in "Elementary General Science," by A. T. Simmons and L. M. Jones, can also be obtained from Messrs. Griffin.

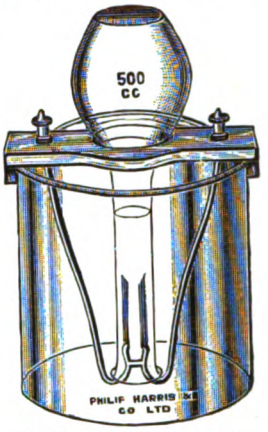


FIG. 6.—Apparatus for comparing the strength of electric currents by the decomposition of water.

Messrs. Philip Harris & Co. are prepared to meet every want of the science-master. We can only refer to a few of their novelties.

Fig. 6 is a cheap apparatus, with platinum electrodes, for comparing the strength of electric currents by the decomposition of water. The apparatus to show the change of temperature which accompanies the expansion or contraction of gases, which is illustrated in Fig. 7, is inexpensive and satisfactory. The

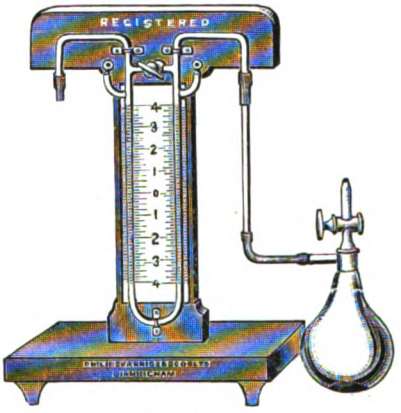


FIG. 7—Apparatus to show change of temperature accompanying expansion or contraction of gases.

cheap form of lantern with its wooden body (Fig. 8) may be used with limelight, incandescent gas lamp, or electric arc. It is filled with a four-inch condenser and an achromatic double

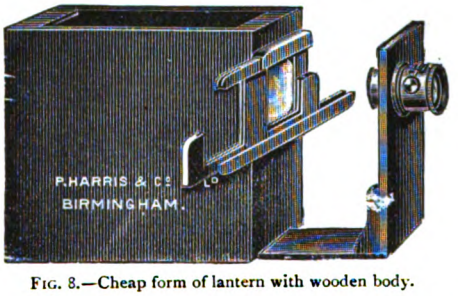


FIG. 8.—Cheap form of lantern with wooden body.

combination lens, and the front of the lantern slides out to enable any apparatus to be put between the condenser and the lens.

The Double Surface Condenser first described by Mr. Cecil H. Cribb, which is made in glass only by Messrs. C. E. Müller & Co., is sure to become a favourite form of instrument in school laboratories. A glass condenser of this pattern (Fig. 9), measuring $4\frac{3}{4} \times 1\frac{1}{8}$ inches, will condense over 1000 cc. per hour. There is a great economy of cooling water, the condenser is of extremely small size and weight, the condensing surface is easily cleaned, and the condenser is readily connected to other apparatus. Metal condensers of the same pattern are manufactured by Messrs. Griffin, who, as well as Messrs. Müller, also sell a very convenient stand (Fig. 10) for instruments of either material.

FIG. 9.—Cribb's form of Condenser.

Messrs. Reynolds & Branson, whose apparatus has a deservedly high reputation, have perfected new forms of spectrometer, constant battery and resistance box, and are also supplying a series of models to graphically illustrate the principal laws of light, including the formation of images by lenses, and the refraction and dispersion of light by a prism. Their single Gold-leaf Electroscope (Fig. 11) is not only to be obtained at a very small cost, but will retain its charge for an hour, and is already in use in many large schools of science.

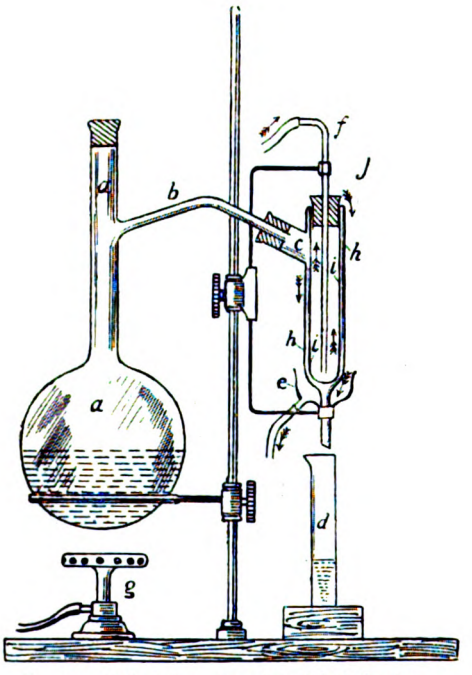


FIG. 10.—Müller's form of stand for Cribb's Condenser.

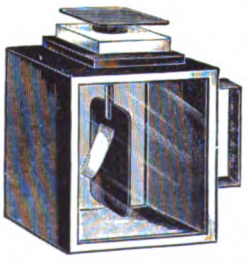


FIG. 11.—Single-leaf Electrometer.

Their Universal Science Lantern (Stroud & Rendall's patent) (Fig. 12) has been devised for the projection of experiments. In the short box in front of the lantern is a hinged mirror, so placed that by the movement of a stud it may be introduced and placed at an angle of 45 degrees with the parallel beam. The beam is thus reflected through a horizontal convergent lens, on which a slide or horizontal piece of apparatus can be placed. Above this is the objective mounted on a brass pillar, and above the objective a prism or mirror (if the screen is elevated above the lantern,

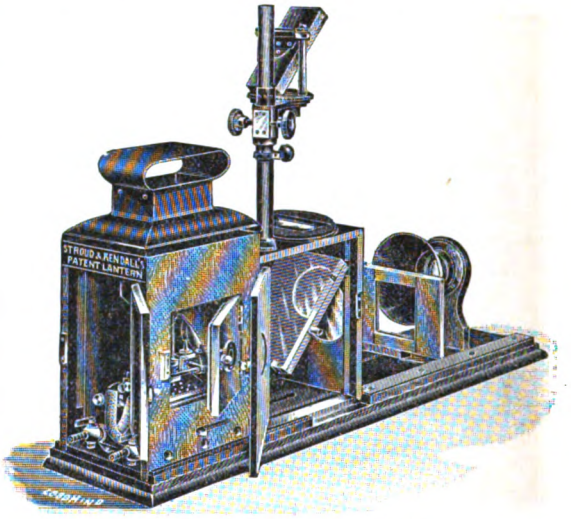


FIG. 12.—Stroud and Rendell's Lantern.

plain prisms are required for each beam), silvered on the outside, so that there is no double reflection. The mirror can be adjusted to any angle, and is intended to send the image in an approximately horizontal direction to the screen. Slides can also be directly projected in the usual way.

TEACHERS' NOTES ON ENGLISH HISTORY, 1603-1715.

By C. S. FEARENSIDE, M.A.(Oxon.), and L. J. MCNAIR, B.A.(Cantab.)

II.—THE REIGN OF JAMES I., 1603-1625.

THE reign of James I. is rather apt to be neglected, being treated either as a mere pendant to that of Elizabeth, or as a mere introduction to that of Charles I. Yet the personal and political position of James I. give the reign a unique position of its own. Some of the salient points are indicated briefly under headings **I.-III.** below; then follow a few miscellaneous hints as to sources of information, &c. The most essential matters are given under headings **I.** (all), **II.** v., **III.** i., and **IV.** ii.: the rest may be sorted and sifted at the discretion of the teacher according to the capacity of the class. It is better to teach too little than too much. Words in the text printed in **dark type** require some sort of explanation. The letter **"R"** (for retrospect) is inserted at certain places where some acquaintance with previous history is especially necessary.

I. Distinctive Features of James I.'s Reign.

(i.) JAMES'S PERSONAL POSITION.

(1) *James was a Scotsman*, and therefore a foreigner in England, not sharing the English national sentiment of hostility against Spain. (Compare and contrast other "foreign" kings of England.)

(2) *James was a family man.* His title to the English throne rested exclusively on hereditary descent (**R**), and he had children (contrast Elizabeth): hence his foreign policy was based not on the national dislike of "Popery," but on his **dynastic** interests.

(3) *James was a believer in kingship and kingcraft.* He came from a land where the **Clergy**, asserting the **supremacy** of the **Church** over all interests and persons, dictated to the king: hence in England he naturally leaned towards that ecclesiastical party which most distinctly recognised the supremacy of the king over the Church (and which should, therefore, not be labelled the "High Church" party).

(ii.) JAMES'S POLITICAL POSITION.

(1) **Scotland.** *James I. was the first king of England who held undisputed sway over Scotland* (**R**): the two kingdoms in Britain had the same king, or, in technical language, were united in **personal union.**

N.B.—Scotland did not "belong to England," nor did England "belong to Scotland": the two kingdoms were yoked together on formally equal terms. (See inscriptions on coins.)

(2) **Ireland.** *James I. was the first king of England who also bore effective rule over the whole of Ireland* (**R**): the submission of Hugh O'Neil, Earl of Tyrone, a few days before the death of Elizabeth, completed what is called "the First English Conquest of Ireland" (begun 1169).

N.B.—The Kingdom of Ireland, unlike the Kingdom of Scotland, did "belong to England"; it was, constitutionally speaking, a "dependency" (*Poynings' Law*, **1495**); and it was a *discontented* dependency. (Why?)

(3) **Colonies.** *James I. was the first king of England who "effectively occupied" territories outside Europe:* English colonial and commercial activity (rendered safe by the defeat of the Spanish Armada) was wide-spread, though as yet on a comparatively small scale.

N.B.—(*a*) The localities and character of this maritime and transmarine enterprise; (*b*) differences between the settlers in Virginia (1607) and New England (1620); (*c*) rise of commercial struggles with the Dutch in the Spice Islands (*e.g.*, 1623).

II. James I. and the English Parliament.

(i.) FIRST PARLIAMENT, **1604-1611**: five sessions.

(1) Vindicates its **privileges**—claiming them as **rights**, not **graces**:—

(*a*) **Freedom of Election:** *Goodwin's Case.*

(*b*) **Freedom from Arrest:** *Shirley's Case.*

(2) Asserts that king has no power to make laws concerning religion, except through Parliament.

[The teacher should read the text of the Commons' *Form of Apology*, **1604.**]

(3) Presses concessions to **Puritans** and persecution of Roman Catholics.

[Result: Gunpowder Plot—aimed at parliament as well as king.]

(4) Increases severity of penal laws against Roman Catholics.

[In what sense can these be regarded as "religious persecution"?]

(5) Rejects Bill for **Legislative Union** of England and Scotland, but repeals hostile Border laws.

[James, by **Proclamation**, assumes style "King of Great Britain," &c.]

(6) Remonstrates against "**Impositions**," Royal Proclamations, **High Commission Court.**

(7) Protests against Cowell's "Interpreter," which declared that "the king was above the law by his **absolute power.**"

(8) Refuses to sanction Cecil's *Great Contract—i.e.*, **commutation** of **feudal dues** (**R**).

(ii.) SECOND PARLIAMENT, **1614**: "**Addled.**"

(1) Appearance of "a strange kind of beast called **Undertaker.**"

[Anticipating the later system of controlling parliament by "**Influence.**"]

(2) Dissolved for refusing **supplies** until "Impositions" had been discussed.

(3) Several members of the Commons imprisoned.

(iii.) THIRD PARLIAMENT, **1621**: **two sessions.**

(1) Attacks **Monopolists**—Sir Giles Mompesson, &c. [Cf. 1601, 1624].

(2) Punishes Floyd for libelling **Elector Palatine.**

[Illustrates the fact that the struggle between king and parliament was not a simple issue between "**Tyranny**" and "**Liberty.**"]

(3) **Impeaches** Bacon for accepting bribes as **Lord Chancellor.**

(4) Petitions James to abandon the Spanish Match and to declare war. (Why?)

(5) Forbidden to interfere in Foreign Policy.

(6) Protests its right to discuss all matters of public interest.

[The teacher should read the Commons' *Protestation*, **1621.**]

(7) Coke, Pym, Selden, &c., imprisoned.

(iv.) FOURTH PARLIAMENT, **1624.**

(1) Votes supplies for war against Spain.

(2) Passes law making **illegal** the grant of monopolies to individuals.

[Granted to *companies* by Charles I. and finally abolished, *with certain exceptions*, by Long Parliament.]

(3) Impeaches **Lord Treasurer** Middlesex for bribery, &c.

[Prince Charles and Buckingham support this impeachment: James's warning.]

(v.) SUMMARY. Parliament attacks James's *constitutional methods* mainly because it disapproves of his *political objects* (ecclesiastical as well as civil): James asserts, and parliament denies, the lawful power of the king, without restraint of **Law** or parliament, to settle matters relating to:—

(1) *RELIGION.*
(2) *FINANCE.*
(3) *FOREIGN POLICY.*

N.B.—In all these cases the Stuart Kings tend to rely on the opinion and support of *official experts* (**Bishops, Judges, Ministers**) in opposition to the opinions and criticisms of *amateur politicians* in the Commons, on what James I. calls "matters beyond their reach and capacity."

III. James I.'s Foreign Policy.

(i.) FUNDAMENTAL FACTS.

(1.) *Western Europe divided into two main camps*: **Reformation** *v.* **Counter-Reformation.**

[These terms are less ambiguous than **Protestant** and **Catholic**: besides, many persons hold that the latter terms are not mutually exclusive.]

(2) *Chief Powers in the West.*

(*a*) *SPAIN:* champion of the Papacy. } Both under the rule
(*b*) *THE EMPIRE:* Papal; weak. } of **Hapsburgs.**

(*c*) *FRANCE* under **Bourbons**: "Catholic at home but Protestant abroad"; weak during the minority follow-Henry IV.'s assassination, 1610-1624.

(*d*) *ENGLAND* under **Stuarts**: Practically, but not professedly, champion of Protestantism under Elizabeth: divergence between government and nation increases after her death.

(*a*) James "the Pacific" is averse to war, particularly on the subject of religion: war as a weapon seems to him clumsy (he

prides himself on his skill in diplomacy) and expensive (and would make him dependent on Parliament for money).

(β) The nation, hating Spain as the chief Roman Catholic Power, is usually desirous of fighting her, "for God and gold."

ii. Principal Stages.

(1) First Period, **1603-1612**, under Cecil, who continues the Elizabethan policy of alliance with the Protestant Powers.

(2) Second Period, **1612-1618**: negotiations for Anglo-Spanish marriage—Prince Charles to Infanta.

(3) Third Period, **1618-1623**: James continues marriage negotiations, hoping at first to *prevent*, later to *stop*, the "religious" war in Germany by the joint **mediation** of the principal Protestant Power and the principal Roman Catholic Power.

(4) Fourth Period, **1624-5**: Breach with Spain; alliance with France; unsuccessful war.

[The events illustrating these points are set forth succinctly and accurately in "Acland & Ransome," and in Professor Tout's "Analysis]."

IV. Miscellaneous Points.

i. Biographies: Robert Cecil, Earl of Salisbury; Sir Walter Ralegh; Francis Bacon, Lord St. Albans; George Villiers, Duke of Buckingham.

ii. Map-Work: East coast of North America (not neglecting early French and Dutch settlements there); Guiana; Spice Islands; the Palatinate (with reference to the Rhine, Bavaria, Bohemia and "Austria").

N.B.—The then *duchy* of Bavaria did not occupy the same limits as are occupied by the present *kingdom* of Bavaria. In describing the position of places it is better to use names of physical features rather than district names (which fluctuate).

iii. Texts for Talks (or for problem-work).

(1) "The greater will draw the less; and it is a safer union for England than that of France" [Henry VII., of the Anglo-Scots marriage, 1503].

(2) "No bishop, no king" [James I. at the Hampton Court Conference].

(3) "I am your king: I am placed to govern you, and shall answer for your errors" [James I. to Parliament, 1604].

(4) "Remember, remember the Fifth of November" [Popular rhyme].

(5) "The seaports are the king's gates, which he may open and shut to whom he pleases" [Judgment in *Bate's Case*, 1607].

(6) "I will rule according to the common *weal*, but not according to the common *will*" [James I. in 1621].

(7) "I shall live to see it an English nation" [Ralegh, concerning Virginia].

(8) "We have a maxim of State that the King of Spain must not fight the Emperor" [Olivares, Spanish Minister of State, to Prince Charles].

(9) "The wisest fool in Christendom" [Henry IV., concerning James I.].

iv. Books, Ancient and Modern.

(1) *Accessible "Sources."* Preface to the "Authorised Version of the Bible," **1611**; Bacon's "Essays" (especially those on political topics). Professor Colby gives three documents on the reign—(1) "Lancashire Witches," (2) "Book of Sports," (3) "Voyage of the Mayflower." The chief constitutional documents of the reign are printed in Dr. Prothero's "Select Statutes" (Oxford Press), 10s. 6d.

(2) *Modern Authorities.*

(*a*) Gardiner's "Constitutional Documents of the Puritan Revolution" (Introduction): for a fair and simple statement of the constitutional points at issue between king and parliament. Dr. Prothero's Introduction is somewhat more technical.

(*b*) Green's "Short History," ch. viii., pp. i., ii.: for a vivid sketch of the period, with a sympathetic analysis of the spirit of Puritanism.

(*c*) Seeley's "Expansion of England" (First Series): for the colonial activity of England.

(*d*) Seeley's "Growth of British Policy," vol. ii, ch. i.: for the international policy of the reign.

(3) Teachers close-pressed for time may take Professor Tout's "Analysis" as a guide: what is there inserted should be taught; what is there omitted may be safely ignored.

The compilers of these Notes would be glad to receive from teachers information as to topics in which they feel the need of help, suggestions and criticisms. Letters should be marked outside "Oxford History," and addressed to the Editors of The School World.

SCHOOL EDUCATION FOR ENGINEERS.[1]

Technical education is a phrase that has been so often misused, perhaps so often misunderstood, that many of those who, like myself, are engaged chiefly in trying to solve the practical problems of engineering are in the habit of hearing it either with impatience or of regarding it as a fad of lay theorists, or sometimes, I fear, as a cloak for educational shortcomings in other directions. And I am bound to confess, if their experience has been the same as mine, that there is some excuse for them. You can form but little idea of the number of persons of both sexes who have assured me that their sons had no taste for books, but had shown a marvellous talent for engineering. I need hardly tell you that the marvellous talent generally turns out to be an incapacity, possibly from defective education, for seriously applying the mind to any subject whatever.

But technical education, properly considered, is of the highest importance both to you and to England. It is only its abuse that we have to guard against.

Now one of the great abuses I take to be that technical education is often begun too early in life, that is, that it is substituted for a general education, and a boy attempts to put his knowledge to practical use before he has learnt how to learn.

Another abuse is the divorcing of practice from theory, and the danger of elevating practical application above scientific knowledge.

I shall try, therefore, to-day to say a few words, firstly, about the necessity of acquiring a sound general education before any special work is attacked, and, secondly, about the necessity of basing all practical work on theoretic knowledge.

I attribute the compliment which has been paid me in the invitation to speak at the opening of the present session to the fact of my having been connected, for many years past, with the management of probably the largest engineering firm in England. That position has afforded me exceptional opportunities for observing what educational antecedents are likely to produce the best results in the engineering field. I say "exceptional opportunities" advisedly, for we at present employ in our various works not far removed from 30,000 hands. Of these a large number are youths, often sons of workmen, but

[1] Extracted from the Inaugural Address given at the City and Guilds Central Technical College, London, by Sir Andrew Noble, K.C.B., F.R.S., on October 3rd.

not unfrequently drawn from the class which I see represented before me.

I am continually asked what education I should recommend for a lad entering Elswick. I always say, "Send your son to as good a school as you can, keep him there as long as you can, do not curtail his time of schooling, do not stunt his early intellectual growth by narrowing it down to any special study as taught at elementary schools."

Science, mechanical drawing, and such like, are no doubt very useful (as all knowledge is useful) in their way. These studies may prove an irresistible attraction to minds with a strong bent towards scientific subjects, but I would fancy most employers would rather that a lad came to us blankly ignorant of both, so long as he had had a good education, had been taught, and had ability to think and to concentrate his attention on any subject brought to his notice.

Some of you may have heard, no doubt, the answer of the Duke of Wellington to a father who asked him what was the best education for his son, preparatory to his joining the army: "The best education you can give him."

It was a very pregnant utterance, terse and to the point, as nearly all the great Duke's were; and it remains as true for any other profession as for the army.

In nine cases out of ten, I should say, any knowledge acquired by a boy before he is sixteen can have but a slight intrinsic value. Up to that age, it is not *what* he learns that we have to look at, but *how* he learns; it is the habit of discipline, of mental application, of power in attacking a subject, that are so valuable; not, generally, any definite piece of knowledge he may have gained.

According to my experience, the most valuable knowledge that a man has at his disposal is that which he has taught himself. That a special technical education is not an absolute necessity is not difficult of proof. My own chief, Lord Armstrong, commenced life as a solicitor; James Watt was an instrument maker, and was prevented from opening a shop in Glasgow because he had not served a full apprenticeship. George Stephenson was an assistant fireman to his father at Killingworth Colliery. Faraday was brought up as a bookbinder. I cite the cases of these great men simply to show how men without trained assistance have taught themselves, and what can be done by the dauntless energy, untiring industry and patient search after truth which were the great characteristics of all of them, and which enabled them to do such great things.

My own impression with regard to early education is that, as a sharpener of the young intellect, and as a mental discipline, it would be difficult to improve upon the curriculum which is now in force at our public schools, and which, in the main, has been in force for so many centuries.

I am not in accord with those who think that modern languages should supersede the classics as a means of education, and I should regret more than I do the attempts which have been made in this direction did I think that these attempts were likely to be successful. Men of science will remember that practically the whole of our scientific nomenclature is borrowed from the Greek and Latin languages; and personally, I have found my own knowledge of the classics—which represents, no doubt, that of a very ordinary schoolboy—stand by me, and enable me to enjoy, as I would not otherwise have done, that noble literature, which, as Lord Macaulay says, is the most splendid and perhaps the most durable of the many glories of England.

But whatever may be the fate of the classics as a means, I must take up my parable against a course of education I have seen in several primary schools where an attempt is made to teach boys, often little better than children, rudimentary chemistry, rudimentary geology, also physiology and electricity.

Occasional popular lectures on these sciences may be of very great value to some boys in interesting them in these great subjects, and in leading them, at some later date, seriously to study them, but these sciences as taught in the schools I refer to can have but little value in encouraging habits of thought, of application, and of mental discipline; and to knowledge so acquired the words of Pope are peculiarly applicable:—

> "A little knowledge is a dangerous thing,
> Drink deep or taste not the Pierian spring.
> There shallow draughts intoxicate the brain,
> And drinking deeply sobers it again."

I am aware that many people say that the years a boy wastes on Greek and Latin might be better employed in learning German and French. It may be so, but it is not difficult to teach these most important languages colloquially at a very early age; and with regard to technical subjects, speaking from my own observation, I may say that I do not think I have known any man at twenty-eight or thirty who was the better for having abandoned his general education for technical subjects at too early an age.

Those men who, with fair abilities, have received a really good education, have been taught to use their minds, and who, by contact with other students, have acquired habits of application, amply make up for their late start by the power of mind and grip that they bring to their work. They are fresh and keen when others, who have been hammering away at semi-technical work from early boyhood, have become stale and are less vigorous, and that reflection moves me to deprecate strongly any attempt to teach seriously practical or electrical engineering in preparatory or elementary schools. As an excellent recreation such studies are no doubt to be encouraged, but to make them a systematic part of education, to the exclusion of studies which have a more direct effect in developing the understanding, seems to me to be entirely wrong. I would go further and say that even in public schools, and their equivalents, for older boys, what are termed engineering shops are generally a failure, so far as any efficient knowledge to be gained in them is concerned. Except as a reasonable diversion for recreation hours, such "shops" have, I fear, but little value, and in nine cases out of ten the hours spent in them are subtracted from the time due to more valuable studies.

In my judgment, the age at which a boy should seriously begin any special studies, with a view to fit him technically for the profession he may have decided to follow, should not be earlier than seventeen or eighteen.

And in any discussion as to the age at which a boy should leave school, the great incidental advantages that he gains from a reasonable prolongation of his schooldays must never be lost sight of. A stricter discipline, a wiser supervision, a more authoritative yet sympathetic advice as to conduct, are more possible at school than can ever be the case in after life, and a more constant and generous association with his equals rubs off angularities and leads to amenity of disposition. It is seldom, indeed, that one cannot trace the difference between a lad who has had a full public school training and another who has been less fortunate. Speaking as an employer of labour, I should say that we find a pleasant speech and manner, tact in dealing with others, and some power of organisation, of the utmost value; and it is precisely those qualities which a boy acquires, or ought to acquire, in his *later* years at a public school. Without such qualities even the highest scientific attainments will never make a captain of industry, and in selecting candidates for appointments the man-of-business distinctly prefers a youth who has had the benefit of some years at a good school.

THE AIMS OF STUDY.[1]

IN life there is a competition, not merely between commercial and intellectual interests, but between different intellectual interests themselves; and a characteristic of a university education is that by some means or other it aims at conveying, not merely accurate knowledge on some one subject, but a healthy interest in all forms of mental effort. This wider range, this general cultivation, should distinguish the university scholar from him who has merely mastered the technicalities of a profession. A man may be a good lawyer or tradesman, he may have grasped a branch of pure science or succeeded in a scientific profession, and yet be careless and ignorant of all that does not bear upon the central interest of his life. The blending of expert and general knowledge, of professional skill in some one subject and of intelligent interest in others, is not to be accomplished by obeying formal rules, such as those which must be followed in producing a given chemical compound. Each one of us must decide for himself what particular combination represents for him the maximum of gain and the minimum of loss; but the true university as distinguished from the professional or technical school is for ever preaching that man is many-sided, that the light of heaven reaches him through many windows, and though to some of us the call may come to sacrifice all else to gain one supreme end, yet it is well to count the cost and to remember that the loss may outweigh the gain.

In speaking of sacrifice I am not now referring to the ordinary habits of industry and self-control which are essential to success in any physical or intellectual struggle. I am dealing rather with that sacrifice which is so often made without any sense of loss, the surrender of all effort to understand the appeal made by nature or art to one or other of our higher intellectual powers.

A man may be so interested in painting or in music that he loses all sense of the divine curiosity which impels the man of science as he strives to unravel the plan of the universe. The seeker after truth may allow the dry light of science to wither the sensibilities which can be touched by art alone. He may purchase the higher knowledge at the cost of the higher emotions.

If you have to choose one philosophy or the other, to adopt one rigid rule of life, I take it that the nobler among you would follow Emerson rather than Pater, would prefer to do "one stroke of faithful work" rather than to maintain a life-long ecstasy. But this is not one of the cases in which no compromise is possible, in which we must vote "Yea" or "Nay," and must put aside wholly one teaching or the other. It may be a great thing to make the efforts and sacrifices which are required in adopting an extreme position, but it is a still higher achievement to maintain through life the intellectual balance necessary for the policy of the "golden mean."

He who has pored too closely and too long over one study cannot in a moment cast aside the fetters which the years have woven round him, and rise up, like Samson, a terror to the Philistines. The intellectual sectarian cannot by a sudden act of will or process of conversion become the intellectual catholic. As well might he hope that the muscles which have been disused for years should suddenly rival the sturdy frame of the athlete, that the bent back should become straight, and the vision of the wearied eyes keen. Mental, like physical powers, are atrophied by disuse. The arts of seeing something of many things and all of one must be cultivatad at the same time, or side by side.

For each of us, then, the safest path lies somewhere between these limits, though thousands lead dull or unsuccessful lives because they shape their course perilously near to one or other of them. My object to-day is to warn you against the two extremes, not to attempt to lay down rules which shall point out the best course between them, rules which could not serve for all characters and dispositions alike. Do not forget that nothing considerable is achieved without concentration. Remember that he who holds himself free to cast aside every interest which does not directly bear on the great central object of his life purchases this freedom "with a great price."

[1] Abstract of an address delivered on October 5th by Prof. A. W. Rücker, F.R.S., at the commencement of the new session of the Royal College of Science, London.

CURRENT GEOGRAPHICAL TOPICS.

By A. J. HERBERTSON, Ph.D., F.R.S.E., F.R.G.S.

Natal.

VASCO DA GAMA reached Port Natal on his first voyage to India on Christmas-day, 1497, and named the land Natal. This bay lies in the middle of the coast of the colony proper, whose northern limit is the Tugela river, beyond which lies the province of Zululand, including Amatongaland, which was incorporated with Natal in 1897. The South African Republic is shut out from the sea by Portuguese East Africa, Zululand, and Natal proper, the boundary with the latter running along the Buffalo river, a left bank tributary of the Tugela river. The western boundary of Natal is the crest of the Quathlamba or Drakensberg mountains, beyond whose summit are the savanas of the Orange Free State. The south-western boundary of Natal is with British territory, Basutoland and Cape Colony.

Confining our attention to Natal south of the Tugela river, where most of the white population lives, the land consists of a series of terraces rising to the crest of the Quathlamba mountains. The easiest pass from these eastern terraces to the western plateau, where the Boer farmers dwell, is by the Nek or col known as Laing's Nek, 5,500 feet above which rises the famous Majuba Hill, 7,000 feet. The ridge slopes slightly from the Nek for a mile, then the Majuba escarpments rise at an angle of 20° to 30°. The top of the hill is a shallow, saucer-shaped basin, under a mile in circumference.[1] Laing's Nek is the pass traversed by the railway from Durban on Port Natal to Johannesburg and Pretoria. A branch from this line crosses the Quathlamba escarpments by Van Reenen's pass to the Orange Free State. Strategically these positions are of prime importance. The descent, however, is very steep, and gradients of 1 in 40 and even 1 in 30 are not uncommon. The road from the coast to the plateau is up that from the plateau to the coast down a series of steps. Until the railway was built communication was difficult. Now, however, a considerable proportion of the traffic with Johannesburg and Pretoria passes over this route, which is the shortest way from the Rand to the sea, except the route to Lourenço Marquez on Delagoa Bay, which ends in Portuguese territory. The Natal railway is also of great importance, as it passes through the coal mining region. Over a quarter of a million tons of coal are annually raised at Newcastle and Dundee, near the Transvaal frontier.

Natal is an important agricultural colony, producing sub-tropical and temperate products in abundance. Durban is about 30° from the equator (cf. Cairo, New Orleans, Shanghai). The temperature is comparatively high on the coastal plain, and temperate on the terraces above. The warm Moçambique current flows southwards off the coast, and keeps the air equably heated. The south-east trades strike the coast, and an annual

[1] Bryce, J. "Impressions of South Africa." (Macmillan, 1897.)

rainfall of 40 inches near the coast, slightly decreasing inland, but increasing again on the higher land, is registered.

By far the greatest proportion of this rain falls in the summer months, so that the climate resembles that of Eastern China and favours the growth of similar crops, such as tea, sugar, maize (mealies), rice, as well as bananas, pine-apples, and other fruits. Unfortunately, most of the rivers flow in deep gorges, and the waters cannot easily be used for irrigation. The higher terraces are grass covered, and the rearing of animals—angora goats, cattle, sheep and horses—is an important occupation.

The population of Natal is 830,000, of whom 61,000, or less than 7½ per cent., are white, and 53,000 are coolies from India. In Zululand there are nearly 200,000 people, but not 1200 whites. This small proportion of white settlers raises important racial questions. The proportion of white people to coloured is very much smaller in Natal than Cape Colony, 24 per cent., or the Orange Free State or the South African Republic, both about 32 per cent. The majority of the white population of Natal are English-speaking, and only about one-third are Dutch. The Dutch and English problem, so acute in the other States, does not complicate affairs to any extent in Natal. The majority of the Dutch are in the higher western part of the colony, near the borders of the two Dutch republics. There has been complete self-government in this little community of farmers and traders since 1893.

The capital of Natal is Pietermaritzburg, often called Maritzburg, named after the two leaders of the great Boer trek, *Pieter* Maurits Retief and Gerrit *Maritz*. It was the capital of the transient Dutch republic of Natalia before the British seized it, which event led to the great trek across the mountains, and ultimately to the founding of the Transvaal Republic. "The streets retain an old-fashioned, half-Dutch air," and the town is situated in a rather bare region 2500 feet above the sea, dotted with plantations of Australian wattles. It has 25,000 inhabitants.

Durban, the chief town and port, is on Port Natal, whose great disadvantage as a harbour is its shallow bar. Durban has never had many Dutch inhabitants. It was first occupied by English adventurers about sixty years ago, and now has a population of 40,000.

ITEMS OF INTEREST.

GENERAL.

COPIES of the test-paper on pp. 432-4 can be obtained in a form suitable for distribution in class at a cost (post free) of sixpence net per packet of twenty-five, on application to the Editors of THE SCHOOL WORLD. Heads of schools who would care to avail themselves of the scheme outlined in our August issue—by which the standard of knowledge attained in those of their forms preparing for the Junior Cambridge Local Examination can be tested by outside examiners—should communicate with the Editors.

TEACHERS and students interested in the study of the sky should watch for the shower of shooting stars or meteors expected to occur in the middle of this month. As most people know, shooting stars are produced by the combustion of solid particles attracted by the earth and passing through our atmosphere. Every thirty-three years the earth meets a swarm of these particles, and the result of the encounter is that shooting stars are seen not singly, but in battalions. In 1866 a very remarkable display was observed, and it is hoped that the sight this month will be no less wonderful. The best time to observe the meteors will be in the early mornings of November 13th, 14th and 15th. The part of the heavens from which the stars will appear to shoot rises in the north-east about 11 p.m., and it will be sufficiently above the horizon for observation at midnight. The moon will be nearly full, and its light will therefore interfere with the observations, but it sets at 3.32 on the morning of November 14th, and after it has gone the display should be well worth watching.

WRITING on "The Fear of Over-education," in the *Nineteenth Century* for October, Mr. Alexander Sutherland maintains there is no reason to feel uneasy. Science is steadily abolishing the humblest classes of employment, though she has by no means conquered the whole of them. "Some parts of the big domain of unreflective labour will long be left untouched, but the process is going forward; and it is clear that while education is rendering the lower classes unfit for the humblest sorts of occupations, science is steadily sweeping away these occupations." Later in his paper Mr. Sutherland remarks:—"While science takes away with one hand, it liberally bestows with the other; but what it takes away are the low-class occupations, and what it gives are the high-class ones, demanding intelligence and cultivating it. The general tendency is therefore humanising." At the same time, we must not be idle; our school-systems, we are told, must grow wider in scope and wiser in spirit, if we would adapt ourselves as a nation to the new economic conditions which the twentieth century will bring with it.

AN article on "Corporal Punishment in Schools," by T. M. Hopkins, in the October issue of *The Westminster Review*, should be studied side by side with Dr. Shelly's treatment of "Punishments" in our last issue. Notwithstanding all Mr. Hopkins says, we are of opinion that there is a place for the cane in a school. For some offences an appeal to corporal punishment is the only proper course. It is useless to talk of expelling all boys "guilty of an offence which warrants corporal punishment," and to ejaculate that a school is not a reformatory! From some of the sentences in this article, we surmise we are incorrect in writing *Mr.* Hopkins—*e.g.*, "It is really difficult to believe that there are loving parents who submit their children to the needless and cruel torture of the birch, and it is matter for wonder how a schoolmaster, supposed to be a refined and educated man, can lower himself to the level of a tormentor." It is refreshing to turn again to Dr. Shelly!

THE membership of the Assistant Masters' Association now exceeds 1,400, and the satisfactory establishment of branches in all parts of the country has, we are glad to find, given a great stimulus to the activity of the organisation. Various circulars which have been brought before us show "that members are urged to write to the papers more frequently if they desire to win the attention of the British public." The efforts of the Lancashire and Cheshire Branch have, indeed, resulted in the appearance of leading articles, on the work of the Association, in the *Daily News* and *Daily Chronicle*. This work of winning the sympathy of the public is very necessary, but we want to see this representative body of secondary teachers something better than a trade union. Notwithstanding that the *Daily Chronicle* says there is "the germ of a trade union" in the Association, we hope for a higher destiny for it. The science and art of education are both incompletely known even by the elect among schoolmasters. There is an infinite amount of research still to be done by somebody. It is to be hoped that, while using every legitimate means to improve their financial position and

to secure fixity of tenure, our assistant masters will not employ all their energies on these merely personal questions, but that they will aspire to a place for their Association amongst the learned societies. Just as the scientific and other societies encourage papers dealing with original work in their respective branches of knowledge, we should like to see the assistant masters encouraging research in education. There are questions enough and to spare waiting to be answered, and where are more fortunately situated observers to be found than the members of the Assistant Masters' Association?

THE Master of Downing College, in the address he delivered to the Senate of the University of Cambridge when resigning the office of Vice-Chancellor on September 30th, referred to the remarkable progress of natural science at Cambridge during the last twelve years. During this period a larger number of students have entered for the Natural Sciences Tripos than for any other examination for honours, notwithstanding the fact that but few students are in a position to allow their prospects in life to depend upon the discovery in themselves of a special aptitude for pure science. Almost all those who have since distinguished themselves in various branches of science have commenced their career by preparing to qualify for a profession. The majority of the graduates, for example, who are at present prosecuting researches in the physical, chemical, botanical, zoological, physiological, anatomical and pathological laboratories, making, to the great credit of the University, additions to knowledge which are not exceeded, if they are equalled in amount, by any other University in the world, entered as medical students. The phenomenal growth of the engineering department under Professor Ewing is also beginning to produce similar results; students who entered with the intention of becoming engineers have discovered in themselves a special aptitude for pure mathematics, or for physics in one of its various branches. Thus experience shows that whereas there can be no doubt as to the advantages which a professional or technical department reaps from the support of a school strong in pure science, the advantages which pure science reaps from the proximity of departments of applied science are not less substantial. An examination of the class-lists, as well as the records of work done after graduation, shows with equal clearness that the older subjects of University culture do not suffer from the rivalry of new departments.

THE scheme drafted by the Charity Commissioners for the administration of the new grammar school for girls at Leeds contains certain provisional proposals having reference to the constitution of the governing body. It is suggested that when complete the committee shall consist of seventeen persons—fifteen representative members and two co-optative members. The former are to be appointed as follows:—Nine by the governors of the grammar school from their own body; two women by the City Council (until the establishment of any local authority for secondary education having power in Leeds, and afterwards one by the Council and one by the said local authority); one woman by the Leeds School Board, one woman by the Council of the Yorkshire College, and two women by the Executive Committee of the Yorkshire Ladies' Council of Education.

THE sub-committee appointed by the Finance Committee of the Leeds County Borough Council to consider the question of establishing a municipal technical school have issued a report which has been adopted by the Council. It has been decided, we are glad to notice, to proceed cautiously with the new proposal. After a careful inspection of the existing institutions in Leeds, the sub-committee consider that, though all the present schools are doing admirable work for secondary education, yet, with the exception of Yorkshire College, they are lacking in proper equipment for practical technical instruction. It is satisfactory to know that the inadvisability of competing with Yorkshire College is fully recognised. We shall watch future developments in Leeds with much interest.

IN a letter to *The Academy*, Mr. Ward Muir tells the following story told *apropos* of the difficulty to the youthful mind of comprehending Gray's "Elegy":—A master who was superintending a boys' reading-class which was working through the poem asked one of his pupils what was the meaning of the line: "The rude forefathers of the hamlet sleep." The question was evidently a poser, and it was some time before the answer came: "Four rude old men sleeping in church"!

AT the request of the Society for the Propagation of Foreign Languages in France, the authorities of the Universal Exposition of 1900 have organised an international congress of the teaching of living languages, which will be held in the Palais des Congrés during five days, beginning Tuesday, the 24th day of July. The congress will be divided into three sections. The first will occupy itself with methods of teaching—the division between oral and written work and the use of books; "intuitive" teaching, object lessons, concert exercise, singing; teaching of grammar; literature; modifications according to nature of school establishment, age, and development of pupils. The second section deals with the technical and commercial sides of the teaching, and with courses for adults—lectures, reading-rooms, polyglot clubs, &c. The third section will be devoted to questions of propagating such studies, and to international relations, travel, scholarships, exchange of pupils between different countries, circulating libraries and international correspondence, and "universal" language, &c. Members will be chosen from each country to report on papers which may be presented. All reports should be handed in by June 1st, 1900. The subscription is five francs.

WE learn from the *University Extension Journal* that the governing body of the London School of Economics and Political Science have again offered six studentships for competition this session among University Extension students. The awards will be made by the Council of the London Society at the end of the session to those students who are recommended by the lecturers and examiners in Economics and Political Science as most likely to profit by more advanced or more specialised work in the subject. Holders of these studentships will be entitled to free admission to the lectures and classes of the school for one year, renewable for a second and a third year if the reports on their diligence are satisfactory. Further particulars on this point may be obtained on application to the Director of the school, at 10, Adelphi Terrace, London, W.C. From the same source we gather that the Cobden Club have again generously placed at the disposal of the Council for the session 1899-1900 two prizes, each consisting of a sum of £2 2s. and a parcel of the Club publications. These are open to all students attending a course at any centre on an economic subject, and will be awarded to the two who are judged to have obtained the highest places in the examinations that will be held at the end of the session.

IN consequence of a desire expressed by members of the Modern Language Association, the committee has arranged for a course of eight lectures on Phonetics, especially intended for teachers of English, French, and German, to be delivered in London during the present term and the Lent term, 1900. The lectures will be given by Professor Walter Rippmann, at Queen's College, on Wednesday evenings at 8.30, commencing on November 8th. The fee for the course will be half a guinea; or, for members of the Modern Language Association,

7s. 6d. Application for tickets should be made to Mr. W. G. Lipscomb, University College School, Gower Street, London, W.C. Each lecture will, we understand, be followed by a discussion.

ALL teachers of domestic science, a subject which is destined to receive in the future much more attention in English secondary schools for girls than it has hitherto secured, will do well to acquaint themselves with the excellent booklets which are from time to time issued by the United States Department of Agriculture. From the large number of pamphlets already published, we select for special mention "Bulletin" No. 56, which is a history of instruction in cooking in the public schools of New York City, drawn up by Mrs. Louise E. Hogan; and the "Farmer's Bulletin," No. 23, on the Nutritive Value and Cost of Foods, by Dr. W. O. Atwater, whose paper at last year's meeting of the British Association will be known to some of our readers. Not only do the papers of this series give the latest results at which men of science have arrived, but also the results of experiments in teaching, together with time-tables and syllabuses which have met with great success in America.

THE Civil Service Commissioners announce that an open competitive examination for the situation of assistant in the Nautical Almanac Office of the Admiralty will be held in London, commencing on January 2nd, 1900. The number of situations to be filled will be the number vacant at the time of the examination. At present this number is one. The limits of age are 18 and 25, and candidates must be of the prescribed age on the first day of the examination. The examination will be in the following subjects, viz:—Handwriting and orthography; arithmetic (including vulgar and decimal fractions); algebra (including quadratic equations); trigonometry (including the logarithmic solution of plane and spherical triangles); spherical and practical astronomy (including astronomical computations); French (translation into English); and German (translation into English). All subjects, except French and German, are obligatory. Assistants in the Nautical Almanac Office receive salary commencing at £100 a year, and rising by annual increments of £10 to £250, and thence by annual increments of £10 to £300 a year. The increase is dependent upon the efficient discharge of the duties, and after £250 a year is reached any further increment will be dependent upon the issue by the Superintendent of a certificate that the assistant is in every way worthy of such advancement, and is competent to undertake the more difficult calculations. Applications, on forms to be obtained from the Secretary, Civil Service Commission, S.W., must be sent in on or before December 14th, 1899.

THE current number of *The Record of Technical and Secondary Education* tells of an interesting instance of co-ordination in education which has been arranged in Burnley. A joint sub-committee of the Secondary Education Committee and the School Board have arrived at the following conclusions:—(1) That it is very essential that elementary, higher grade and secondary (including science and art and technical) instruction, supplied or aided by public funds, should be organised on one correlated system; (2) That it is essential to real technical instruction that students should have a sound elementary education, which should be continued beyond the standards; (3) That it is practicable and desirable that one building be erected in the borough for a higher grade school and a technical school. In addition to these resolutions, the sub-committee recommend the County Borough Council to provide land and buildings, and let parts of the buildings to the School Board by mutual agreement.

A SCHEME, based upon the recommendations of a conference of representatives of the Bristol School Board, Merchant Venturers' Technical College, and School of Art, for the co-ordination of evening class work in the city, has been adopted by the various bodies concerned. The School Board may provide classes in all the subjects specified in the Code of Regulations for evening continuation schools issued by the Education Department, and such subjects will not be taught beyond the standards specified in the Code. The Merchant Venturers' Technical College will be concerned with all science classes in connection with the Department of Science and Art, all technological classes in connection with the City and Guilds of London Institute and all advanced commercial classes. The School of Art will provide all art classes in connection with the Department of Science and Art. *The Record of Technical and Secondary Education* for October gives in full the terms of the various agreements which have been drawn up.

THE report upon the question of the provision, government, and endowment of polytechnics and technical schools, &c., in Middlesex, recently drawn up by Mr. B. S. Gott, the Organising Inspector to the Technical Education Committee of the Middlesex County Council, may be briefly summarised as follows:—(1) That a sum not exceeding £2,000 per annum be devoted to the payment of lecturers' salaries, as at present; (2) That a sum of £4,100 per annum be set apart for grants to secondary schools; (3) That an annual sum, not exceeding £3,190, be devoted to the establishment of scholarships; (4) That the residue of the grant (£14,000) be made available for the purposes of technical education, on the ground that any scheme to be successful must be largely dependent upon local effort; (5) That the allocation of the grant be reconsidered when the census of 1901 is published; (6) That the sums unexpended on education purposes in any one year be set aside as a reserve fund.

THE "London University Guide" for the year 1899-1900, published at the University Correspondence College Press, gives the fullest information as to the courses arranged by the College for the different examinations of the London University and also detailed particulars of books published by Mr. W. B. Clive for the same purpose.

THE syllabus of the 1900 examinations conducted under the Commercial Education Scheme of the London Chamber of Commerce has now been issued, and may be obtained upon application to the Secretary, at the offices of the Chamber, 10, Eastcheap, London.

LECTURES on the Principles of Education are being delivered on Tuesday and Friday afternoons of this term, in connection with the Cambridge Teachers' Training Syndicate, by Dr. S. S. F. Fletcher, of King's College. The lectures are free to members of the University.

THE new half-yearly number of the *Cheltenham Ladies' College Magazine*, with its 156 pp. of good reading matter, reminds us, both in appearance and from its contents, of the best monthly reviews. That it is edited by Miss Dorothea Beale is guarantee enough of its high literary character. With its abundance of information concerning present and past pupils of the College, the publication must be each time awaited with great pleasure. The organisation which makes it possible to give so much interesting intelligence about old students deserves to be widely imitated.

WE have received from Messrs. George Philip & Son a handy "Technical and Evening Continuation Schools Register," which has been arranged by Mr. R. Proctor Wright to meet the requirements of the Education Code, 1899. It costs 1s.

FOREIGN.

THE agricultural schools of Germany, which have been largely developed in recent years, are of three grades, all of them entirely dependent on State support. Not only do these institutions aim at imparting instruction in the principles of agriculture, but also at fostering scientific investigation. In addition a very complete system of winter schools, located in small towns, is provided. The scholars, mostly peasants' sons, are engaged in practical farming at home during the summer months, when these schools are closed. The lecturers and demonstrators utilise the summer for visiting different farms both to study recent improvements and where possible to assist the farmers with advice on any question which may present difficulty.

THE commercial schools subsidised by the Swiss Government are not intended for female pupils. There exist in all the more important towns in Switzerland, in connection with the higher schools for girls, facilities for commercial education, but the proposal, more than once brought forward, that commercial schools for girls should be subsidised by the Government, has so far failed to find favour. This is no doubt partly for financial reasons, as well as for those brought forward in a report dealing with this question, drawn up by the commercial department of the Federal Government, which expresses the opinion that such a step would probably lead to an undesirable increase in the number of such establishments, and would serve as an inducement to many girls to devote themselves uselessly to branches of education and occupations outside their proper sphere. The report, however, cites one instance where male and female pupils are both admitted to a commercial school subsidised by the Government, namely, at Winterthour. It is admitted that the system in this particular instance appears to work well.

THE following cutting from the notes of the Dunedin correspondent to the August number of the *New Zealand Schoolmaster*, published at Christchurch, should do something to dispel the current impression that unlimited scope for teachers of all grades, who find it difficult to obtain employment at home, is to be found in our colonies:—"A strong feeling prevails here among our teachers that the Education Board should discontinue, for a time, the training of more pupil teachers, with a view to engaging those teachers in our midst who are now unable to find employment. I am assured that many of our young lady teachers would willingly accept the salaries paid to pupil teachers rather than remain idle for an indefinite period."

PRINCIPAL SALMON, of Swansea Training College, in a recent lecture concerned with his impressions of American education received during a four weeks' visit to America, spoke of the public interest manifested in education throughout the United States. He said:—"Private benefactions are regarded as a regular source of income of the public schools, and are spent not in relieving the taxes, but in supplying the secondary needs—libraries, busts, pictures, scientific appliances, &c. Social economists often criticise severely the monopolies of the American millionaire, but he has one monopoly which excites no unfriendly comment—the monopoly of founding universities, colleges, and institutes. I could not name a twentieth part of the great gifts which have been made to education, but I will quote a few of the gifts of over a million dollars to universities and colleges alone:—

Asa Parker	... Lehigh University, Pa.	... £700,000
Johns Hopkins	... Johns Hopkins Univ., Md.	... 700,000
Isaac Rich	... Boston University, Mass.	... 400,000
Leonard Case	... School of Appl. Sci., Ohio	... 240,000
James Lick	... University of California ...	... 330,000
Peter Cooper	... Cooper Union, N. Y. ...	... £240,000
Ezra Cornell	... Cornell University, N. Y.	... 200,000
The Vanderbilts	... Vanderbilt University, Ten.	... 355,000
Paul Tulane	... Tulane University, La. ...	... 500,000
W. C. De Pauw	... De Pauw University, Ind.	... 300,000
Leland Stanford	... Leland Stanford, jr., Un., Cal.	... 1,000,000
John C. Green	... Princetown College, N. J.	... 300,000
Stephen Girard	... Girard College, Pa. ...	... 1,600,000
Jonas G. Clark	... Clark University, Mass. ...	... 400,000

In addition to these handsome bequests, the lecturer said later that during 1898 no less than £7,600,000 was given to libraries, galleries, hospitals, and so on. There can be no doubt that Americans believe in education!

THE number of students studying Latin in the secondary schools of the United States has steadily increased during the last ten years, until at the present time it is, with the exception of mathematics, the most widely studied school subject. While the percentage of the total number of scholars in the American secondary schools studying German was 14·24, and of those taking up French only 10·45 per cent., the proportion of pupils taught Latin reached 49·44 per cent. in the school year 1897-98. A comparison of the numbers in the German and French classes shows that the majority of American educationists agree with the views expressed by Mr. Milner-Barry in our last issue concerning the relative importance of these two modern languages. It is noteworthy, too, that, though only 8·55 per cent. of the secondary school pupils in the United States study chemistry, the numbers taught physics reach 20·48 per cent.—another reversal of English experience.

THE second of a series of articles on the training of teachers contained in the current issue of the *Columbia University Quarterly* is by Professor James E. Russell, the Dean of Teachers' College. From it most interesting information respecting this admirable training-school for secondary teachers can be gathered. Teachers' College was founded in 1888, and is now a part of the educational system of Columbia University. It is the professional school of the University for the study of education and the training of teachers. It takes academic rank with the schools of law, medicine and applied science. It not only affords opportunity, both theoretical and practical, for the training of teachers of both sexes for secondary schools, but also of specialists in various branches of school work, of principals and of those essentially American officials—supervisors and superintendents. Among eight separate courses of study offered in Teachers' College we note:—(*a*) A four years' course for teachers in the kindergarten; (*b*) a graduate course for teachers in secondary schools; (*c*) courses of varying lengths for art teachers, lecturers in domestic science, and instructors of manual training. Prof. Russell names the chief factors in a teacher's equipment in the following order—general culture, special scholarship, professional knowledge, and technical skill. The great problem in the training of teachers is to combine these four characteristics in due proportions.

MR. J. N. TATA has declared his intention of making his offer of thirty lakhs of property for a Teaching University at Bombay quite unconditional. He is now preparing, in consultation with a Provisional Committee, a revised scheme for submission to the Government.

THE *Bombay Educational Record* deals with the "Art of Setting Examination Papers," and enumerates the principles which should be followed. These are (our contemporary states):—(1) A paper ought not to be too hard. (2) It ought not to be too easy. (3) It ought to be representative. (4) It ought to be generally intelligible. (5) It ought to be tangible.

We should have imagined that these propositions were sufficiently self-evident to have made an article unnecessary for their demonstration.

REFERRING to the education of deaf-mutes, the *Madras Educational Review* states that in India there are about 200,000 people who are deaf as well as dumb; Bengal accounting for 70,000, and the United Provinces 32,895, the rest being distributed over Bombay, Madras, Central India and the Punjab. There are only three schools for their education in India, one at Bombay, another at Palamcotta in Madras, and the third at Calcutta. The two outside Bengal are missionary institutions, and that in the metropolis an Indian venture under the principalship of Mr. Jamini Nath Banerji, who was deputed to Europe and America to learn the art of teaching the deaf-mutes and to see how they manage such schools in the West.

CURRENT HISTORY.

WHEN Dr. Smiles wrote his "Life of George Stephenson," it seems to have been an undisputed maxim that railways had quite superseded macadamised or other roads as ordinary means of locomotion, at least for long distances. The great engineer is reported by his biographer as saying that "it would be cheaper for a working man to ride than to go on foot." And Dr. Smiles chuckles as he tells how Stephenson and his navvies were tunnelling under the very hill on the summit of which Telford was painfully making a new road for horses. Some sixty years have passed, and so far from the railway having triumphed over "the road," the once going-to-be-despised is having its "resurrection." Bicycles and motor-cars are threatening to be serious rivals to first, second and third class, and Macadam will share the triumph of Stephenson.

THE Servian trial has many morals. It reminds us, among other things, of the relations between Austria and Russia, and the long history of their mutual attitude during the break-up of the Turkish Empire. A hundred years ago, there were three Eastern questions—the Swedish, the Polish, and the Turkish. In 1770, Russia was threatening to outflank Austria by seizing the Danubian Principalities, and the "first partition" of Poland was effected to induce the Czarina to retreat from her crusade. A few years later, Catherine II. was dangling before Joseph II. the scheme of a re-established Greek Empire to be ruled over by a newly-born Constantine, in which both Russia and Austria would find their account. And ever since then the two Empires have been jealous of one another's action in the Balkan peninsula, though with a constant possibility of union.

ARGENTINA, Brazil, Uruguay and Chili are working out in South America the problem which was recently set to Europe at the Hague by the Czar of Russia. They have come to a general understanding—*entente cordiale*—and will probably soon enter into a treaty which will enable them to reduce their armaments and enter on the much-needed task of recovering their fiscal prosperity. Thus, while Spain is traversing the last stages of her progress downwards—out of which, however, she may rise to a new and better greatness—her former colonies of South America, which shook themselves free in the early years of this century, are adding solutions to the problems of civilisation. We neglect too much the contemporary history of South America, but it is a world worth attention.

BECAUSE "we are going to war with the Boers," and because the Army Reserves are to be called out, Parliament has been summoned. Because the Scots had invaded England, Charles I. summoned Parliament in the spring of 1640. There is a direct connection between the two. In 1642, Parliament demanded the control of the militia, and not getting it, went to war, or, if you please, rebelled. "A standing army in time of peace, unless with consent of Parliament, is illegal." So may be summarised one clause of the Act of Rights, Oct. 1689. Ever since, Mutiny Acts, or, as they are now called, Army Acts, have been annually passed, granting, under certain conditions, to the Crown the right to govern some subjects by special laws. One of these conditions has now become permanent, and Parliament meets, with the remote possibility of the "Government being defeated," and that in face of outside danger. Yet we are calm!

THE SCHOOL PULPIT.

NOTABLE PASSAGES FROM SERMONS PREACHED IN PUBLIC SCHOOLS.

Ordering One's Conduct.[1]

IN the common matters of life most of us know the man or woman who seems to think that, if facts are disagreeable, you have only to lose your temper over them and you will do away with the disagreeable facts. In the largest of all life's concerns the like attitude is sometimes indulged in. Here lies our personal life and fortune, our "single state of man," as a poet called it, in the midst of God's vast scheme of human things, acted on by this scheme, dependent on it, as the little state of Judah lay amidst the scheme of earthly empires. A mighty order of fact and influence surrounds the individual man, and upon whether he bears himself truly or mistakenly towards this order depends whether his fate is good or bad. And a counsel of God comes to him, directing him how he should shape his conduct towards the scheme of things. It does not come to him in a prophet's roll, which he can read or else burn; but it does come in some mode which he can either honour with a welcome or can lose his temper with and treat with scorn, under the idea that by this means he can be quit of obeying it.

Let me try to show how by an example or two. Very early in life the case can happen. When we are young boys and girls, and still under discipline, what is, for us then the order of God which we must yield to? Chiefly the will of the parents. The rule of parents may not be a perfect system, yet, roughly, it represents to the child the larger and truer order outside the individual will to which that will must conform: the parent's word is the prophet's message to the child. It is needless to say that the parent's will sometimes crosses the son's or daughter's, it is disagreeable, it seems an unnecessary or an unwise restraint. What to do in that case? Well, not as Jehoiakim, king of Judah. Do not lose your temper, and go away to your room exclaiming that it is a shame to keep a son down in that way, or nonsense to restrict a daughter that other way. It is quite easy, even for the young, to say cutting things about the narrowness and want of wisdom of their elders, and to show their feeling in sullen and impatient moods; what is not easy, what is impossible, is to alter the fact that obedience is for the young the prophet's counsel from God, and the young life can only prosper by it. You may perhaps come to no visible disaster as boy or girl; but your future life, by its follies, blindness, weakness, and false starts will take revenge on the petulance of the child. All the words are written again, and there are added besides many like words.

Again, on a later day of your life, God's counsel, the word which interprets to you His order, presents itself to you in a riper mode. It is the mode of what I will call the world's moral and social experience: I mean that wisdom of men which,

[1] From a sermon entitled "The Burning of The Roll," by John H. Skrine, Warden of Glenalmond. The sermon is printed in full in "The Heart's Counsel," published by Messrs. Skeffington & Son, who have kindly permitted the publication of the extract here given.

because it is man's, is not therefore uninspired, which embodies itself in the laws of marriage and of property, in the unwritten rules of social intercourse, or the code of honour binding in a profession, or (one may also add) the code of religious observance imposed by a Church. Here surely is opportunity for a clash between the impulse of the individual and the law of his society. The clash comes, and the result is at times a revolt with passion. The young man finds some strong craving checked by one of these old ordinances. He flames up and rails at the ignorant convention which obstructs. "Cannot I judge for myself what is wise and lawful in conscience better than a past generation, which does not know the new ideas, and cannot comprehend the young men and women of to-day? Are my vigorous impulses to be strangled by antiquated prejudices, by a fossil etiquette, by the social oppression of the dull and the timid?"

That is the reasoning. And presently some startling breach with religion, some defiant marriage out of rule, some outrage on the moral reserves which govern art or literature, is justified in the eyes of the perpetrator by a burst of passion against the wickedness of social tyrannies.

JUNIOR CAMBRIDGE LOCAL EXAMINATION, DECEMBER, 1899.

Monthly Test Papers.—No. III.

ARRANGEMENTS have been made for three sets of test-papers in each of the subjects dealt with below. Copies of papers in any of the subjects can be obtained in a form suitable for distribution in class at a cost (post free) of **Sixpence net per packet of twenty-five,** on application to the Editors of THE SCHOOL WORLD. Heads of schools who would care to avail themselves of the scheme outlined in our August issue—by which the standard of knowledge attained in those of their forms preparing for the Junior Cambridge Local Examination can be tested by outside examiners—should communicate with the Editors.

History of England—449-1509 A.D.

(1327-1509 *A.D.*)

(1) State shortly and clearly on what grounds the English crown was claimed by Richard II., Henry IV., Edward IV., Richard III. and Henry VII. In each case name, *without discussion*, the persons who might be considered to have as good or better claims to the crown.

(2) Tell the story of *one* of the following events:—
(*a*) Edward III.'s war with France.
(*b*) The Peasants' Rising of Richard II.'s reign.
(*c*) The campaign of Agincourt.
(*d*) Henry VI.'s loss of his French dominions.
(*e*) The efforts of Henry Tudor to obtain and keep the English throne.

(3) Write brief accounts of two of the following persons, choosing *one* from (*a*), and *one* from (*b*):—
(*a*) The Black Prince, Glendower, Poynings, Warwick the King-Maker.
(*b*) Archbishop Arundel, Cardinal Beaufort, Archbishop Morton, John Wyclif.

(4) What were the principal causes and effects of the Wars of the Roses?

(5) Show the importance of the marriages arranged by Henry VII. for himself and for his children.

(6) Describe carefully the position of the following places, mentioning—if possible with dates—any historical events during this period associated with each:—Arras, Barnet, Bretigny, Blackheath, Estaples, Bloreheath, Pecquigny, Bosworth, Troyes, Bristol.

[N.B.—"*In France: battle between French and English*" is not an adequate kind of answer to such a question.]

Geography.

(*British Dependencies in Australasia.*)

(1) Australasia, Malasia, Oceania, Polynesia. What is the geographical signification of each of these names? Name the principal British Dependencies in Australasia.

(2) What do you know of the following:—Dunedin, Geelong, Hobart, Norfolk Island, Mt. Kosciusko? Name the largest rivers of Australia, and the seas into which they flow.

(3) Give a short account of the physical geography of each of the five Australian colonies.

(4) Draw a map of New Zealand showing the position of each of the following (and no others):—Wellington, Auckland, Nelson, Invercargill, River Waikato, Lake Taupo, Mount Cook, Mount Ruapehu.

(5) Describe the course of the telegraph cable from England to Australia.

(6) Give an account of the trade of New Zealand (*a*) with the United Kingdom, (*b*) with Australia.

Latin.

CÆSAR DE BELLO GALLICO.—BOOK V. (Ch. I.-XXIII.)

(1) Translate
(*a*) Ch. II. His confectis rebus . . . militum reliquit.
(*b*) Ch. IV. His adductis . . . dolore exarsit.
(*c*) Ch. XVI. Toto hoc in genere . . . periculum inferebant.

(2) Translate and explain the construction of each word in italics:
(*a*) Ac sic accidit, uti ex tanto navium numero tot navigationbus neque hoc neque superiore *anno* ulla omnino navis, quæ milites *portaret, desideraretur;* at ex iis quæ inanes ex continenti ad eum remitterentur et prioris *commeatus* expositis militibus et quas postea Labienus *faciendas curaverat numero* LX., perpaucæ locum *caperent.*
(*b*) Si vim *faciat* neque pareat interfici jubet, nihil hunc se absente pro sano facturum, qui præsentis imperium *neglexisset.*

(3) Give the meaning of—subductiones; litem æstimare; actuariæ naves; percepta oratione; civitati consulere; obsidum loco; loca sunt temperatiora; consilium pro tempore et pro re capere; navis longa; animi causa; fagum; certis ex aqua mensuris; cum annotinis.

(4) Write a brief account of Cæsar's second campaign in Britain.

(5) Give, as nearly as you can, Cæsar's ideas with regard to the geography of Britain and discuss their accuracy.

VERGIL'S ÆNEID.—BOOK II. (Ll. 506-804.)

(1) Translate:
(*a*) Ll. 531-543. Ut tandem . . . regna remisit.
(*b*) Ll. 624-633. Tum vero . . . flammæque recedunt.
(*c*) Ll. 749-759. Ipse urbem . . . furit æstus ad auras.

(2) Translate and explain:
(*a*) Sceleratas sumere poenas
(*b*) Quos omnes undique Graiæ
Circum errant acies et, ni mea cura resistat
Jam flammæ tulerint inimicus et hauserit ensis.
(*c*) Facilis iactura sepulcri
(*d*) Integer ævi sanguis.
(*e*) Satis una superque
Vidimus excidia, et captæ superavimus urbi.
(*f*) Sinite instaurata revisam prœlia
(*g*) Latos umeros subiectaque colla
Veste super fulvique insternor pelle leonis.
(*h*) Heu! misero coniunx fatone erepta Creusa
Substitit, erravitne via, seu lassa resedit.

(3) Give the meaning of—gaza, nurus, famuli, limes, limen; who were Neoptolemus, Tyndaris, Creusa, Julus Atridæ?

(4) Quote and scan any ten consecutive lines from this last part of the book.

(5) Give as briefly as you can that part of the story which is contained in the first book of the Æneid, and show how it happens that it is the second book which narrates the fall of Troy.

(6) Write a short life of Vergil. What was Vergil's great model? What poets have in like manner made Vergil their model? Give the names of their poems.

French.

(1) Translate into English :—

Le président de Montesquieu et milord Chesterfield se rencontrèrent, faisant l'un et l'autre le voyage d'Italie. Ces hommes étaient faits pour se lier promptement ; aussi la liaison entre eux fut-elle bientôt faite. Ils allaient toujours, disputant sur les prérogatives des deux nations. Le lord accordait au président que les Français avaient plus d'esprit que les Anglais ; mais qu'en revanche ils n'avaient pas le sens commun. Le président convenait du fait ; mais il n'y avait pas de comparaison à faire entre l'esprit et le bon sens.

(2) Give the singular of—coraux, grand'mères, porte-clefs, yeux, and the plural of—bal, corps, chef-lieu, rouge-gorge.

(3) Write in full the present subjunctive of—*moudre*, the present indicative of—*prendre*, and the present perfect of—*se sauver*.

(4) Form adverbs from—prodigue, gai, fou. From what adjectives are the following adverbs formed—incessament, crûment, dûment, expressément ?

(5) Distinguish between *plus tôt* and *plutôt*, *consumer* and *consommer*, *le crêpe* and *la crêpe*, *le souris* and *la souris*.

(6) Translate into French :—

And now the poor girl was all alone in the wide wood, and was in such a fright that she almost feared to look at the leaves of the trees, and did not know how to get away safely. Then she began to run, over the sharp stones and through the thorny bushes, as fast as her feet would carry her, until it grew quite late in the evening. Then she saw a little house before her, and went in to rest herself. In this house everything was small, but very clean and tidy.

(7) For those only who offer "La Fortune de D'Artagnan" (chaps. ix.-xiii.).

(*a*) Translate : (1) p. 95, ll. 18-26 ; (2) p. 105, ll. 19-31 ; (3) p. 127, ll. 1-8.

(*b*) Write notes on—pêle-mêle, huit jours, boulet rougi, s'ensablent.

(8) For those only who offer "Charlotte Corday" (ll. 1554-end).

(*a*) Translate : (1) ll. 1690-1699 ; (2) ll. 1776-1785 ; (3) ll. 2386-2392.

(*b*) Write notes on—brigands de vingt-deux ; Tartufe ; à ton gré ; cela se voit à.

Mathematics.

ARITHMETIC.

(*Including Problems in Percentages, Interest and Stocks.*)

(1) 1,200 articles are bought at the rate of 11d. a dozen ; of these 480 are sold for 1s. 2d. a score, and the remainder at the rate of four for 5d. What will be the total gain ?

(2) Divide the product of $7\frac{7}{16}$ and $2\frac{10}{21}$ by $2\frac{1}{8}$. Subtract 7·413 from 741·3.

(3) Find the cost of 16 kilogrammes 250 grammes of butter at 1s. 4d. per lb. [1 kilogramme = 2·2 lbs.].

(4) Find the rent of 13 ac. 2 ro. 18 per. of land at £4 3s. 4d. per acre.

(5) What will be the amount of £79 17s. 2d. in $3\frac{1}{4}$ years at $1\frac{3}{7}$ per cent. per annum, simple interest ?

(6) Simplify

(i.) $\left(\frac{7}{6\frac{1}{8}} + \frac{4\frac{2}{9}}{1\frac{7}{11}} \text{ of } 2\frac{3}{11}\right) \div (2\frac{4}{7} + \frac{7}{9})$;

(ii.) ·0098 × 1·53 ÷ ·0238.

(7) The cost of carpeting a room with carpet, 3 ft. 6 in. wide at 4s. 3d. per yard, is £6 13s. 2d. ; if the width of the room be 14 ft., find its length.

(8) At what price should a dealer sell an article so as to gain 8 per cent., if by selling it for £7 4s. 1d. he would lose 9 per cent ?

At what price should he mark it so as to be able to give 10 per cent. discount for cash and still gain 8 per cent. ?

(9) Which is the better investment, Great Western Railway stock at 165, paying a dividend of $4\frac{3}{4}$ per cent., or London and North Western Railway stock at 200, paying a dividend of 7 per cent ?

What is the difference in the income of a man who, holding £5,000 stock in the former, sells out and re-invests in the latter ?

Answers : (1) 11s. 4d. (2) $8\frac{2}{3}$; 733·887. (3) £2 7s. 8d. (4) £56 14s. $4\frac{1}{2}$d. (5) £84 2s. $8\frac{3}{4}$d. (6) (i.) 2 ; (ii.) ·63 (7) 23 ft. 6 in. (8) £8 11s. ; £9 10s. (9) latter ; increase £51 5s.

ALGEBRA.

(*Including Indices.*)

(1) Prove that $a-(b+c)=a-b-c$, where a, b and c are positive integers and a is greater than the sum of b and c.

Simplify

$$(a+2x)(b-2y)+2(a-b)(x+y).$$

(2) Find the continued product of

$$1-x+x^2,\ 1+x+x^2 \text{ and } 1-x^2+x^4.$$

Write down all the factors of x^6-729a^6.

(3) Find the highest common factor and the lowest common multiple of

$$15xy^2z(x^2-y^2),\ 27x^2yz^2(x^3-y^3) \text{ and } 18xy^2z^2(x-y).$$

(4) Solve the equations :

(i.) $3(x-7)-5(9-x)=4(2x-9)-(x-8)$.

(ii.) $3x-7y+4=11y-5x+30$; $7x-5y=12$.

(iii.) $\frac{x-4}{3x+2}-\frac{x-1}{x-7}=1$.

(5) Show that, if $a+b+c=1$,

$$a^3+b^3+c^3=1-3(ab+bc+ca)+3abc.$$

(6) Simplify

$$\left[\left(\frac{a}{b}+2+\frac{b}{a}\right)-\left(1+\frac{2}{\frac{a}{b}+\frac{b}{a}}\right)\right] \div \frac{(a+b)^2}{ab}\left(1-\frac{ab}{a^2+b^2}\right).$$

(7) A man has a capital of £10,000 ; a certain portion of this he invests in house property which realises 10 per cent. on his outlay, and the remainder in other securities paying a dividend of $2\frac{1}{2}$ per cent. ; if the income derived from each investment be the same, what amount does he invest in house property ?

(8) Prove that $(a^m)^n=(a^n)^m$ when m and n are positive integers.

Simplify $\left[\sqrt{\left(\frac{a^{\frac{1}{2}}b^{-2}}{a^{-1}}\right)} \div \sqrt[3]{\left(\frac{ab^{-3}}{a^{-2}}\right)}\right]^{-2}$

Answers :

(1) $(a-2y)(b+2x)$. (2) $1+x^4+x^8$; $(x-3a)(x^2+3ax+9a^2)(x+3a)(x^2-3ax+9a^2)$. (3) H.C.F., $3xyz(x-y)$; L.C.M., $270x^2y^2z^2(x+y)(x^3-y^3)$. (4) (i.) 38 ; (ii.) $x=1$, $y=-1$; (iii.) 4 or $-2\frac{3}{8}$. (6) 1. (7) £2,000. (8) a.

EUCLID.

(*Books I. and II.*)

(1) Define a circle, a parallelogram, a gnomon.

(2) If two triangles have two angles of the one equal to two angles of the other, each to each, and have also the sides adjacent to the equal angles in each, equal, then shall these two triangles be equal in all respects.

(3) Any two angles of a triangle are together less than two right angles.

Write out the axiom of which this proposition is the converse.

(4) If the square on one side of a triangle be equal to the sum of the squares on the other two sides, the angle contained by these two sides is a right angle.

(5) If a straight line be bisected and produced, the rectangle contained by the whole line thus produced and the part produced together with the square on half the line is equal to the square on the line made up of the half and the part produced.

(6) ABCD is a quadrilateral in which the side AB is equal to the diagonal AC ; if BE and AE be drawn inside the quadrilateral so as to make the angles ABE, DAE equal respectively to the angles ACD, BAC, show that the triangle ABE is equal in all respects to the triangle ACD.

(7) From the middle point of one of the sides of a parallelogram draw seven straight lines dividing the parallelogram into eight equal parts.

(8) ABC is a right-angled isoceles triangle with the right angle at A ; ADE is any straight line drawn through A and BD, CE are perpendiculars drawn from B and C to this straight line ; show that the sum of the squares on BD and CE equals the square on AB.

Theoretical Chemistry.

(1) What is the chemical name of caustic potash ? How is this compound manufactured ? What occurs if a strong solution of it is heated with zinc ?

(2) What formula should be given to a compound having the following percentage composition?

Sodium	32·77
Aluminium	13·03
Fluorine	54·20

[Na = 23; Al = 27; F = 19.]

(3) Explain fully what the chemist means by the terms reduction and reducing agents. Name three commonly employed reducing agents, and describe three re-actions in which they are used to bring about a reduction.

(4) In what respects do cast-iron and wrought-iron differ? Are there any chemical differences between these two kinds of iron and steel?

(5) Give the chemical name and formula for each of the following:—hematite, bicarbonate of soda, saltpetre, calcite, rock-salt, galena, alabaster, quick-lime, pig-iron.

(6) What is meant by the density of a gas? Explain carefully how the density of laughing gas would be determined.

(7) You are provided with caustic soda and sulphuric acid and are required to prepare specimens of the two sodium sulphates. Explain fully how you would proceed.

KIPLING ON ASSISTANT MASTERS.[1]

That Mr. Rudyard Kipling's new book is intensely interesting everybody will naturally take for granted. Of its vigorous English, its fascinating style, its evidence of an intimate acquaintance with the British schoolboy, we do not propose to write. Mr. Kipling does not need our praise; besides, we have given him our respectful worship so long that anything in the way of a testimonial would savour too much of presumption. But after reading the account of Stalky & Co.'s exploits, we are left with a feeling akin to sorrow—certainly something more than regret. Though his knowledge of schoolboys is profound, Mr. Kipling's acquaintance with assistant schoolmasters is inadequate, and the impression he succeeds in giving is unsatisfactory.

At the North Devon school where the three boys known as Stalky & Co. are such important people there were four house-masters. First, Mr. Prout, "whose school-name, derived from the size of his feet, was Hoofer," and "whose imagination leaned to the darker side of life, and he looked on those young-eyed cherubims most sourly. Boys that he understood attended house matches, and could be accounted for at any moment. But he had heard M'Turk openly deride cricket—even house matches; Beetle's views on the honour of the house he knew were incendiary; and he could never tell when the soft and smiling Stalky was laughing at him." M'Turk considered Mr. Prout a "gloomy old ass." Stalky is continually supplying new variations for the nickname Hoofer—sometimes it is "Hoophats," sometimes "Heffles,' and the literary Beetles makes it into "Hefflelinga." "Mr. Prout could move very silently if he pleased, though that is no merit in a boy's eyes. He had flung open the study-door without knocking—another sin—and looked at them suspiciously." "The honour of the house was Prout's weak point, and they knew well how to flick him on the raw." Mr. Prout "never imputed anything; but, on the other hand, he never did anything else, and with the best intentions in the world, he had reduced the house prefects to a state as nearly bordering on nervous irritation as healthy boys can know."

Then there is Mr. King, no friend of Mr. Prout's, "but a zealous hater of Stalky & Co." He always tries to exalt his own house. "'Ah-haa!' said King, rubbing his hands when the tale was told. 'Curious! Now *my* house never dream of doing these things.'" He is for ever insisting upon his aversion "to interfering with another man's house." King "loathed the Natural History Society because he did not like Hartopp (the master responsible for it). His conversation is like a phonographic record. He has a silly habit of working himself into a great rage over everything." "Mr. King desired no buts, nor was he interested in Stalky's evasions. They, on the other hand, might be interested in his poor views. Boys who crept—who sneaked—who lurked—out of bounds, even the generous bounds of the Natural History Society, which they had falsely joined as a cloak for their misdeeds—their vices—their villanies—their immoralities— . . . . Such boys, scabrous boys, moral lepers—the current of his words was carrying King off his feet—evil-speakers, liars, slow-bellies—yea, incipient drunkards" . . . .

"The Head knew that Mr. King's statements depended very largely on Mr. King's temper." M'Turk considered Mr. King "a Philistine, a basket-hanger. He wears a tartan tie. Ruskin says that any man who wears a tartan tie will, without doubt, be damned everlastingly." In the common room, on one historic occasion, "King was pleased to be full of airy persiflage that tide, and brilliantly danced dialectical rings about Prout." He "always took his temper to meals." He "knew by bitter—by most bitter—experience that the management of the College was slack, dilatory, and inefficient. He might even add almost as slack as the administration of certain houses which now thought fit to sit in judgment on his actions. With a short summary of his scholastic career, and a *précis* of his qualifications, including his degrees, he withdrew, slamming the door."

Mr. Hartopp, the President of the Natural History Society, "being a Master, was suspicious; but was also an enthusiast, and his gentle little soul had been galled by chance-heard remarks of the three." "Hartopp believed in boys, and knew something about them." He does not take a large part in the stories, but the impression one gets of Mr. Hartopp is that he has a grain of common-sense and a trace of sweet reasonableness. The fourth house-master, Macrea, besides a few remarks in common-room conversation, takes up little of the reader's attention.

In addition to the four house-masters, one gets to know a little of Mr. Mason, a mathematical master; but the only important things recorded about him are the way in which he was fooled by Stalky & Co. by a "silly tale of theft on their part," and the ineffectual way in which he tried to take 'prep.' on the last night of term.

But the Chaplain belongs to another order of being, and in describing the Rev. John Gillett, we think Mr. Kipling has got nearer the personality of an average public school assistant master than in any other of his examples. "He was fat, clean-shaven, except for a big moustache, of an imperturbable good temper, and those who loved him least said, a guileful Jesuit. He smiled benignantly upon his handiwork—four sorely-tried men talking without very much malice." In another place it is written, "He was emphatically a gentleman. He knocked at a study door before entering; he comported himself as a visitor, and not a strayed lictor; he never prosed, and he never carried over into official life the confidences of idle hours. Prout was ever an unmitigated nuisance; King came solely as the avenger of blood; even little Hartopp, talking natural history, seldom forgot his office; but the Reverend John was a guest desired and beloved by Number Five."

As the Chaplain said on one occasion in the common room—"Ours is a dwarfing life—a belittling life, my brethren. God help all schoolmasters! They need it." We are afraid Mr. Kipling's book won't help assistant masters throughout the country very much by the influence it will exert on the boys they have to deal with. "What Kipling says must be right," the schoolboy will argue, and we surmise that the ingenuity of the "young savages," as they are called by Mr. Kipling in one

[1] "Stalky & Co." By Rudyard Kipling. (Macmillan.)

place, will receive such a fillip that the House-Master will do something other than bless "Stalky & Co."

The Headmaster, "the Prooshian Bates," as M'Turk used to call him, has as many virtues as Prout and King have weaknesses. Mr. Bates always does right. It is a common mistake to suppose that a headmaster is necessarily perfect; for after all most Heads have had some experience as assistants, and how a change in a man's official status can bring about a complete alteration of character it is a little difficult to imagine.

Though the assistant masters described in "Stalky & Co." may be portraits from life, it is fortunate that there are many scores of teachers of a different type.

OVER-STRAIN IN EDUCATION.[1]

IT is fortunately beginning to be recognised that rational systems of education must be based upon an intimate knowledge of the functions of the nervous system. The results of the exhaustive observations made by eminent physiologists like Dr. Francis Warner have established the inter-dependence of muscular manifestations and nervous control, and though the truths which numerous experiments have demonstrated can be, from the nature of things, but slowly assimilated by the rank and file of teachers, there is gratifying evidence that the seed of intelligent appreciation of scientific methods in education is surely developing into a vigorous growth of sane reforms.

Though we are indisposed to adopt the pessimistic generalisations which allege the existence of a widespread deterioration in our national physique and character, the data which the authors of the book before us have collected make it clear that the time has arrived when every effort should be put forth to avoid over-strain in our schools, with its necessary sequel of maimed or wasted lives. The problem is stated very briefly: "There is over-strain, and there must be a high standard—how can the former be avoided while the latter is maintained?" The over-strain is traced to a combination of circumstances, in which under-feeding or wrong-feeding, unwholesome surroundings, vicious courses, insufficient sleep, over-study and unscientific teaching are included. These are all evils which can with due care be remedied, and we are glad to see that the authors think "a health report, giving, not opinions, but the actual facts which are the bases for opinions, in Dr. Warner's or some other simple form, should be sent to parents, together with those interesting documents in which the personal equation of the form-master bulks so large." The remedy which Messrs. De Brath and Beatty advocate for the prevalent over-pressure is to be found in a careful use of the years from 8 to 14 in a boy's life. A given amount of work has to be accomplished at school, and to avoid evil consequences, the only possibilities are either to begin it earlier, or to do it by improved methods, or both. The greater part of the book is taken up with an explanation of how to adopt both these measures.

Among other characteristics which deserve attention, the authors' enthusiastic belief in the educating power of science must be noticed. Their pages under the heading, "Cultural Value of Science," is a vigorous and convincing piece of work. The clear exposition of the methods of Froebel and Herbart affords an index to the influence which these great educators have exerted upon the writers of this volume. The provisional scheme of instruction for a complete school course, from 9 to 18 years of age, with its minute division into terms, and the number of lessons per term for each subject, will give rise to much disagreement. No other two teachers will have exactly the same ideas as the authors.

There are many minor points which are open to discussion. What Mr. Barnett has described as a "heresy from Germany" and as "impracticable pedantry"—we mean insisting that every question shall be answered in a complete sentence—is here strongly advocated. Thus, p. 185:—"Every branch of instruction must subserve the main end in this—good verbal expression; but it is chiefly attained by always making children answer in class by complete sentences in good English." Or, p. 143:—"Good expression is chiefly taught by insisting on grammatically complete answers in class, given in short, clear sentences."

But the book will repay a teacher's careful study, though the fact that it is sometimes written in the first person singular will give rise to the thought that the authors are not always in agreement—*e.g.*, it is difficult to know which author is writing on pp. 28, 36, 43, 45, 121 and 131.

[1] "Over-Pressure." By S. De Brath and F. Beatty. viii.+236 pp. (London: George Philip & Son. 3s. 6d.).

RECENT SCHOOL BOOKS.

Modern Languages.

Gems of Modern French Poetry. By J. Lazare. xvi.+112 pp. (Hachette.) 1s. 6d.—A selection of 40 poems by 29 different authors, in clear type. There is an introduction of ten pages dealing with French prosody, which may suffice to give a knowledge of the rudiments; here and there clearness has been sacrificed to brevity. The notes consist largely of translations; of these there are so many that the pupil practically has nothing to do. The short biographies of the authors are a welcome addition.

Cœurs Russes, par le Vte. E. M. De Vogüé. Edited by E. Pellissier. xvi.+161 pp. (Macmillan.) 2s. 6d.—As far as style is concerned, nothing could be better than these short stories; but we doubt whether the subject matter of "Varvara Afanasiévna" is suitable for school reading, interesting as it is to a reader of more mature years. The last story is also rather gruesome. The notes have been compiled with care, but are perhaps too full; candidates preparing themselves for examinations will find many good "tips." The volume appears in Mr. Siepmann's Series; the fourth appendix deals with "adjectives formed by suffixes from adjectives and particles," and is clearly put together.

Rules of French Grammar at a Glance. By O. F. Camphuis. iv.+84 pp. (Marlborough.) 1s., cloth 1s. 6d.—The rules are well expressed, and the printing is clear. The book gives one the impression of being made up from an observant teacher's jottings; this, above all, is the case with regard to Section 45 and Appendix II.

E. About, L'Homme à l'Oreille Cassée. Edited by Prof. H. Testard. xii.+322 pp. (Hachette.) 2s. 6d.—This tolerably well-known novel would make a better reading-book for class if it were cut down to half its present length (203 pages). The notes are brief and satisfactory, and there is a vocabulary which appears to be complete. The book in its present form may be set with advantage for home reading.

Grammar Rules: English-French-German. By J. Oliphant. iii.+18 pp. (Macniven & Wallace.)—Mr. Oliphant has written a short but suggestive introduction to his little book, which consists of the main facts of English, French and German accidence arranged in tabular form, and accompanied by remarks in which the peculiar features of the languages are

compared. The tables may be found useful for class work; the critical remarks will interest students of language. They are eminently calculated to stimulate thought; some of the views propounded will doubtless fail to meet with general acceptance. The book comes as somewhat of a surprise among the great quantity of trash that is turned out.

Lessing. Minna von Barnhelm. By S. W. Cutting. liii. +224 pp. (Macmillan.) 3*s.* 6*d.*—Another volume in the admirable series edited for the Macmillan Company by Professor Hewett. Dr. Cutting's introduction is a careful and scholarly piece of work; the chapter on "Lessing as Dramatist and Dramatic Critic" is particularly interesting and valuable. The text is nicely printed; the notes are full and clear. May's portrait of Lessing is given as frontispiece.

Leading Events of Modern Warfare. (Advanced German Readings.) Edited by Aloys Weiss. vii. + 198 pp. (Hachette.) 2*s.* 6*d.*—Fourteen extracts from various sources, chosen with discrimination and ably edited by the Professor of German at the Royal Military Academy, Woolwich. The passages selected cover the period from Trafalgar to Wei-hai-Wei, and include accounts of Austerlitz, Waterloo, Gettysburg and Sedan. There are no notes, but a very full vocabulary compensates for this. It appears to be comprehensive and accurate.

Auswahl aus Luthers Deutschen Schriften. Edited by W. H. Carruth. lxxxii. + 362 pp. (Ginn.)—A very meritorious piece of work, for which Professor Carruth deserves our lasting gratitude. There is little likelihood that the book will be read in any of our schools, and we cannot discuss it here at length; but we recommend it warmly to all in whom admiration for the striking figure of the great reformer is combined with a fair knowledge of the German language.

Edited Books.

The New Atlantes. Edited by A. T. Flux. 63 pp. 1*s.* Macaulay's *Frederick the Great.* Edited by A. T. Flux. 127 pp. (Macmillan.) 1*s.* 6*d.*—These two editions are specially prepared for the use of candidates for the Second Year and Queen's Scholarship in 1900, and they are in every way thoroughly adapted to the requirements of those examinations. The introductions and summaries are comprehensive without being lengthy, and the notes are in all cases clear and concise. The "Note on the Map of Europe" included in the introduction to the essay on "Frederick the Great" is especially valuable, because it will assist even a historical student in gaining clear ideas upon a very complicated political imbroglio of interests and territorial complications. Indeed, without some brief guide, the mere literary student would be hopelessly at sea in examining a map of Europe in the year 1730 A.D. Mr. Flux's explanation is brevity itself, but it amply suffices to clear up much that looks very puzzling in comparing Europe as Napoleon left it with Europe as Frederick the Great found it.

History.

A Brief Survey of British History. By G. T. Warner. vi. + 278 pp. (Blackie.)—Mr. Warner has here embodied an excellent idea, and the book is most suggestive. The best chapters are naturally those in which the author treats of the economic side of the national life. This has been a favourite subject of his, and we recently noticed an excellent introduction by him. As to the other subjects, however, we are not quite sure of Mr. Warner's success. For whom is he writing? The book is too meagre for pupils; too elementary for their teachers, too text-booky in appearance for the school library. A perusal of the work leaves us, therefore, in a state of perplexity and regret. We must also add a word of warning. We think Mr. Warner is somewhat too "premature" in his account of the mediæval parliaments, and that he makes unsatisfactory work of the ecclesiastical nomenclature of the seventeenth century. The "Church of England" is not logically alternative to "Presbyterian" or "Independent," since it was for a time, though a short time, both of these.

French History for Schools. By Katharine Stephen. xii. + 338 pp. (Macmillan.) 3*s.* 6*d.*—This book is a republication of an introduction for children adapted for "somewhat older readers." Would that it were not so! The result of the adaptation makes at times somewhat curious reading, and we still find "the Emperor of Germany" and other old friends of that kind. The maps are good and instructive, but not always quite clear.

Geography.

The Excelsior Atlas of Europe. Twenty-eight maps. By G. W. Bacon, F.R.G.S. (Bacon & Co.) 1*s.*—We can recommend the use of this cheap atlas to students who are preparing for the Government Certificate Examination in June, 1900. Four of the maps illustrate the physical geography of Europe, four deal with the special period—1700 to 1789, and the others are the usual political maps. One of these shows the railways of the British Isles; the Great Central is not indicated, nor is the most direct route between Leeds and York. The atlas as a whole, however, is well worth a shilling, and should prove generally useful.

Science and Technology.

A Practical Introduction to the Study of Botany—Flowering Plants. By J. Bretland Farmer, M.A. viii. + 274 pp. (Longmans.) 2*s.* 6*d.*—When our schools are provided with laboratories fitted up on the lines suggested in the new Science and Art Directory it will be possible to organise the elementary teaching of botany on something like a scientific basis. For a student working under conditions so favourable we cannot imagine a better laboratory companion that Professor Farmer's little volume. The practical character of the book is very strongly marked, and theoretical considerations are introduced sparingly. That the book makes no pretensions "to combine the functions of a theoretical and practical text-book" is indeed stated in the preface, and we are inclined to agree with the author's opinion that such an attempt would be hopeless with so small a volume. Considered as a guide to practical work on the flowering plants, the book is most valuable, but it will require to be supplemented by lectures on theory. The book contains a few misprints, which it is hoped will be rectified in the next edition. "Water-bath" for "water-oven" (p. 150), 10^2 for 10 (p. 166), and "orsphere" for "oosphere" (p. 189) may be instanced. Also a beginner might imagine from p. 69 that Silicula is the generic name of the shepherd's purse, and Siliqua that of the wallflower. A student who works through this book will not only gain a sound elementary knowledge of flowering plants and their life-processes, but, what is of much more importance, he will learn to think.

Botany for Beginners. By Ernest Evans. viii. + 290 pp. (Macmillan.) 2*s.* 6*d.*—The author states in the preface that the book has been primarily designed to cover the syllabus of the Department of Science and Art. It accomplishes this object very completely, and a pupil working carefully through it will find no difficulty in passing any ordinary examination in the botany of Angiosperms. The importance of practical work

is rightly insisted upon: a commendable feature of the book being the description of a large number of simple experiments to be performed by the pupil himself. At the end of each chapter is a brief summary, which should prove of considerable assistance in revision. The book as a whole is excellently written, but it is marred in the earlier chapters by some rash generalisations and ambiguous statements. For example, we are told on p. 68 that "all plants with scattered vascular bundles belong to the monocotyledons, and those with the bundles arranged in a ring to the dicotyledons"; and again (p. 93), it is stated that "Vessels . . . are found in the wood of all plants." Classification—the great bugbear of the average student—is explained more clearly than is commonly the case in elementary text-books, and is well illustrated by the natural orders prescribed in the Elementary Syllabus of the Science and Art Department. The book contains 271 useful figures, and is provided with a large number of classified test-questions, most of which are taken from past examination papers, and cannot fail to be useful.

Manual of Experimental Physics for Secondary Schools. By F. R. Nichols, C. H. Smith, and C. M. Turton. xxxi.+324 pp. (Boston, U.S.A.: Ginn & Co.)—We have here the course of practical physics in vogue in the secondary schools of Chicago. On the whole, the experiments form a good introduction to experimental work in physical science. We doubt the wisdom, however, of devoting so much time to the properties of matter immediately the exercises in the measurement of length and mass have been worked through. Such subjects as impenetrability, cohesion, porosity and the others, are much better postponed. If they deserve a place in the volume at all, it should be towards the end. Magnetism and electrostatics are very inadequately dealt with, and compare very unfavourably with the excellent chapters on mechanics. We commend to the notice of science masters the very clear way in which the results of the experiments are tabulated.

A Handbook of Physics and Chemistry. By H. E. Corbin, B.Sc., and A. M. Stewart, B.Sc. vi.+424 pp. (Churchill.) 6*s.* 6*d.*—Here the requirements of the first examination of the Conjoint Examining Board of the Royal Colleges of Physicians and Surgeons, as far as physics and chemistry are concerned, have been reduced to their lowest terms. In one small volume, hydrostatics, pneumatics, heat, frictional and voltaic electricity, the chemistry of the non-metals and metals, and organic chemistry (including tribasic acids and benzene derivatives) are included. The consequence is that the authors have not done themselves justice. How can the C.G.S. system be explained in half a page? What good comes of telling a student on p. 21 that "the correct formula for obtaining the vapour density is as follows:—

$$\text{Vapour density} = \frac{M \times 760 \times (273+T)}{273 \times v \times (P-f) \times 0{\cdot}0000896}$$

when no mention has been made of the barometer, the thermometer, and the expansion of gases by heat? If the medical student can learn enough about frictional electricity from 17 pp. to satisfy these examiners, the sooner the syllabus is altered the better. But it is unnecessary to multiply examples. We are of opinion that the authors have attempted an impossible task. The only use we can see for the volume is as a piece of revision work for students who have already studied the subjects.

Inorganic Chemical Preparations. By Felix Lingfield. xviii.+57 pp. (New York: The Macmillan Co.) 2*s.* 6*d.* net.—This course will serve to familiarise advanced students with the methods and processes used in making certain typical inorganic compounds, and will supply practical information of a kind which is rarely to be found in laboratory manuals.

The Elements of Blowpipe Analysis. By F. H. Getman. x.+77 pp. (New York: The Macmillan Co.) 2*s.* 6*d.* net.—Mr. Getman has prepared a good introduction to blowpipe analysis which will prove very useful to students of mineralogy, and will provide the field geologist with the essential points in the examination of ores.

Practical Magnetism and Electricity. By J. R. Ashworth, M.Sc. (Vict.) xvi.+88 pp. (Whittaker.) 2*s.* 6*d.*—This is a second edition of a book containing a series of simple experiments, which can be performed with inexpensive apparatus, exemplifying the principles of magnetism and electricity included in the elementary syllabus of the Science and Art Department. We notice that several new illustrations have been introduced, and would suggest that a short description placed underneath each would enhance their value.

A Dissected Model of a Direct Current Dynamo. By Arnold Philip, B.Sc. (Philip.) 4*s.* 6*d.* net.—This ingenious attempt to explain the structure and mode of action of a dynamo by means of coloured diagrams, so pasted together as to imitate the way in which the actual machine is constructed, should go a long way to helping both students and ordinary persons to understand the internal anatomy of an indispensable mechanism. The dissected model is accompanied by twenty foolscap pages of explanatory text.

Manual of Psychology. By G. F. Stout. Vol. II. 616 pp. (University Tutorial Series: W. B. Clive.) Price 4*s.* 6*d.*—There are a good many manuals of psychology already in the market, from the well-known volume by James Sully down to very rudimentary treatises; but for clearness and comprehensiveness we do not remember any that can enter into rivalry with Mr. Stout's present book. The reproach of sketchiness which is often heard concerning the volumes issued by the Correspondence College authorities is quite out of place in considering this volume. The language is most crisp and forcible, and there is a transparency about the sequence of the thoughts of the writer which leaves nothing in doubt. Each chapter shows ample evidence of a competent mastery of all the bearings of the subject combined with excessive care in the statement even of minor matters of detail. A volume like this will not only be serviceable to those who are preparing this somewhat perplexing but interesting subject for examination; it is also a very good introduction to it for the general reader, who will here find all necessary guidance, and sufficient references to those highly specialised works to which he can proceed when he has fairly grasped the outline of the subject.

Miscellaneous.

The Dawn of Revelation: Old Testament Lessons for Teachers in Secondary Schools. By M. Bramston, with Preface by Rev. the Hon. E. Lyttelton, Headmaster of Haileybury College. xiv.+308 pp. (Simpkin & Co.) 5*s.* net.—The Headmaster of Haileybury, who writes a preface to this book, describes it as a sincere and painstaking effort. It is that, and it is more. It is bold—to the verge of audacity. The authoress has gleaned in many fields—historical, antiquarian, archæological, and even in the scientific and critical. Certainly no labour has been spared in the collecting and arranging of material, and, as a consequence, the volume is packed with relevant and suggestive facts. The book, which is essentially one for teachers, consists of a series of lessons "arranged for secondary and other schools where the year is divided into three terms, so that the whole course may be gone through in two years." As specimens of bright and interesting teaching these lessons are models. Their

principal object seems to be the awakening and nourishing of a religious life in the pupil. But the moral drawn by the teacher will not always coincide with that drawn by the writer. Nor will the former always approve the interpretations of acts and incidents which have puzzled theologians and philosophers, not to say plain men, since the Canon was formed. It is the method here employed that we have been compelled to designate audacious. The writer has not hesitated to plunge—not once or twice, but repeatedly—into the troubled waters of the higher criticism, where, all unconsciously, she has got out of her depth. If the style is somewhat colloquial and the English faulty, as is notably the case in the last paragraph on p. 47, the matter is always readable and the tone devout.

The Heart's Counsel, and other Sermons. By John Huntley Skrine, Warden of Glenalmond and Canon of St. Ninian's Cathedral, Perth. xi.+159 pp. (Skeffington & Son.) 3*s.* 6*d.*—To the preparation of a school sermon, which is to have the desired effect upon the hearers of it, a combination of qualities must be brought. A lively sympathy with youth must be added to a thorough acquaintance with the limitations of immature intelligences. The power to draw examples from the school and home life of boys and girls must go hand in hand with an appreciation of their keen sense of humour. There must be no talking down to one's audience, and yet the temptation to indulge in abstractions must be carefully avoided. How rarely the same person combines these requirements, only those who have Sunday by Sunday wended their way to a school chapel will ever know. Mr. Skrine is possessed of a thorough knowledge of boy-life. He generally manages to be convincing, and, though he rarely indulges in rhetoric, he seldom fails to maintain an interest in his topic. What especially pleases us in reading his addresses is that while he succeeds in being interesting, he invariably provides material for quiet thought in the odd moments of school-life during the week—thoughts so expressed that they will lay hold of the minds of his hearers. The selection which we are enabled to publish in our "School Pulpit," by the courtesy of Messrs. Skeffington & Son, will, we hope, lead our readers to examine this volume.

Synopsis of English Literature, 1688-1760 A.D. By A. E. Rowe. (University Examination Postal Institution.) On large chart. Price 1*s.* 6*d.*—This chart will serve its purpose very well in all cases where there is sufficient room to display it. The principal works of each author only are given, but sufficient space is left for each student to fill in additional notes and information as he obtains them. The historical sequence of British authors is exhibited by a very ingenious arrangement of dates.

Systematic Course of Elementary Drawing and Colouring for Kindergarten, School and Home. (1) The Victoria Series, by Mrs. J. J. Findlay; (2) The Alexandra Series, by E. Archibald Brown. (George Philip & Son.)—Both these series of drawing-books and copies, designed for children from six to ten years of age, can be adopted with confidence. They are based upon the fundamental idea of Frœbel's doctrine, and throughout make every use of the child's self-activity. The learner's progress is steadily maintained, but the error of too rapidly covering the ground is avoided, while new exercises are introduced with sufficient frequency to prevent that "staleness" which is so detrimental to the maintenance of interest. The plan of having small books with different sized chequers, each book costing one penny, and the packets of eight exercises at sixpence, is admirable.

Wordsworth's "Prelude" as a Study of Education. By James Fotheringham. 73 pp. (Horace Marshall.) 1*s.* net.—Mr. Fotheringham has here amplified an essay read originally to the Bradford branch of the Teachers' Guild. We are sure the well-printed little volume will be welcomed by all students of Wordsworth who have also an interest in the many-sided problem of education.

PRIZE COMPETITION.

Result of No. 7.

OUR September Prize Competition—the best set of answers to our first Test Paper, in English History—was somewhat disappointing. No boys' answers were received, and the girls' answers were more remarkable for quality than for quantity. No single competitor corrected *all* the five mistakes contained in the "howler" extract given in Q. 1; but the answers displayed considerable insight and humour. Qq. 2, 3, 4, were well done; but no competitor attempted to describe the notable struggle between the Danes and the English in the time of Sweyn and Canute [Q. 2 (c)], no one selected Æthelflaeda or Lanfranc for treatment, and no one avoided the common mistake of regarding the Norman Conquest as completed with the coronation of William of Normandy. Qq. 5 and 6—which are undoubtedly stiff, but are stock questions for Junior Candidates—yielded the least satisfactory results: the only good answers were given by the successful competitor.

The candidates were much more dogmatic about the meaning of the term *Bretwalda* than are our leading historians; the term Dane*lagh* was generally confused with Dane*geld;* and fifty per cent. of the competitors misspelt *Witenagemot*, though a correct spelling of the word was used in the test paper itself. Teachers would do well to check the premature use of the names of England, France, and of the English shire-divisions in describing the locality of places. We fear that there is more simplicity than truth in the hypothesis that "the Feudal System was called 'feudal' because the nobles of the time were in constant feud with each other."

The girls' prize goes easily to:—

Norah Mary Gwynne,
High School for Girls,
Leek.

OUR CHESS COLUMN.

No 11.

I AM glad to be able to report a gratifying increase in the number of solutions sent in. For the September end-game there were no fewer than thirty-two postcards received, and of these thirty were quite correct. It is true that about two-thirds of these came from three schools, but I take this as an encouraging circumstance. What three schools can do more can do. My thanks are hereby tendered to those teachers and club secretaries who have responded to my appeal to foster and develop the game amongst schoolboys. The possibilities of chess as a recreation for boys in their teens are great, and I feel sure that, as time goes on, its influence for good, mental and moral, will be more widely recognised than has been the case hitherto. On the other hand, there is the danger of what, for lack of a better name, I will call "chess mania," to be avoided. Some months ago I recorded the fact that I had had occasion to deprive of a pocket-chessboard two young people who were using it during preparation. This term I find it almost impossible to live through a day without receiving a complaint from one or other of my colleagues anent the surreptitious composi-

tion of two-move problems by the same individuals, and neither of them is yet fourteen years old!

Now that the chess season has begun, may I suggest to secretaries the advisability of sounding "old boys" who are chess-players as to their personal opinion upon the expediency of giving a prize—say a small Staunton set—to be competed for in a tournament conducted on the League principle? Or, possibly, some former master might like to continue his interest in the chess club in a similar way.

The chess-players of Merchant Taylors' School, London, have once more succeeded in beating their opponents of Nonconformist Grammar School, Bishop's Stortford, in our Correspondence Tourney; we may soon expect to hear of other games being finished. Merchant Taylors' 3 points, Trowbridge High School 1 point, is the result at the time of going to press. It is curious that four games have been finished already in Division B and none in Division A.

I have been asked to give two games each month, one considerably more difficult to work out than the other. My object in these monthly games is not so much to promote competition as to make the game of chess as widely spread as possible, and that is why I have not selected difficult end-games. However, I will insert a problem occasionally in future. Mr. J. J. Glynn, a headmaster in Ryde, New South Wales, has sent me two beautiful problems of his own composition, one of which obtained a prize of three guineas, and the other baffled the efforts of the whole corps of solvers in the *Sydney Mail*. Here is the position in the latter :—

White (6 pieces) K on Qsq, Q on QKt4, B's on KKtsq & QR8, R on KB3, Kt on KB6.

Black (7 pieces) K on K4, Kt's on KBsq & QKt6, B on KKt6, P's on Q2, K3, & KR4.

White has to play and mate in two moves. It is an exceedingly clever production, but I am afraid that I must give White's first move if I am to receive any postcards at all. No good problem begins with a checking move, and this is no exception to the rule. B to QB6 is the key-move. Solvers must prove that, whatever move Black makes, White mates at the next move. This exercise merely involves a little patience, and will, I am sure, awaken a feeling of admiration in the minds of our competitors. Perhaps a postcard will not be large enough to contain all the variations, and, if preferred, the solutions may be sent per letter-post.

Two (possibly three) pocket-chessboards will be awarded, one to the school sending in the most correct answers, each to be the unaided work of the boy signing it. (See September number.)

The results of the September competition are appended :—

One prize goes to

The Friends' School,
Saffron Walden,

from which eleven correct solutions were received.

The other is awarded to

C. Varley,
Bluecoats' School,
York.

Correct answers were also received from :—P. D. Harrison, D. Hopkins, J. Hess, N. Falconer, J. H. Francis, F. M. Johnson, J. Waddington, E. Walker, A Maude, E. Baker, W. J Wickenden (all of Saffron Walden); G. Parsons, A. D. Pickard, W. J. G. Askey, R. G. Hollis, R. Nightingale (Tettenhall College); E. Colman, C. Mellows, L. Shillingford, L. Pascall, T. A. Poulter (N.G.S., Bishop's Stortford); R. G. Weil, A.D. Punchard, N. P. Wood, N. B. Dick, A. V. Poyser, E. Edser, L. Cutbush, J. McGubbin.

This results in the leaders' list being as follows :—N. P. Wood 7½, N. B. Dick 7, A. V. Poyser 7, A. D. Punchard 7, a very close finish, quite justifying my awarding a half-guinea set of men to the ultimate winner.

RULES.

I.—Write on postcards only.
II.—Give name, date, and school address.
III.—Answers must reach
The Chess Editor,
THE SCHOOL WORLD,
St. Martin's Street,
London, W.C.,
on or before the 16th. inst.

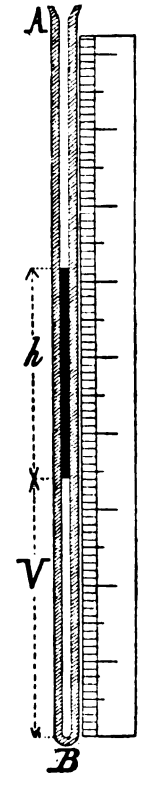
CORRESPONDENCE.

The Editors do not hold themselves responsible for the opinions expressed in letters which appear in these columns. As a rule, a letter criticising any article or review printed in THE SCHOOL WORLD *will be submitted to the contributor before publication, so that the criticism and reply may appear together.*

Simple Experimental Proof of Boyle's Law.

THE usual form of apparatus, constructed on the **U**-tube principle, for proving Boyle's Law, may be occasionally found inconvenient—especially when placed in the hands of beginners. The young student often experiences difficulty in clearly understanding the method of obtaining the *total pressure* applied to the enclosed air, and thereby has his attention partly withdrawn from the main deductions which are to be obtained.

I have recently used a simple form of apparatus, which, to the best of my belief, is not suggested in any text-book, and which has the advantage of simplicity in the method of observing the total pressure, and at the same time requires a minimum of material.



The principle depends upon the fact that mercury will not gravitate down a tube of small bore, one end of which is closed. **AB** (*see* Fig.) is a length, about 75 cms. long, of thermometer-tubing, 1 millimetre bore, sealed off at end **B**, and expanded at end **A**. A metre-scale, a length of thin steel wire,[1] a glass funnel, and a small quantity of mercury are required. The mercury must be pure and clean.

Method: Clamp **AB** in a vertical position, with the metre-scale at its side. Connect the funnel to **A** by means of a short piece of rubber-tubing. Pour a little mercury into the funnel, and induce it to run down the bore of the tube by inserting the steel wire; the mercury will readily run down the bore as far as the end of the wire, thus enclosing any desired volume of air. The *length* of the column of enclosed air may be taken to represent the *volume* (**V**). If **H** = the barometric pressure, and h = the length of mercury thread (both expressed in the same units), then the total pressure on the enclosed air = $(H + h)$. More mercury may now be introduced in the same manner, thus altering the values of **V** and h.

The volume of the air under pressure **H**

[1] A length of fine capillary glass tubing works more satisfactorily than wire, but its liability to break is a disadvantage.

(only) can be observed by laying the glass tube flat on the table. Observations with reduced pressures may be taken by inverting the tube; and variations in the length of the mercury thread may be obtained by inserting the wire up the bore to any desired distance, when all mercury below the end of the wire will run out.

The following numerical results indicate that the method is capable of giving fairly accurate results:—

Volume (V).	Pressure (H±h).	Vol. × Press.
30	76	2280
24·4	(76 + 18)	2293
18·9	(76 + 44·3)	2273
16·6	(76 + 62·1)	2294
50·0	(76 − 31·2)	2240
42·0	(76 − 21·8)	2276
39·3	(76 − 17·9)	2283

H. E. HADLEY.

Kidderminster,
October 10th.

A Teacher's Library of English History.

I VENTURE to think that Wakeman's "Introduction to the History of the Church of England," published by Rivington, Percival & Co., is a book you might have included in your list of history books useful to the teacher, in the September number. Of a wider range, the volumes called "Epochs of Church History," edited by Creighton, contain several valuable additions to various periods and aspects of Ecclesiastical History in England and elsewhere.

Yours faithfully,
K. R. HEATH.

Clifton, Bristol,
October 5th, 1899.

[Wakeman's "Introduction to the History of the Church of England" was omitted from our list because, though temperate in statement, it is denominational in its standpoint and terminology. It would, we think, do very well for a teacher who wished to treat the ecclesiastical aspects of English history from a distinctly Anglican point of view. Some of the volumes in Messrs. Longmans' "Epochs of Church History" series would certainly be helpful to the student or teacher of special periods of English history; but such books were explicitly excluded from the scope of our article.—THE AUTHORS of the article in question.]

CALENDAR.

[*Items for the December Calendar should be sent in by November 17th.*]

November, 1899.

Wednesday, 1st.—Entrance Exams. at Trinity College, Dublin University.

Saturday, 4th.—Return forms for (*a*) Higher Certificate Exam. of Nat. Froebel Union; (*b*) Preliminary Exams. of the Institute of Chartered Accountants.

Tuesday, 7th.—Oxford Exams. for Women. B. Mus. and D. Mus. Exams. begin. Combined Entrance Scholarships Exam. at Caius, Christ's, Emmanuel, Jesus, King's, Pembroke, and St. John's colleges, Cambridge.
Scholarship Exams. in Classics at Exeter and Brasenose Colleges, and Christ Church, Oxford.

Wednesday, 8th.—Oxford Exams. for Women. Return forms for 2nd Public Exam.

Friday, 10th.—Return forms for December Interm. Exam. of the Institute of Chartered Accountants.
Sir Michael Hicks Beach distributes London Chamber of Commerce Examination Prizes at Mansion House, 3 p.m.

Tuesday, 14th.—Scholarship Exams. in Classics at Merton, Pembroke, and Worcester Colleges, Oxford.
Scholarship Exam. in Hebrew at Wadham College, Oxford.

Wednesday, 15th.—Last day for sending in lists of students for the Interm. Education Board, Ireland.
Oxford Exams. for Women. Return forms for 1st Public Exam.

Thursday, 16th.—Return forms for Local Theory Exams. of Trinity College of Music, London.

Saturday, 18th.—Return forms for December Final Exam. of the Institute of Chartered Accountants.

Monday, 20th.—Honours Exams. begin for B.A. and B.Sc., London University.

Tuesday, 21st.—Scholarship Exams. in Classics at Queen's, St. John's, and Keble Colleges, Oxford.
Scholarship Exams. in Mathematics at Balliol, Queen's, and Corpus Christi Colleges, Oxford.
Scholarship Exams. in Natural Science at Balliol and Trinity Colleges, and Christ Church, Oxford.
Scholarship Exams. in History at Balliol, New, and Queen's Colleges, Oxford.

Thursday, 23rd.—Scholarship Exam. in Classics at Balliol College, Oxford.

Tuesday, 28th.—Entrance Schol. Exam. at King Edward's School, Birmingham.
Scholarship Exams. in Mathemetics at Brasenose, Pembroke, and Worcester Colleges, and Christ Church, Oxford.

Wednesday, 29th.—Oxford Exams. for Women. Return forms for Responsions.

Thursday, 30th.—Return forms for Preliminary Exam. of the Surveyors' Institute.
Scholarship Exams. in Classics at Trinity and Wadham Colleges, Oxford.

The December number of THE SCHOOL WORLD will be published on Tuesday, November 28th.

The School World.

A Monthly Magazine of Educational Work and Progress.

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The Editors will be glad to consider suitable articles, which, if not accepted, will be returned when the postage is prepaid.

All contributions must be accompanied by the name and address of the author, though not necessarily for publication.

The School World

A Monthly Magazine of Educational Work and Progress.

NO. 12. DECEMBER, 1899. SIXPENCE.

SOME DANGERS OF BOARDING-SCHOOL LIFE.

By ALFRED THOMPSON.

IT is no part of the present writer's purpose to decry boarding-schools. On the contrary, he has so lively a sense of their peculiar educational advantages, of their characteristic influence on English social life, and of their yet undeveloped possibilities of national power, that he hesitates to utter opinions which may have the appearance of disparagement. For whatever the merits or defects of our haphazard system of secondary education, we look with jealousy and misgiving upon any attempt to disturb the stability of those great foundations, ancient and modern, which are its chief glory, viz., our public schools, for with them the boarding-school system stands or falls. But as no institution designed for human improvement in whatever form is quite capable of producing, in an imperfect state of society, a perfect result, so a system of boarding-schools, while it may furnish the most effective available instrument for reaching the highest educational ends, may at the same time betray evidences of faultiness and incompleteness. And this being the case, it behoves us not to turn a blind eye to the defects of our machine, but to scrutinise it with the hope that, by making some improvement here or some delicate adjustment there, we may render it more than ever efficient for the accomplishment of its purposes.

SHOCK OF VIOLENT CHANGE.

If we would discover what dangers pertain to life in boarding-schools we must look to the radical substitution, at an early age, of the communal for the family mode of life. The removal of a boy of tender years, or even of a boy in his early teens, from the parental to the school roof, is sometimes argued unnatural, if not a violation of the sanctities of home. But without proceeding to this length, and at the same time without cynically sneering at the "sanctities of home"—which we are bound to admit is a very variable, sometimes a minus, quantity—we must allow that the change is sudden and violent. Unquestionably there is a certain genus of parents to whom a certain genus of boy is a perpetual irritation and a presence unwelcome. By them the responsibilities of parentage are never for a moment felt. Removal from such a home means no loss to the boy. But, on the other hand, while most boys of any worth are, even in the best of homes, voted at times a nuisance, they live in an environment so joyous on the whole that they cannot be suddenly snatched out of it and planted in a totally new world without prematurely tasting, and, if highly strung, drinking deeply, of the bitter cup of loneliness and estrangement. On returning for their first holiday, their parents observe that they have visibly aged, "have thrown off the child," as is said. It is idle to deny that this is mostly the effect of much suffering, keen and intense, secret and silent, such as is endured by a majority of boys during their initial term at boarding-school. Callous hearts and unimaginative minds may question this, but generally it will be conceded that no boy who has a home worth leaving will give it up without a pang. But the British boy's skin, thanks to the doggedness and pluck underneath it, covers ofttimes a multitude of hardships and conceals a little world of sorrows. Life's discipline has begun. It has to begin sometime. The only question is whether—what we have already, though with hesitation, assumed—this crucial test is premature. There are educationists and philosophers who maintain that it *is*, and who, in consequence, place this among the disadvantages of boarding-school life.

DANGER OF BEING MISUNDERSTOOD.

The transference of a child from home to school is like the transference of a plant from one locality to another. The new soil should be congenial. But, however skilfully planned and carried out, the transplantation will involve a temporary arrest of growth. The new environment may be more suitable than the old, but it is not the same. Time is needed for adaptation. Few mothers are psychologists, and not many fathers, yet a large, and largely increasing, proportion of parents are careful and vigilant students of their children's mental development. Many a mother knows that what the class-master calls slowness is really caution, what he rates as stupidity is nervousness, and, often, what he praises as sharpness is a

compound of shallowness and cunning. A boy's education at boarding-school is too apt to proceed on what may be called "symptomatic" lines, *i.e.*, the master judges of his mental capacity by superficial signs, for unless he be more astute and philosophic than the average, he cannot, except by long and patient study, get behind the child's mind. But it is essential to the boy's best training that his mental symptoms be treated in connection with what physicians would call the "history" of his case. The parents alone possess this; consequently a strong argument is deducible in favour of the co-operation of school and home in educational work; in other words, in favour of the day-school as against the boarding-school system. True, it would be a sorry day for school organisation when parents were allowed to pester teachers with details of their children's mental history; but it is a question whether it is not in the highest degree desirable that the parent, who has the advantage of knowledge in one realm, and the schoolmaster, who has the advantage of knowledge in another, should combine their forces to call out the best faculties lying dormant in their pupils. It may be contended that such interest is so rarely evinced that it cannot be regarded as a factor affecting the case. But there is much evidence to the contrary. And where such parental responsibilities are grasped, the absence of so sympathetic and intelligent a kind of assistance must—assuming that it would otherwise be given—constitute an unspeakable loss to a boarding-school boy. But against this it is only fair to cite the large number of instances where a boy receives no educational encouragement whatever in that place where it should be the first object of solicitude—his home.

Restricted Mental Environment.

With the exception of the time he spends in class, a boarder passes his existence almost entirely amongst his school-fellows. And even within that small circle there is a smaller, his own set, to whose atmosphere his life is almost wholly confined. Now, every observant father must have noted the fact that at home—whether in house or garden or stable, in the street, on the tram, on the 'bus, in the train, in town or in country—a thousand impressions are made on his boy's mind. The lad sees, hears, feels, many things which are new to him, which excite wonder and inquiry. Naturally, he turns to his father for explanations of these phenomena. At the table and by the fireside he hears talk of stocks and shares, of crops and cattle, of polar expeditions and punitive campaigns, of men and manners and music and books. There is no end to the fund of miscellaneous knowledge which he thus crudely accumulates. He is laying in a promiscuous store, of little use in the present, but which in after years he will find again, arranged and classified, and which, in addition to proving weapons in life's armoury, will furnish happy, never-to-be-forgotten associations—the sweetest, most wholesome memories of youth and home. Contrast with this the environment of a boarding-school. The questionings of a boy's mind cannot be answered as they arise—a first essential—for the minds around him are ill-formed as his own, lacking perception, analysis, and balance; and such miscellaneous information as he picks up at school is often of a puerile and frivolous character. If he has—in the number of boys around him—a large world under constant observation, his outlook is extensive rather than intensive: the frequent contact of one well-developed intellect and character might prove a more liberal education. But it is not every younger Mill who has an elder Mill to inspire him. Nevertheless, the lack of constant proximity to a greatly superior, better balanced, and more experienced mind may be reckoned among the drawbacks of boarding-school life.

Low Moral Standard.

But there is a danger of still greater moment than that of a crude mental environment. Where boys congregate together and form a society of their own, they make their own standard of ethics and honour. They make their own laws, appeal to their own precedents, arraign, try, and impose penalties upon, members of their own order. No schoolmaster in the world can upset, at a blow, so virile and complex a republic. "The School" is a powerful, mysterious, spiritual essence which, though boys may come and boys may go, itself goes on for ever. Only a sagacious, diplomatic Head, who knows how to combine clemency with firmness, can govern successfully such a society; and only a man who is the very soul of justice and integrity can preserve such a society from corruption. It was the recognition of the evils latent in this system which led Arnold to exclude from Rugby boys whose individual example gave a bad tone to the school as a whole. He says, "My own school experience has taught me the monstrous evil of a state of low principle prevailing amongst those who set the tone to the rest. I can neither theoretically nor practically defend our public school system, where the boys are left so very much alone to form a distinct society of their own, unless you assume that the upper class shall be capable of . . . receiving and transmitting to the rest, through their example and influence, right principles of conduct, instead of those extremely low ones which are natural to a society of boys left wholly to form their own standard of right and wrong." (Stanley's "Life of Arnold," vol. i., p. 118.) Undoubtedly the moral tone of a school has a tendency to gravitate to the level of the average, if not of the worst, boy, who although (as may be contended) he brings his morals with him, finds about him restraining influences of a different order, and running in a different direction, from the restraining influences of home. Yet a long succession of high-minded masters and assistants, a noble lineage of captains and prefects, a carefully cultivated atmosphere of refinement and *noblesse oblige*, and a reverent regard

for antiquity and the memory of great names, may exalt a particular school to the highest pitch of pure tone. But, dealing with the average public school, with the typical proprietary or private boarding-school, can it be said that the moral standard of these aggregations of raw, undeveloped boy-natures, is as high as in the average home they represent? Unless it can, this is to be set down amongst the disadvantages, or at least amongst the dangers, of boarding-school life. That the tone of a school is the subject of so much solicitous inquiry on the part of parents is a proof that herein lies the vulnerable point of the boarding system. And it is uncertainty of, rather than lowness of, tone which causes so much anxiety, for after all, this quality is an abstraction of vague and elastic proportions, defying discernment except by persons of much observation and insight.

REPRESSION OF ORIGINALITY.

There is a tendency in every boarding-school to the production of a type of boy *sui generis*. Granted a high type, and the characteristic is not regrettable. And yet it suggests that the rubbing down of angles, while effecting the removal of oddities and eccentricities, produces too often a monotonous sameness of character which is at best a dubious substitute for the original. Spite of the fact that bullying has to a great extent died out, the boarder is as alert as ever to seize on any singularity or mannerism of the new boy, and to turn into ridicule what is perhaps a very proper and valuable part of this boy's personality. But because it finds no counterpart in that stereotyped little community, it is laughed to scorn. Dr. H. Montagu Butler, long the honoured Headmaster of Harrow, says, "I believe that manliness is taught not by roughness, but by sympathy. If you wish to make boys manly you must make the least of their weaknesses and the most of their strength. You must laugh at nothing in them, certainly not their scruples, or their religious habits, or their purity. . . . . You must not laugh at their nervousness, or their shyness and awkwardness, or even what looks like their cowardice." But, unhappily, this is too common, and its baneful shadow falls over both boarder and day pupil, only far less perceptibly over the latter, the opportunities being so many fewer and less favourable. Hence the day-boy preserves a much more decided individuality, while every year the boarder seems to merge his increasingly in a common type.

FORCED MANLINESS.

Again, boarding-school life quickens development. The boy who tastes early the bitter cup of isolation, and learns to fend for himself, becomes graver and more self-conscious than the boy whose instincts of self-preservation are not so soon awakened. In a physiological sense boarding school makes a man of a lad, but it is doubtful if this is so great an advantage as is sometimes assumed. Soon enough the child becomes a man, but childhood once lost is never regained. To every stage ample time for development. The highly organised must develop slowly. So far, then, as the boarding-school proves a forcing-house, it is of questionable service in the evolving of highest character. The confined limits of the life of a boy lived amongst boys, and the almost universal tendency of a school to organise itself to circumvent authority, foster a certain knowingness and secretiveness which, too frequently, produce the half painful impression that boys of this class are inclined to become disingenuous—never "letting themselves go" in the presence of their elders, seldom quite as frank and sincere as we should like to find them; certainly not as communicative and simple-hearted as the less self-reliant day-boy. But there is this extenuating, though not the less prejudicial, circumstance—the boarder is on terms of intimacy with none but his school-fellows, hence he is apt to be overawed by every adult. On the whole, the day-boy has a decidedly better chance of living his *own* life, indulging his hobbies, following his peculiar bent, and progressing towards a distinct individuality, than his rival, the boarder. But whether this is to the ultimate advantage of the boy himself and to the race as a whole, belongs to the province of the philosophy of education.

SEVERANCE FROM WOMAN'S INFLUENCE.

There is one danger which, because it is so subtle, so unobtrusive, so potent in its influences, is difficult to set forth, but which is perhaps the greatest borne by a boy sent to boarding-school, viz: removal from the refining forces of family affection and the gracious, tender, talismanic atmosphere of a mother's love. Does not the perfecting of a boy's character seem to demand that, once at least, every day of his life, he should come within range of that womanly sympathy which expresses itself so often in a long series of sacrifices for others?

REMEDIES AND QUALIFICATIONS.

Notwithstanding all that has been said of these dangers, some of which will doubtless be questioned, as great an array of advantages might perhaps be marshalled on the other side. Nor are most of the dangers inevitable or irremediable. Much, and much more, might be done than *is* done to reduce them to a minimum. It is not sufficiently realised how crushing to many a sensitive boy are those first days and weeks in foreign surroundings—surroundings often needlessly bare and cold and unattractive. New boys must fight their own battles, but masters may see to it that the terms of the combat are a little more equal than is sometimes the case. A good tone may be preserved by the Arnoldian method—the only sure one—of weeding out boys whose influence is baneful; for all arguments against this expedient overlook the consideration

that the choice of a boarding-school means to parents the choice of a society for their children. Hence the House-Master should never hesitate—where he has the power—to exclude persons whose presence contaminates this society or disturbs its peace. Above all, the rights of the individual to some share in the shaping of his own destiny should be recognised—yes, even amongst this crude, ill-formed conglomerate of boy-life. Within limits hobbies should be encouraged, and experimental and research work—however irrelevant to the school curriculum—should never be thwarted, even though it may need to be repressed. For, when all is said, though moral discipline comes of being compelled to do some things we dislike, intellectual progress is begotten of a freedom to do all worthy things we love. And as regards the loss of those finer home influences—let the masters' wives look well to their ministry!

Of girls' boarding-schools nothing specific has been said, but obviously, to a greater or less degree, the same dangers beset them. Yet there is at least one drawback in addition—the possible development of a dislike for domestication. In any case, that being every girl's rôle in life, it is a question whether any but exceptional circumstances can justify her education apart from the practical and prosaic, yet the salutary and sacred training-school of home.

THE POSITION AND TEACHING OF GERMAN.

By E. L. Milner-Barry, M.A.

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III.—Elementary Instruction.

The Reader.

It was resolved some ten years ago, by a Conference of Modern Language Teachers which met at Cheltenham,[1] "That the reading-book should be the centre of instruction in teaching a foreign language." This was one of the planks in the platform of the *Neuere Richtung* which was then just beginning to attract attention in this country, but the principle enunciated goes back to a period far more remote. It was, in effect, the method employed by Roger Ascham when imparting the classics to his royal pupil Elizabeth, and is expounded by him at length in his well-known work, "The Schoolmaster." It may be safely affirmed that the use of the Reader is one of the few points on which nearly all modern language teachers would agree. The Reader does undoubtedly form the basis of instruction in German in many schools, but its utility and value is too often diminished by the fact that the so-called Reader is but the set-book for one of the many elementary examinations by which we try to stimulate the powers of our pupils, and the feverish haste with which the book must be "got up" leaves no time for the application of any true method, and proves the source of much bad teaching. Pupils are hurried through some hundred pages of text, and at the end are frequently unable to write down the very simplest sentence in the language they have been studying. It is quality not quantity which should be aimed at. The Reader should be kept in the foreground, and should form the trunk on which the teacher should model all his work in the language—grammar (including word formation), retranslation, dictation, conversation and repetition.

Assuming that the study of German is commenced at an age not earlier than thirteen, I would advocate that the Reader should be placed in the hands of pupils after a few elementary grammar lessons covering the principles of inflection have been given, and that the subsequent teaching of grammar be based on the study of the text of the Reader. The teacher will then have to decide whether he will avail himself of a manual comprising a Reader, Writer and Grammar, like those suggested in the previous article, or whether he will content himself with placing a mere text in the hands of his class, supplying the rest of the material himself by means of notes. If he adopts the latter course, he will probably derive considerable pleasure from the fact that his method becomes more personal, and he will have the additional advantage of being able to vary and modify it to suit the needs of his class without being tied down to the routine of a book. He will probably be somewhat hampered by the fact that the text he puts into the hands of his pupils may not contain as many examples of the points he wishes to inculcate as the extracts in a course written especially to illustrate grammatical features; but this difficulty is not insuperable. It is essential, however, in such a system that the term's work should be mapped out carefully in advance, and a sort of syllabus be drawn up to suit the number of hours allotted to the subject. The following arrangement is suggested for a course extending over a term of twelve weeks, with four periods a week given to the subject.

Suggested Scheme of Work.

We pre-suppose some knowledge of the verbs, nouns, adjectives and numerals as the result of the preliminary lessons, which may be spread over a period of three weeks. We ought then to proceed to drive home by practice what has been already learnt, and to teach our pupils how to put together sentences of very simple construction. This may well occupy the remainder of the first term's work in the language. Every lesson, or group of lessons, must be built up on some extract, and should include translation, the grammar deduced from it, short sentences for retranslation, elementary conversation, and occasionally dictation. The time at our disposal might be distributed in the following way:—Construction of simple sentences with the

[1] Cf., for a full report of the proceedings of the Conference, *Journal of Education*, June, 1890

auxiliaries and with transitive verbs eight lessons, treatment of the simple interrogative and simple negative sentence four lessons; the personal pronouns may be introduced next, and should give material for four lessons. We might then pass to the adverb, and give at the same time rules for word order in simple sentences, four lessons. The use of the prepositions will naturally follow the adverbs and word order, and will also occupy four lessons. The principle of the separable and inseparable verbs should be then explained, four lessons. Then we may pass to the relative pronoun and relative clause, two lessons. The rest of the time at our disposal (six hours) may be distributed throughout the course for general revision and learning extracts by heart.

Preparation of work will naturally form part of the course, but I would suggest that it should be limited to the preparation of the translation of the text and to the writing out and learning up of notes. All retranslation should be done in class under the supervision of the teacher. The equitable distribution of the time to be spent upon home-lessons is a difficult problem for the child mind to settle, and the amount of home-work set is often quite out of proportion to the capacities of pupils. I am convinced that in the earlier stages of language teaching too much help cannot be given; the work done in class will show greater thought, and consequently will be more correct and of a higher educational value than that produced where no supervision is exercised.

As an example of the way in which it is suggested that the Reader should be utilised, I have selected the following extract for treatment:—

Die Wette.

Zwei Maurer arbeiteten an einem Hauſe. Robert rühmte die Sicherheit, mit welcher er eine Laſt eine Höhe hinantragen könne. Jakob beſtritt den Punkt; und die Unterhaltung endete mit einer Wette, daß Robert ſeinen Freund nicht auf einer Leiter bis in die Spitze des Gebäudes tragen könne. Der Verſuch wurde gemacht. Jakob ſetzte ſich in einen Kübel, und es gelang ſeinem Kameraden nach großer Anſtrengung, ihn hinauf zu bringen. Ohne irgend eine Ahnung von der Gefahr, welcher er entgangen war, ſprach der Verlierende zu dem Gewinnenden: „Ich habe die Wette verloren; aber erinnerſt Du Dich, im dritten Stock machteſt Du einen Fehltritt; da hatte ich Hoffnung."[1]

It may be fitted into the course as one of the lessons on the prepositions. At the conclusion of the previous lesson the passage to be taken next should be read over to the class by the teacher, who should direct attention to any words or expressions which he thinks are likely to puzzle his pupils, and the lesson set should be the preparation of the translation of the piece and the parts of the verbs and declension of the nouns contained in the extract, all of which the pupil should be able to work out from the vocabulary.

[1] From Lange's "lementary German Reader." (Whittaker & Co.)

The extract should then be read carefully by the class, and special points in the pronunciation remarked upon, such as the ſt in beſtritt (line 3), Spitze (line 5), Stock (line 12), Kameraden (line 8), &c., &c. The passage should then be translated sentence by sentence and the nouns and verbs carefully gone through, the unfamiliar ones being noted down; sentences containing a past tense should be put into the present, plurals substituted for singulars and *vice versa*. The passage should then be dictated, after which some simple questions should be asked in German. Wo arbeiteten die zwei Maurer? Wie hießen die zwei Arbeiter? Wie unterhielten ſie ſich? Was war der Gegenſtand ihrer Wette? Was machte Jacob? Gelang es ihm, ſeinen Kameraden hinauf zubringen? &c., &c. The answers should of course take the form of connected sentences, not of mere monosyllables. With the Reader still in the hands of the class, the teacher should proceed to drive home the special point of grammar which he has set apart for this lesson—the prepositions governing the accusative and the dative—an, auf, hinter, neben, in, über, unter, vor, zwiſchen. The two simple rules should be given—

(1) Use these prepositions with the accusative case in answer to the questions "whither?" and "for how long?"

(2) Use these prepositions with the dative case in answer to the questions "where?" and "when?"

Such expressions as denken an, Erinnern an, erſtaunen über, lachen über, should be pointed out as indicating a sort of mental process akin to motion, and therefore followed by the accusative.

All the prepositions occurring in the text should be noticed and attention directed to the contraction im (line 12); this and similar forms such as am, beim, ins, aufs, &c., &c., should be explained. Then some simple sentences should be given for retranslation, which should be done in class with open Readers:

Robert and James, his companion, are working at a house. Robert was on a ladder and James was standing below him. There was a tub before the building. Robert says he can carry his friend in it to the top. James places himself in it. With great exertion Robert succeeds in carrying his friend to the ladder. He reminded his brother of the danger. Their companions were astonished at the bet.

The sentences should then be collected, corrected and returned at the next lesson, when attention can be drawn to any further points arising out of them. The aim should be to avoid, as far as possible, the danger of pupils writing down incorrect sentences and constructions. Mistakes once made are apt to perpetuate themselves. Let us give pupils in the earlier stages of the language something which they can hope to accomplish successfully.

"Realien."

Any attempt to bring home the life of our continental neighbours cannot fail to react advantageously on our teaching. We ought to endeavour to give our classes a sketch of German life, to draw for them in bold outline a

picture of the country whose language we wish to teach them. Wherever an opportunity presents itself let us talk to our pupils about the geography and the history of Germany, let us tell them something about the Holy Roman Empire, about Charlemagne, Barbarossa, Kaiser Max; how the old Imperial idea proved a bane to the true development of the country, how the old Empire mouldered away, how Prussia became a great power, and how the New German Empire came to be founded. Let us try and familiarise them with the giants of German literature, Walter von der Vogelweide, Luther, Lessing, Goethe, Schiller, and then let us turn to the institutions of the country, its religion, its government, army and navy, universities and schools. Let us tell our pupils how the average German passes his days, what are his pursuits, his tastes. Nothing is more striking in the method of the *Neuere Richtung* than the way in which the "Realien" of the subject are brought home to the pupils, and the natural curiosity of the German mind with regard to foreign countries quickened and developed. As a valuable adjunct to the teaching of this part of the subject I would recommend the excellent historical wall pictures issued by Messrs. Hölzel, of Vienna, and Dr. Kron's "German Daily Life" (Dent & Co.), a book which should be placed in the hands of all our pupils.

Concluding Remarks.

The further course of instruction in the language will naturally depend on how far the class will come under the present examination system. I should like to offer one or two suggestions on this point. Let all set books be avoided in elementary examinations where "unseens" are prescribed as an alternative. Above all, let us avoid the works of classical authors such as Goethe, Lessing and Schiller, which for some inconceivable reason are sometimes found in the syllabuses of elementary examinations. To put the works of the classical authors in the hands of beginners probably breeds a distaste for literature. Again, let composition receive due attention; only in this way can we hope to give fair play to the living language. Dr. Breul, in his extremely interesting essay on "The Teaching of Modern Foreign Languages,"[1] deplores the fact that composition is set in elementary examinations, and advocates free composition. I am quite prepared to admit with him that the value of the work sent up by many of the candidates in composition is *nil*. It seems to me, however, that this is largely due to the fact that every candidate thinks it necessary to inflict on the unfortunate examiner his or her version of passages which the teacher never contemplates being attempted except by the better candidates, since passing in composition is not a *sine qua non* of the examination. But, as it is just this part of the subject which is so obviously neglected, I believe we should do well in every examination to insist on all candidates passing in some easy re-translation — whether we call it composition or sentences. A reform of this nature would raise the standard of our teaching and form a useful stepping-stone in the direction of a complete re-moulding of our examination system in modern languages.[1]

[1] Cambridge University Press. Second Edition. 1899

THE SALLÈZE METHOD OF TEACHING HISTORY.

By Ethel M. Reily.

A NEW method of teaching history, or to be more accurate, chronology, was invented some fifteen years ago by Madame Sallèze, a lecturer on history in Paris. It is an improvement on the Polish method, and aims especially at enabling the student to retain long lists of dates and events without any undue strain on the memory. Madame Sallèze relies on pictorial diagrams in her chronologies; she has published chronologies of the History of France, also of Rome and Greece, and she intended eventually to prepare a chronology of English History. Her method received the warm approval of the Society of Teachers of the Seine Department, and was awarded a silver medal from the "Societé d'Instruction et d'Education Populaire."

Of its actual merits I can speak from personal experience, since I had the privilege of studying history for nearly two years under the direction of Madame Sallèze. During that time neither I nor any of my fellow-students had a history-book in our hands. We attended Madame Sallèze's admirable lectures, and, by the aid of her chronologies and a few simple notes, were enabled to dispense with other text-books.

These chronologies are paper-covered books, containing from forty to fifty pages—about two pages being devoted to each century. On one page is the diagram, headed by the names and dates of accession of the kings who reigned during the period; on the opposite page is a list of the principal events and their dates.

The diagram is very simple. It consists of a large square, representing a century, subdivided into one hundred little compartments, each representing a year. In each of these little squares is placed an emblematic sign suggestive of the special event of the year in question. Should there be more than one event of importance, the square contains two, three, or more sections, each with its pictorial sign. Should there be no event of importance to commemorate, the square is left blank.

As a further aid to memory the pictorial signs are placed on a background of a distinctive colour: thus, red indicates a military event; violet some ecclesiastical event; a green background refers to

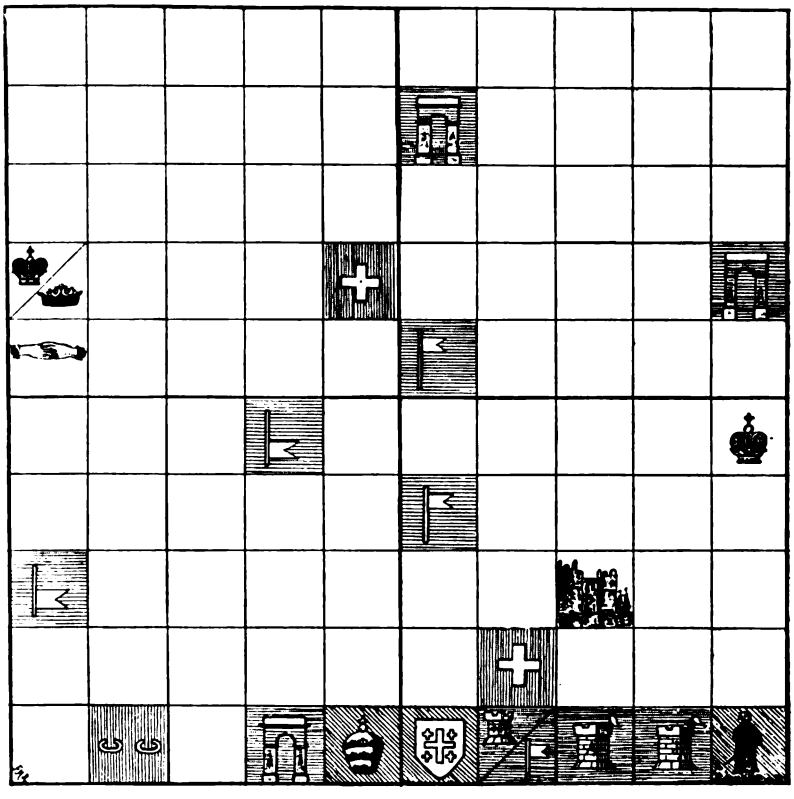
[1] Cf. *Modern Quarterly of Language and Literature*, April, 1899, p, 312, *sq.*

naval affairs, and grey denotes a death, an assassination, or civil revolt, according to the sign displayed. The signs are, in themselves, suggestive of the events they represent; a cross indicates a death, a crown an accession, a war is signified by two tents, a battle by a flag—if reversed, defeat is indicated. A ship represents a naval battle—if the sails are set, a victory; if furled, a defeat. Clasped hands indicate a treaty; a triumphal arch a conquest. Naturally there are certain events of rare occurrence which are somewhat difficult to illustrate by a definite emblem. Madame Sallèze has, however, displayed much ingenuity in suggesting these events by pictorial signs. The founding of the Jesuit Order, for instance, is indicated by the letters A.M.D.G., these being, of course, the initial letters of the well-known motto of the Order, "*Ad Majorem Dei Gloriam.*" The flight of Louis XVI. is suggested by a picture of a travelling coach; the discovery of America is plainly set forth by an outline of that continent, and the births of Louis XIV., the "*roi soleil*," and Napoleon—while they are both suggested by a cradle, are specialised in the one case by a rising sun, in the other by an imperial eagle.

The manner of using the diagrams is as follows: during the progress of the lecture, or history-lesson, the pupils have the diagram representing the century in question open before them. As the lecturer deals with each event of importance the pupil observes its position on the diagram. At the end of the lesson the pupil is called upon to enumerate the principal events and their dates. While it would be obviously impossible for him to do so after a single hearing, by the aid of the diagram he is able to do so. The sight of a flag reminds him that a battle was fought in the year indicated, its upright position tells him that it was a victory for the country whose history he is studying. With these aids to memory he can at once recall the name of the battle and other details concerning it.

At the next lesson the pupil once more recites the list of events and dates by the help of the diagram, and afterwards shutting the book, when asked the date of any particular event can usually reply correctly, as he is able to call up a clear mental picture of the diagram and so to place the event rightly. In this manner long lists of dates and events can be committed to memory without undue effort. The diagrams are also prepared on single sheets of cardboard and very much enlarged, so that they can be seen by a whole class at one time.

It is really wonderful how, after a very short use of these diagrams, one is able to call up at will a clear mental photograph of the sequence of signs



HISTORY OF FRANCE. DIAGRAM OF SIXTEENTH CENTURY.

EVENTS REPRESENTED.

1016. Conquest of Burgundy.
1031. Accession of Henri I. He gives the duchy of Burgundy to his brother, Robert.
1035. Death of Robert.
1040. Conquest of Southern Italy by the Normans.
1041. Trève de Dieu.
1046. Victory of Val des Dunes.
1054. Defeat at Mortemer.
1060. Accession of Philip I.
1066. Battle of Hastings. William of Normandy becomes King of England.
1071. Defeat at Cassel.
1078 William the Conqueror commences the Tower of London.
1087. Death of William the Conqueror.
1092. Divorce of Philip and Bertha.
1094. Conquest of Portugal by Henry of Burgundy.
1095. Council of Clermont.
1096. 1st Crusade.
1097. Siege of Nicea. Battle of Dorylée.
1098. Siege and Capture of Antioch.
1099. Siege of Jerusalem.

for any particular century, and very often the juxtaposition of certain signs is a fresh aid to memory. For instance, three events of French history which are most clearly linked in my own memory, yet having no connection between them, are the founding of the Order of Templars, the battle of Brenneville and the wreck of the *Blanche Nef*. I do not suppose that, under any ordinary system of teaching dates, I should be able to recall the dates of these events, but by closing my eyes for a moment I can see three little pictures, one of a man robed in a long cloak and bearing a cross upon the shoulder, next a flag reversed denoting a battle lost to France, and finally a ship sinking in the waves. I see that these three pictures occupy the last three squares of the second line, and I know that the events in question took place in the years 1118, 1119 and 1120 respectively.

The later centuries are of course terribly crowded with events, and it is very difficult to retain the dates even by the aid of the diagrams, yet they are of very great assistance, the great point in their favour being that if the student can recall a single date or event a whole host of associated events and dates at once rise in the memory of the very knowledge of which one was almost unconscious.

Since this article was written I have had the opportunity of seeing a history published in the early part of the present century and written by a Miss Rundall, which contains diagrams illustrative of the principal historical events. These differ from Madame Sallèze's diagrams in that they are more elaborate and aim rather at representing each event by a symbolical picture than at a mere aiding of the memory by a single symbol. Both Miss Rundall and Madame Sallèze disclaim any originality as regards the idea of illustrating by symbols, though they have carried it out in different manners. Considerable ingenuity is required to discover the meaning of some of Miss Rundall's diagrams, since the authoress is of the opinion that "the greater the exertion to discover the meaning may be, the more tenaciously will the mind retain the meaning when discovered."

As the events are grouped by "reigns" and not by centuries, and two events, separated in point of time by many years are often placed side by side, there is not the same aid to memory as regards the dates of events as is afforded by Madame Sallèze's diagrams.

I am inclined to think that elaborate illustrations give too much aid to the pupil and do not sufficiently exercise the memory.

It is, however, interesting to note that the idea has been applied to our own history, and curiously enough, by a woman in both cases.

"Ah, my boy, you learn history, do you? Well, here's sixpence for you if you'll tell me the date of the battle of ——" "Please, sir, we don't learn dates of battles." "You don't! My boy, here's half-a-crown for you."—A. L. Smith in "Essays on Secondary Education" (*Clarendon Press*).

THE TEACHING OF ANALYSIS.

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II.

In my last article I attempted to sketch the method I have been in the habit of using when teaching analysis to the lowest forms of secondary schools—say, to boys of the average age of twelve. Up to this stage the pupil has acquired the information necessary for the analysis of Simple sentences, but has not been taught to differentiate the various kinds of Subject, Object, &c. It is now necessary to treat each part in detail; in this way the economical advantage of "killing two birds with one stone" will be obtained—the detailed consideration of the several parts of a sentence will strengthen and develop the preconceived ideas of their functions. This additional knowledge is best acquired inductively. Let us, for example, take

The Subject and its Adjuncts.

Write down a number of sentences in which the Subjects and their Adjuncts are separated, thus:—

(1) Now came still evening on.

evening — now came on.

still

Evening, the Subject, is a noun; *still*, its Adjunct, is an adjective.

(2) Peel's "View Halloo!" would awaken the dead.

"View Halloo!" — would awaken the dead.

Peel's

"View Halloo!" is a Noun phrase; its Adjunct is a noun in the Possessive case.

(3) His refusal to come was misunderstood.

refusal — was misunderstood.

his — to come

Here one of the Adjuncts is a pronoun in the Possessive case; the other is a Gerundial Infinitive.

(4) Correcting boys' exercises is sometimes amusing.

Correcting — is sometimes amusing.

boys' exercises

Correcting is a Verbal Noun, followed by its Object as an Adjunct.

(5) To err is human.

The Subject, *to err*, is a Simple Infinitive.

(6) The day of destruction came suddenly.

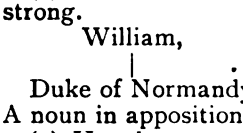
day — came suddenly.

the — of destruction

One of the Adjuncts is an adjective, the other an Adjectival phrase.

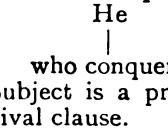
(7) The brave are no more.
Here the Subject is an adjective with a noun understood after it.

(8) William, Duke of Normandy, was very strong.



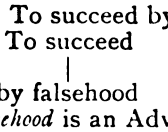
A noun in apposition forms the Adjunct.

(9) He who conquers shall live.



The Subject is a pronoun and its Adjunct is an Adjectival clause.

(10) To succeed by falsehood is dishonour.



By falsehood is an Adverbial phrase.

(11) Where he went is evident.

The Subject of the whole sentence, *where he went*, is a Noun clause. The pupils should now be told to summarise these results, and they will find that the Subject of a sentence may be (1) A noun (or any word used as a noun), (2) A pronoun, (3) An adjective with a noun understood after it, (4) A Noun phrase, (5) A Noun clause, (6) A Simple Infinitive, (7) A Verbal Noun; and that the Adjuncts to the Subject may consist of one or more of the following:—(1) An adjective (or any word used as an adjective), (2) An Adjectival phrase, (3) An Adjectival clause, (4) A Possessive case, (5) A Gerundial Infinitive, (6) The Object of a Verbal Noun or of a Simple Infinitive, (7) An Adverbial phrase, when the Subject is a Simple Infinitive or a Verbal Noun. The treatment of the parts of the Verb Infinite requires care. The teacher should explain that *this* in "To do this is a waste of time" is an Adjunct to the Subject *to do*. Some authorities would have us take the whole phrase *to do this* as the Subject; to be consistent they would have to take *this work* as the Subject in "This work is waste of time," yet everybody would consider *this* as an Adjunct. The fact is logical and grammatical analysis are not necessarily identical.

The method we have just described should be adopted with each of the remaining parts of a sentence. We will now consider some of the difficulties that the pupil will encounter in his further progress.

Prepositional Verbs.

A verb followed by a preposition is frequently the cause of error. The learner does not realise the distinction between the uses of the verb and preposition in the two sentences, "He walked on the road," and "He thought of the crime." If (he argues) *thought of* may be considered as a single verb followed by an Object, why does *walked on* not admit of similar treatment? The best test seems to lie in the degree of authority that attaches to the use of the verb in the Passive form. We frequently use such a sentence as "The motive was thought of," but a good writer would hesitate before committing "The road was stood on" to paper.

Adjuncts to the Finite Verb.

Amongst these should be classed Cognate Objectives, Adverbial Objectives, and Absolute phrases. Cognate Objective is the term applied to a noun having a meaning similar to that of the verb which precedes it; *e.g.*, "dream *a dream*," "row *the course*." These are not Objects—the verbs being Intransitive.

Adverbial Objectives are nouns in the Objective case that have the functions of adverbs. Instances are seen in "He toiled *all day*," "It weighs *ten pounds*."

An Absolute phrase is a combination of a noun (or pronoun) and a participle, which does not affect the construction of the sentence in which it occurs; in Latin it is known as the Ablative Absolute. In "*Thus done the tales*, to bed they creep," we have an instance of this construction. The pupils should be taught to distinguish such combinations of noun and participle from others that *do* enter into the construction of the sentence. The Participial phrase is not absolute in "The men, tired by their exertions, returned to the fort." It forms an Adjunct to the Subject.

After having treated the Object on the lines previously indicated, the teacher will have to explain a few difficulties that arise in dealing with this part of the sentence.

The Indirect Object.

Show that with verbs of *giving*, *sending*, *telling*, &c., two Objective cases may be used; the Indirect Object names the person or thing indirectly affected by an action. Of course the name of the person or thing is still the Indirect Object when the preposition *to* is used. Examples: "I gave *him* a shilling." "I gave a shilling *to him*." There is, however, no reason why the Indirect Object should not be taken as an Adjunct to the verb, and, with younger pupils at any rate, this course is preferable.

The Retained Object.

Under certain circumstances a sentence in the Passive form may contain an Object. Verbs that take two Objects in the Active voice may retain either of them when the construction is changed to the Passive. Thus, "He showed me the book" may become "The book was shown *me* by him," or "I was shown *the book* by him."

The Complex Object.

A typical kind of Complex Object consists of a noun or pronoun in the Objective case combined with a verb in the Infinitive mood, a participle, or an adjective, by means of which something further is indirectly asserted about the person or thing

denoted by the noun or pronoun. Examples: "We heard *the man fall*," "You found *the ground hard*." It must be clearly understood that we cannot have a Complex Object unless the verb be of complete predication. The Object is not complex in "They made *the boat* fast"—*fast* is no part of the Object.

Furthermore the Infinitive as part of a Complex Object must be distinguished from the Infinitive as Adjunct to the verb. In the sentence, "They ordered him to release us," *him* is the Direct Object, and *to release us* is an Adjunct to the verb—the order was given to him; in "They ordered us to be released," *us to be released* forms a Complex Object (compare with *our release*)—the order was not given to us. We will now discuss

The Complement.

This can occur only when the Finite verb is of incomplete predication. Auxiliary verbs are *always* of this nature, certain Transitive and Intransitive verbs *may be* of incomplete predication. It is considered unnecessary to separate Auxiliary verbs from their Complements; take such an expression as *have been walking* as a single verb. On the other hand, when a part of the verb *be* followed by a participle can be replaced by the corresponding part of the verb *exist*, the two must be separated. An instance is seen in "Your hand is already *frozen*."

Subjective Complements.

A Subjective Complement is one that refers to the Subject of the sentence, as in "The king was surnamed *Rufus*," "The sky looks *black*." From these two instances it will be seen that the Subjective Complement is used

After Intransitive verbs / After Transitive verbs in the Passive voice } of incomplete predication.

Examples may be given in which such verbs as *be*, *feel*, *seem*, *grow*, *taste*, *appear*, *prove*, &c., are followed by Subjective Complements. I have found the following a useful hint: the verb *be* can be substituted for a verb of incomplete predication that takes a Subjective Complement; for instance, instead of "the wine tastes sour," we might substitute "the wine is sour"; *sour* is the Complement of *tastes* just as it is of *is*.

Objective Complements.

An Objective Complement refers to the Object of the sentence. It can be used only with Active Transitive verbs. Its use is necessary with such Transitive verbs as require not only that on which the action takes effect to be expressed, but also the effect of the action. Thus, in "Make the well deeper," *deeper* expresses the effect of the action on the well.

For a verb + its Objective Complement we can frequently substitute a single Transitive verb. For instance, the above sentence = "Deepen the well." Similarly, "He called me a knave" = "He insulted me," or dare we venture on "He 'knaved' me"?

Infinitive Complements.

The verbs *can* and *must* always—*may*, *shall*, and *will* when not mere auxiliaries of mood (*may*), or tense (*shall* and *will*)—are followed by an Infinitive Complement. Hence, although "I shall come to-morrow" may be treated as containing a single verb, "I will come to-morrow" contains a verb of incomplete predication and its complement.

The following sentences will serve to remove difficulties that may occur in dealing with constructions that are liable to be confused:—

(1) They found the man guilty.
(2) They found the ground smooth.
(3) They made the ground smooth.
(4) They found the smooth ground.
(5) They coloured the map red.
(6) They fast covered the ground.

In (1) *found* is a Transitive verb of incomplete predication; *guilty* is its Objective Complement. For *found guilty* we might use the single Transitive verb *sentenced*, or a verb of similar meaning.

In (2) *found* is a Transitive verb of complete predication; the state of the ground was not the result of the finding. *The ground smooth* is a Complex Object.

In (3) *made* is a Transitive verb of incomplete predication; the state of the ground was the result of the action; *smooth* is an Objective Complement.

In (4) *found* is a Transitive verb of complete predication; *smooth* is an Adjunct to *ground*, the Object.

In (5) *red* is the Objective Complement of *coloured*; it indicates the effect of the colouring.

In (6) *fast* is an Adverbial Adjunct to *covered*, which is a verb of complete predication. Contrast this sentence with "We dyed the cloth a fast colour." Here *a fast colour* is the Objective Complement to *dyed*.

DRAWING IN SECONDARY SCHOOLS.

By A. W. Fenton Langman, A.R.C.A.(Lond.)

Art Inspector to the London School Board; formerly Headmaster of the School of Art, Hartley College, Southampton.

IT often strikes one that too much attention is paid to drawing for its artistic qualities, or rather too little thought is bestowed upon its use as a clear and short method of explanation of many subjects. The writer remembers hearing Professor Huxley make the following remark: "I would give anything to be able to draw moderately well, as it would very often save me a great deal of talking." He no doubt referred to his lectures on Physiology. There are many other able men who have expressed themselves in a similar way. In most public schools a drawing-master is appointed for his talent as an artist, and this is as it should be, with certain reservations. Again, in some schools, the subject is either optional or not

compulsory above a certain form in the school, and then it becomes a question of only a few deriving benefit from it.

The type of master suitable for secondary schools should undoubtedly possess artistic tastes and capabilities, but it ought to be felt that drawing could be of very great use in its humbler branches; for through these branches help can be given to other subjects. By this it is not meant that in matters of Art teaching the drawing-master should be subordinate to the other masters. It means that where the scheme of general education is sound that each class, form, or standard should have drawing taught in such a way that the other subjects taken by the boys might be benefited.

DRAWING ASSISTS OTHER WORK.

The writer, after much experience in every kind of school (primary and secondary), has come to the conclusion that every boy or girl should understand scale and elementary geometrical drawing, and grasp intelligently the meaning of the plan, elevation and section of a simple object. Boys ought to be able to draw scales of all kinds, whether plain, diagonal or comparative, and even those of the different thermometers. By drawing carefully the arrangements of pulleys and other physical apparatus they are more firmly fixed in the mind. In the latter case, the position in the school where certain divisions of a science subject are taught will suggest when a particular kind of drawing could help to fix the subject in the student's mind. In other words, drawing is an inseparable part of a boy's or girl's general education.

GEOMETRICAL DRAWING.

Plane geometry should be taught during the same terms as Euclid, and might with advantage cover the same course with applications of the same principles in exercises on that course. For some time no problems ought to be given which will not admit of mathematical proof. Clean, decided, sharp work must be insisted upon at the very beginning. The lines need not necessarily be executed in ink, nor for show, but must be accurate. Wherever there is any apparatus in the way of measurement on the science side of the school the same objects might with advantage form exercises for scale and geometrical drawing.

It may be thought that too much has been mentioned about geometrical and mechanical drawing, but unfortunately in many schools the geometrical drawing does not work in with the subjects it should help. It is rather taken as a subject which has to be crammed up for certain examinations at the upper part of the school, and as those examinations are far off to the students in the middle part of the school, it happens that very little serious work is taken until close upon the actual examination. These examinations ought to complete a course of work begun years before.

THE TRAINING OF THE EYE.

In the continental schools the judgment of proportions by the eye and the aid of a sliding rule form exercises in drawing in the lower forms of the ordinary schools. It is evidently correct to start with this kind of teaching, but at the same time the instructor must leave it off as soon as it has a detrimental effect in checking the independent judgment of the scholars. Exercises in drawing lines of a stated length might be given, or, again, questions as to the actual length of various distances and the size of objects in the class-rooms. The teacher could either himself correct these exercises or answers, or, by means of exchanging these drawings and questioning other pupils on the distances, &c. By these means careful criticism is made useful in a general educational sense as well as for artistic purposes. Figures should then be given which, after starting with a line of stated length (to be judged by the eye only), ought to have the remaining lines added with lengths estimated in relative proportion to the first line.

As a training in judging the distances between openings, the system of placing points only and not lines ought to be adopted, because spaces are often more incorrectly set out than the lengths of edges or lines. As an example, take a straight line and mark a distance, not in its continuation, but having its space from one end of the line equal to the length of the line itself. The straight line ought to be placed in a vertical position as well as in a horizontal position, because if two sticks of equal length be held out, the one vertically and the other horizontally, one will, unless looked at very steadily, look longer than the other. Teachers know, moreover, that the relative size of closed spaces to openings is generally very inaccurately represented by students.

COPIES TO BE EMPLOYED.

As a general rule, copies should not be built up line by line, but the complete form ought to be seen all through. The copy or example can with advantage be taught line by line, although the writer is convinced that there is far too much done in this direction by teachers and not enough left to the student. It must be remembered that individual effort and self-criticism are invaluable aids to the formation of character in drawing as well as in other subjects.

Freehand drawing ought seldom to consist of pure ornamental forms from the flat, but should often consist of object or nature drawing, or, later on, either of memory drawing or drawing from dictation. The latter kind of exercise makes the teacher more precise in his language, and the pupil in the interpretation of that language.

MODEL DRAWING.

The models should mainly consist of common objects, although, for the purpose of impressing a few of the principles of perspective, they may par-

take of a geometrical form. Teachers should always be very careful to explain that it is the structure and position of a model and not the finish of the line which represents the important and useful part of a drawing. Lining-in cannot be condemned too strongly, although at the same time it must be borne in mind that to be artistic is not to be slovenly and careless. Many nicely smoothed and laboured drawings, executed in a neat, clean manner, are framed and exhibited as specimens of good work. If, however, one looks carefully at the hand or whatever may be the subject represented, it is frequently found a meaningless drawing without structure or character—everything smooth and everything empty.

Structural Drawing.

Structural drawing is a name given by the writer to any kind of work the reproduction of which must show growth—fibres, anatomy, lines of motion, or jointing—and should form a very important part of education. It may not always be easy to draw models in which the jointing or construction is not very evident at first sight. This is one reason why a set of geometrical models is so often given as examples in a course of preliminary model drawing. Very few models or objects of any kind can be properly shown by pure outline (such, for instance, as a cone with the base turned away, or a vase when placed upon its side). The teacher ought to illustrate how by a few touches of shade (not by any means elaborate or finished shading) the character and shape can be more thoroughly expressed.

The importance of understanding the view or position from which a drawing has been made cannot be over-estimated. Drawings are made to assist in the explanation of a subject, and when once its position is clearly demonstrated by the view shown in that drawing, then half the difficulty has been overcome. Practising for certain examinations which are conducted for the purposes of the better comparison of the work of one school with another, or with a standard, has brought into existence the cramming up of the proportions of known models placed at a fixed height from the floor. By this means differences caused by models being placed above the eye level or below it have not been grasped at all, and consequently the training has been one-sided in its effect.

A rough idea of the plan of a group of models should be illustrated in a blackboard sketch first and then drawn by the class, the student marking his own position as well. This will enable the scholars to realise their own positions and that of the models, as well as the fact that each person has a different place. For some considerable time the indication of the level of the eye should be marked by means of a straight line lightly drawn across the paper and kept there until the drawing is finished. This ought to be done, although the vanishing points may not come on the paper, as it will form a check to inconsistent depths.

Plants as Exercises in Drawing.

Plants drawn and their structure analysed form excellent exercises. These should, if possible, be drawn from nature, and might be coloured with simple flat washes to represent the local colour of the plant chosen. The plants selected at the beginning ought to be large and bold and free in their growth.

Lessons on the joints of stems, the structure of leaves, the arrangement of the flowers, &c., in fact, structural, but not systematic, botany will form good sound material for the expression of thoughtful observation. It teaches even a dull student differences and facts, and leads him to note them in a clear intelligent way. How often is one fatigued by looking at a school exhibition of drawings all of which exhibit the same amount of neatness and sharpness, whether it be a gas-pipe, or a plant with its soft downy surface. All the varied characteristics have been cleaned and cleared out by the diligent application of india-rubber and false finish.

Outline Drawing.

Practice in drawing the essential lines of a diagram should occasionally take the place of an ordinary freehand lesson. These lessons are necessary to impress upon the scholars the importance of simplicity in explanatory diagrams, and to learn which lines are to be accepted or to be rejected in a diagram. The reasons for this class of drawing will be more obvious if the reader has had any answers to questions in mechanics or physics to correct. It has fallen to the lot of the writer to have to mark sketches of pumps or other apparatus; and pretty-looking drawings, with wasted shading, expressing nothing of the working or arrangement of valves, have predominated.

Its Use in Secondary Education.

To be of any value in a secondary school the drawing must not be laboured, and students must have it drilled into them that time is of importance. Time should be given to the deliberate judgment of where to place a line, but the actual execution of the line ought to be rapid. The power of illustrating rapidly with a few strokes is invaluable to many professions and occupations. Teaching should be a mixture of criticism and encouragement, and masters would do well in going round a class to point out the greatest fault and the best part, ignoring the rest. The student will then have sufficient courage to go on, and at the same time will not be over-praised. As the amount of time allotted to drawing has to depend upon that devoted to other subjects (and is necessarily limited), not much in the way of colour work except flat washing can be done. A taste for colour can be stimulated by having simple examples of good colouring, both pictorial and decorative, hung round the drawing-class rooms. Should a system of inspection be instituted in

secondary schools, the inspectors chosen ought to be persons who know that education cannot always be judged by the amount of finished work, but by noticing the attempts that are being made. Activity and enthusiasm should count for something in education.

THE PRESENT POSITION OF SCIENCE IN SECONDARY EDUCATION.

IT has been so often stated in recent times that the various branches of physical science are steadily usurping the place of literary and human subjects in all grades of English secondary education that there is a danger of the statement being accepted as a fair presentation of the actual trend of educational development. The President of the Teachers' Guild, in his address last June, gave it as his opinion that such a change had gone much too far, and said that the present tendency was to produce "a hard, dry, unfertile type of mind as compared with the type of mind which literary and human studies ought to produce." And this expression of Mr. Bryce is typical of many warnings which have been uttered by eminent authorities during the last year or two. Is there really cause for alarm?

Whatever may be the state of affairs in England, Mr. West, of Princetown University, has shown quite clearly[1] that American education is in no similar danger. The number of students studying Latin, for instance, in the public and private secondary schools of the United States has increased steadily during the last ten years, until in 1897-98 it was, with the exception of mathematics, the most popular school subject. From the same source it will be found that the subjects which, with mathematics and Latin, take the largest part in American secondary education are, in order of their popularity, English literature, history, and rhetoric. The sixth subject is physiology, which is, however, taken by less than 29½ per cent. of the total number of scholars compared with a percentage of very nearly 49½ taking Latin. Nor is there any marked annual increase in the number of pupils studying science subjects; indeed, in some cases there is an actual decrease.

There is, as far as we know, no exhaustive summary of the total number of children studying the numerous subjects which figure in the time-tables of our secondary schools like that prepared, with the help of the Commissioner of Education, by Mr. West, for similar schools in the United States. Yet it is possible, from the statistics published by the various examining bodies in connection with English schools, to get a fair idea of the relative importance of literary and scientific subjects in English secondary education.

It will be generally admitted that the Matriculation Examination of the London University, together with the Senior, Junior, and Preliminary Local Examinations of the Universities of Oxford and Cambridge, roughly represent by their syllabuses the subjects which together form the mental food supplied at the majority of our secondary schools. It will be interesting, and by no means unprofitable, to examine with some care the number of entries which have been received in the more important subjects by the examining authorities we have mentioned. When this has been done, it should be easily possible to draw correct inferences respecting the character of the education which boys and girls are receiving in the schools under consideration, and the promise may be hazarded that this alleged usurpation on the part of science will turn out to be a mere bogey, giving no reasonable cause for anxiety.

To begin with the London Matriculation will be to start at the upper part of an average school, from which we can conveniently work downwards. In January, 1899, this examination was held for the first time under new regulations, when all the 1,314 candidates examined were compelled to take four groups of subjects, viz.:—Latin; English, including one paper on English grammar and composition, and one paper on the history of England to the end of the seventeenth century, with the geography relating thereto; mathematics, including arithmetic, algebra and geometry; and general elementary science. In addition, a fifth subject could be any one chosen from five languages and five science subjects. The selection of this fifth subject, which offered such a wide choice, should give some assistance in discovering the predilection for any particular branch of study. The following table shows the chief subjects selected and the number of candidates offering each:—

French	756
Chemistry	212
Mechanics	120
Greek	86
Magnetism and Electricity	26
Botany	26
Sound, Light and Heat...	24

Or, of the 1,250 candidates here accounted for, 842 selected a language and 402 a science subject.

The Oxford and Cambridge Senior Local Examinations are with advantage considered separately. It will be sufficient for our present purpose to take the numbers for the two most recent examinations, and we will deal with the Oxford numbers first. The total number of senior candidates in 1898 was 1,794, and last July 1,902. The number of papers worked in the most important sections of the examination is shown in the following table, though in the case of mathematics it must be pointed out that the numbers (in italics) represent the number of candidates taking the subject:—

	English subjects.	Languages.	Mathematics.	Science.
1898	6,578	2,394	*880*	749
1899	6,977	2,418	*969*	796

[1] *New York Educational Review*, October, 1839.

The total number of entries in the Senior Cambridge Local was 2,191 in 1897 and 2,215 in 1898. As before, the number of papers worked in the most important sections are tabulated. :—

	English subjects.	Languages.	Mathematics.	Science.
1897	10,259	3,432	1,776	1,804
1898	10,327	3,391	1,590	1,838

Again, the number of candidates examined in the Junior Oxford Local was 4,187 in 1898 and 4,396 in 1899. The papers worked in both these years in the chief groups of subjects are given in the following table, where, as before, the numbers in italics represent candidates and not papers. :—

	English.	Languages.	Mathematics.	Science.
1898	*4,110*	6,202	*2,653*	2,393
1899	*4,321*	6,182	*2,814*	2,641

In the Junior Cambridge Local the numbers of candidates in 1897-8 were 8,416 and 8,470 respectively, and the papers worked are shown in the table :—

	Chief English subjects.	Languages.	Mathematics.	Science.
1897	29 154	12,501	7,376	5,880
1898	30,180	12,728	7,637	6,440

Of the 3,194 Preliminary candidates examined by the Oxford Delegacy in 1899 upwards of 3,000 candidates took English and 2,194 presented French, but only 116 papers were examined in natural science. Similarly, with the 5,256 Preliminary candidates in the Cambridge Local Examination of 1898, while 5,182 were examined in English grammar and composition, 5,105 in English history, 3,950 in French, and 3,929 in the English author; only 525 presented themselves in botany, 531 in heat, and 59 in mechanics, the only science subjects prescribed in the examination.

The same kind of result follows from an inspection of the statistics of the examinations for certificates of the Oxford and Cambridge Schools Examination Board—numbers which can be fairly taken to represent the condition of things in the better public schools. The total number of candidates for higher certificates was this year 2,140, and the following table gives the number of candidates offering the several subjects :—

HIGHER CERTIFICATE EXAMINATION.

Latin	1,358	History	1,281
Greek	1,189	Natural Philosophy—	
French	1,257	Mechanical	168
German	345	Physical	111
Mathematics—		Chemical	159
Elementary	1,824	Physical Geography and	
Additional	714	Elem. Geology ...	38
Scripture knowledge ...	1,374	Biology	131
Composite	5	Music	38
English	845	Drawing	66

The total number of candidates for lower certificates was this year 962, and the numbers offering the several subjects are shown below :—

LOWER CERTIFICATE EXAMINATION.

Latin	698	English	594
Greek	373	English History	661
French	954	Geography	356
German	253	Mechanics and Physics ...	55
Arithmetic	960	Physics and Chemistry ...	261
Additional Mathematics...	908	Chemistry and Mechanics	108
Scripture knowledge ...	733	Geometrical Drawing ...	38

In the case of the only other important school examination, the most popular perhaps in the large body of private schools—namely, the three examinations of the College of Preceptors—we believe no statistics are published. Certainly, an examination of the College Calendar has failed to discover similar tables. But, in view of the results of the numbers which have been already summarised, there seems no reason to suppose that science would take a larger part in the curriculum of schools in connection with the College of Preceptors. When it is remembered that the equipment necessary for the teaching of science is comparatively large, the justice of this conclusion will be admitted as fair and reasonable.

It is quite clear, then, as far as the question can be answered from an inspection of examination results, the fear that science is taking too large a share in secondary education is groundless. In every part of our schools by far the largest number of pupils are examined in English subjects and in languages. It is true that in the Local Examinations of the Universities French is taken by a far greater proportion of candidates than those offering Latin and Greek; but this in no way interferes with our main contention. Of optional subjects in the London Matriculation Examination, while French was taken by 756 candidates in January, 1899, the most popular science paper was chemistry, with only 212 entries, and the total number of candidates in all the remaining optional science subjects was only 200. In the Senior Oxford of 1899, though 6,977 papers were examined in English subjects, only 796 sets of answers in science subjects were looked over. In the last Cambridge Senior Examination, the corresponding numbers were 10,327 and 1,838. A glance at the Junior and Preliminary tables tells the same story.

Discussing the relative importance given to these groups of subjects in secondary education with a well-known headmaster the other day, we were met with an argument which, it was said, invalidated the main conclusion at which we had arrived. The numbers taking a subject for examination purposes do not represent, it was urged, the extent to which such subject is studied in the school. But when pressed for clearer information, it was admitted that Latin was the subject which the headmaster had in his mind. Though every boy studied Latin in the schools with which he was acquainted, only a small percentage were sufficiently advanced to stand any chance of satisfying the examiners.

Whether this is a common experience or not does

not matter, for every addition to the number of candidates offering Latin brings the comparative insignificance of the number presenting science into still greater relief. But we have no desire to labour the point. It is sufficiently clear that the case against science as a usurper has not been made out. We feel that there should be places of honour for many subjects, whether literary, mathematical or scientific. While it is not desired to say one word in disparagement of the educative power of literary and linguistic studies, we sometimes fear that, with some educationists in authority, there is an unfortunate disposition to depreciate the claims of scientific subjects. There is a place for all these branches of mental activity, but it is by no process of belittling science that a well-proportioned school syllabus, in which each subject takes its due and proper proportion, will be evolved.

ENGLISH HISTORY DOWN TO 1700.

TWO HUNDRED NOTEWORTHY TOPICS ARRANGED ALPHABETICALLY.

By C. S. FEARENSIDE, M.A.Oxon.

THE subjoined lists of topics are intended to assist the teacher in revision work on English History for the Matriculation Examination at London University. Some suggestions for use will be found in the somewhat similar list (bearing on the Oxford Local Examination) published in the June issue of THE SCHOOL WORLD. It may be assumed that topics common to these lists and to the word-lists contained in the June and November issues are worth special attention.

As the questions in English History at London Matriculation have changed considerably in character during the last few years, owing probably to the substitution of historians for philologers as examiners, it has been deemed advisable to consult only recent papers in compiling this list of topics. The lists form a fairly exhaustive index of the contents of the last eleven papers: that was the smallest number of papers which would yield the 200 topics desired (June 1894—June 1899). The most notable omissions are about half-a-dozen questions dealing with the "social condition" of England at different periods, and about ten questions dealing with the international relations of England, chiefly with France. These have been noticed only when the question contained some proper name, like Elizabeth or Burgundy. The names of kings have not been taken into account when they were given *merely* as notes of time.

The "terms" in the first column are shown in **dark type**. The "documents" in the second column are shown in *italics*. Topics appearing twice in the eleven papers under review are distinguished by an obelus (†): those appearing more than twice are distinguished by an asterisk (*).

	TERMS AND PLACES.	PERSONS AND DOCUMENTS.
1.	**Annates.**	*Act of Settlement.*
2.	*Bannockburn.	*Act of Supremacy.*
3.	Battle of the Standard.	*Alfred.
4.	Beachy Head.	Anselm.
5.	Berkeley.	†*Assize of Clarendon.*
6.	Bosworth.	†Bacon.
7.	Boyne.	Becket.
8.	Burgundy.	†*Bill of Rights.*
9.	Canterbury.	Black Prince.
10.	**Celts.**	Blake.
11.	**Ceorl.**	Burghley.
12.	Chalgrove.	Canute.
13.	Chester.	*Charles I.
14.	*__Civil Wars__ [7 times].	†Charles II.
15.	*__Colonies__ [5 times].	Clarendon.
16.	**Common Pleas.**	†*Confirmatio Cartarum.*
17.	*__Conversion__ (to Christianity).	*Conventicle Act.*
18.	*__Counties.__	Cranmer.
19.	**Craft-Gild.**	*Cromwell, Oliver.
20.	Cropredy.	†Cromwell, Thomas.
21.	**Crusades.**	*Declaration of Indulgence.*
22.	*__Danes.__	*De Haeretico Comburendo.*
23.	**Dissenters.**	Dunstan.
24.	Drogheda.	Edgar.
25.	†__Ealderman.__	Edgar Atheling.
26.	**English Conquest.**	Edward the Elder.
27.	†__Eorl.__	*Edward I.
28.	Evesham.	Edward II.
29.	**Fealty.**	*Edward III.
30.	**Feud.**	Edward VI.
31.	**Feudalism.**	*Elizabeth.
32.	**Fief.**	*Exclusion Bill.*
33.	Fotheringay.	Fairfax.
34.	**Fyrd.**	*Five-Mile Act.*
35.	**Gesith.**	*Habeas Corpus Act.*
36.	Glastonbury.	*Henry II.
37.	**Hampton Court Conference.**	Henry III.
38.	**Hansa-town.**	Henry IV.
39.	Hastings.	Henry V.
40.	**Homage.**	†Henry VI.
41.	**House of Commons.**	Henry VII.
42.	†__Hundred Years' War.__	Henry VIII.
43.	**Independents.**	Hereward the Wake.
44.	*Ireland [8 times].	*Humble Petition and Advice.*
45.	**Judicial System.**	*Instrument of Government.*
46.	**Justices in Eyre.**	*James I.
47.	Lancashire.	James II.
48.	Lewes.	John.
49.	Limerick.	Ket.
50.	Lincoln.	King-Maker.
51.	Lincolnshire.	Knox.
52.	**Long Parliament.**	Langton.
53.	**Merchant Gild.**	Laud.
54.	**Monasteries.**	Leofric.
55.	Mortimer's Cross.	†*Magna Carta.*
56.	†__Mortmain.__	Mary Queen of Scots.
57.	Naseby.	Mary Tudor.
58.	**Navy.**	*Millenary Petition.*
59.	Newbury.	*Mise of Lewes.*
60.	**Norman Conquest.**	Monk.
61.	Nottingham.	Monmouth.
62.	**Opposition.**	*More [5 times].
63.	**Parliament.**	†*Navigation Act.*
64.	**Peasants' Rising.**	†*Petition of Right.*
65.	**Pilgrimage of Grace.**	*Protestation*, The.
66.	Poitiers.	*Provisions of Oxford.*

Terms and Places.	Persons and Documents.
67. Pontefract.	Raleigh.
68. **Pope.**	*Remonstrance*, The.
69. **Protestantism.**	Richard I.
70. **Puritans.**	Richard II.
71. **Reformation.**	†*Self-Renouncing Ordinance.*
72. **Relief.**	Seven Bishops.
73. **Representation.**	Shaftesbury.
74. **Restoration** (of 1660).	Sidney, Algernon.
75. †**Revolution** (of 1688).	†Simon de Montfort.
76. Rochester.	Siward.
77. ***Roman Occupation.**	†*Six Articles.* [*nant.*
78. **Saxon Shore.**	†*Solemn League and Cove-*
79. *Scotland.	*Star Chamber.*
80. *Sedgemoor.	**Statute of Labourers.*
81. †Shrewsbury.	*Statute of Liveries.*
82. Sluys.	†*Statute of Mortmain.*
83. Somerset.	†*Statute of Provisors.*
84. **Spanish Succession.**	Stephen.
85. Stamford Bridge.	*Strafford.
86. **Succession, Royal.**	Strongbow.
87. **Tallage.**	Temple.
88. †**Towns.**	*Test Act.*
89. Towton.	Thomas of Canterbury.
90. **Trade.**	Tiptoft.
91. **Tribes.**	Tosti.
92. **Tudor Monarchy.**	*Treaty of Newport.*
93. Ulster.	*Triennial Act.*
94. **Universities.**	*Triple Alliance.*
95. **Usurper.**	Waltheof.
96. †**Wars of the Roses.**	Warwick.
97. **Wergeld.**	†William I.
98. Wessex.	*William III.
99. †Worcester.	Wolsey.
100. Zutphen.	†Wyclif.

NOTES FOR LANTERN LECTURES.

By R. A. Gregory, F.R.A.S.

Oxford University Extension Lecturer; Professor of Astronomy in Queen's College, London.

I.—The Starry Heavens.

The following notes provide the groundwork for a popular lantern lecture on the Stars, with special reference to the birth, growth and death of worlds. The photographic camera and the spectroscope have been so extensively applied to astronomical research during the past few years that it is possible to illustrate a lecture of this description with many actual photographs of celestial objects themselves, and of their characteristic spectra or light-badges. Almost all of the slides referred to in the lecture are photographs instead of the fantastic pictures which are sometimes shown in popular lectures on astronomy. All or any of the slides described can be purchased from Messrs. Newton and Co., 3, Fleet Street, London, E.C., for 1s. each, and if required, a lantern and its accessories can be hired from the same firm. Messrs. Newton do not usually let these slides out on hire, but they have kindly put aside the set required for the purposes of this lecture, and will lend them on the usual terms to readers of The School World who may wish to use them.

It has, of course, not been possible to describe in detail the points illustrated by the slides, but sufficient has been said to show their significance and to serve as notes for the lecturer. Any modern book on astronomy will furnish further particulars on the points dealt with. One of the following books, for instance, should be consulted by the lecturer, if he is not closely familiar with astronomical work:—

The Concise Knowledge Library: "Astronomy." By A. M. Clerke, A. Fowler, and J. Ellard Gore. (Hutchinson.) 5s.

"Elementary Lessons in Astronomy." By Sir Norman Lockyer. (Macmillan.) 5s. 6d.

"The Story of the Heavens." By Sir Robert Ball. (Cassell.) 15s.

"Lessons in Astronomy." By Prof. C. A. Young. (Edward Arnold.) 6s.

"The Vault of Heaven." By R. A. Gregory. (Methuen.) 2s. 6d.

Slides Required.

The following are the slides required for the lecture. The numbers in brackets are from Messrs. Newton's catalogue; and in ordering any of the slides for purchase it is sufficient to refer to these numbers. The slides without numbers must be separately specified. The set cannot be divided for hiring purposes, but must be taken as a whole. The list of slides need not be given in making application for the loan, as Messrs. Newton will understand what is required if the set described in these notes is asked for, and mention is made of The School World:—

1. Galileo's Drawing of the Stars in Orion.
2. The Great 36-in. Telescope in the Lick Observatory (Y114).
3. Relative Distances of the Stars.
4. Region of the Milky Way about ξ Cygni, from a photograph by Dr. Max Wolf (Y95).
5. Region of the Milky Way about ϵ Cygni, from a photograph by Dr. Max Wolf (Y98).
6. Photograph of the Milky Way about α Cygni, taken by Dr. Max Wolf with an exposure of thirteen hours (Y99).
7. Photograph of the Nubecula Major, by Dr. H. C. Russell, Sydney (Y58).
8. The η Argus Region of the Milky Way, from a photograph taken by Prof. Bayley (Y108).
9. The Great Nebula in the Pleiades, from a photograph by Dr. Isaac Roberts (Y54).
10. Photograph of the Nebulosities surrounding the Pleiades, taken by Prof. E. E. Barnard (Y78).
11. The Star Cluster ω Centauri, from a photograph by Dr. Gill (Y69).
12. The Great Nebula in Orion, photographed by Dr. Roberts (Y76).
13. The Great Nebula in Andromeda, from a photograph by Dr. Roberts (Y55).
14. The Annular Nebula in Lyra, from a photograph by Dr. Roberts (Y53).
15. Spiral Nebulæ, photographed by Dr. Roberts (Y75).
16. Star Cluster, photographed by Dr. Roberts (Y74).
17. Dumb-bell Nebula in Vulpecula, photographed by Mr. W. E. Wilson (Y62).
18. Prismatic camera for photographing the Spectra of Stars.
19. Spectrum of Vega, photographed at the Astro-physical Observatory, South Kensington (Z39).
20. Spectrum of Arcturus, photographed at the Astro-physical Observatory, South Kensington (Z36).
21. Series of Spectra of Stars increasing in temperature, photographed at the Astro-physical Observatory, South Kensington (Z26).
22. Spectrum of the Sun compared with the Spectrum of a Star, photographed at the Astro-physical Observatory, South Kensington.
23. Photograph of the Moon taken at the Lick Observatory (Y29).

Lecture Notes.

A glance at the sky on a fine night gives the impression that an immense NUMBER OF STARS can be seen by the naked eye. This is not the case; less than 2,500 stars are visible without optical aid to any single observer under the best conditions, and a little haze or moonlight reduces the number very considerably. A small telescope brings many unseen stars into view. When GALILEO used his teleseope (1610) to make observations of the heavens, he saw stars which had never before been looked upon by human eyes. A similar instrument can now be purchased for one shilling. *Slide 1 represents Galileo's drawing of a part of the sky* in the neighbourhood of Orion's Belt. The stars visible to the unaided eye are the large ones with six rays; the eighty small ones, shown with four rays, were first seen by Galileo with his telescope.

TELESCOPES ARE OF USE IN REVEALING FAINT STARS.—About 300,000 stars are visible with a telescope 3 inches in diameter, and about 100,000,000 with such a large instrument as the *Lick Telescope represented in Slide* 2. This instrument, erected on Mount Hamilton, California, has an objective 36 inches in diameter, and is 60 feet long.

STARS DIFFER IN BRIGHTNESS for several reasons, viz., (1) differences of distances from us; (2) differences of intrinsic luminosity; (3) differences of size. Bright stars are thus not necessarily nearer the earth than fainter ones.

THE DISTANCES OF STARS can only be measured by the most refined astronomical instruments. Not until 1838 was a trustworthy determination made of the distance of a star, and less than 100 stellar distances are even now known with a reasonable degree of accuracy. It is unnecessary to explain methods of determining distances; but the results will give an idea of the immensity of the universe. Star distances are so great that the mind cannot grasp them if expressed in miles.

THE VELOCITY WITH WHICH LIGHT TRAVELS (186,000 miles a second) is used to give ideas of results obtained. The light of the nearest star (α Centauri) takes four years to reach the earth. *In Slide* 3 *the concentric circles represent distances light travels in from* 5 *to* 30 *years*, taking the solar system as the centre. Stars within these limits of distances from us are shown in the correct positions relative to the circles. The vast majority of stars are at practically infinite distances.

STARS ARE NOT DISTRIBUTED UNIFORMLY OVER THE HEAVENS.—About 90 per cent. of the stars lie in or near the Milky Way. Before Galileo, this galaxy was thought to be a luminous mist. The telescope demonstrated that the MILKY WAY IS COMPOSED OF INNUMERABLE SMALL STARS. Many photographs showing the structure of the galaxy have been obtained during the past ten years. *Slides* 4, 5 *and* 6 *are photographs of parts of the Milky Way*, taken with portrait lenses similar to those fitted on ordinary cameras. By using such lenses, mounted so as to follow the apparent movement of the sky, and thus keep in view the object being photographed for several hours if necessary, more extensive views of the heavens can be obtained than are possible with ordinary telescopes. The photographs show clearly that the *Via Lactea* is composed of stars.

The MAGELLANIC CLOUDS OR NUBECULÆ visible in the southern skies have the appearance of patches of the Milky Way, though no connection with it can be traced either with the naked eye or with a telescope. *Slide 7 shows the Nubecula Major*, which covers an area of sky more than two hundred times greater than the apparent size of the full moon. Numerous faint stars can be seen in the Nubecula, and also clusters of stars and a LUMINOUS MIST OR NEBULA. The whole object thus presents the appearance of a chaos of light.

Another luminous mass, differing slightly, however, from the Nubeculæ, is the great nebula around the star η Argus of the southern hemisphere, shown in *Slide* 8. Many small patches of nebulosity, having the appearance of half-formed worlds, are seen in the photograph. Though this nebula appears in the Milky Way, it may be at a much greater distance than th stars which compose this celestial stratum.

Many CLUSTERS OF STARS are visible in the heavens, and have been photographed. In some clusters the stars occur in connection with nebulosity, and in others no trace of nebulosity is found. THE PLEIADES is a group or cluster of stars well visible in autumn and winter. The unaided eye sees six or seven stars in the group; a telescope reveals many more. Photographs of the Pleiades have shown that the chief stars have wisps and patches of a misty nature attached to them. *Slide* 9 *is a Photograph of the Pleiades* taken by Dr. Roberts, the photographic plates being exposed to the action of the star beams for a period of four hours. *Slide* 10 is a picture of the group and the neighbouring sky taken with a portrait lens at the Lick Observatory by Prof. E. E. Barnard. In each picture the Pleiades are seen to be surrounded by nebulosity; in fact, they appear to be condensed parts of a nebula.

A very remarkable cluster of stars, resembling a mass of luminous sand, or a "bee-like swarm of suns," is shown in *Slide* 11, which represents a group designated as ω Centauri. More than six thousand stars have been counted in this cluster, and the real number is probably much greater than this.

The photographs already shown suggest a RELATIONSHIP BETWEEN STARS AND NEBULÆ which will now be more closely traced. *The Great Nebula of Orion, shown in Slide* 12, is an immense mass of nebulosity not connected with stars. About seven thousand nebulæ are now known. As to the NATURE OF NEBULÆ, it was once thought that a nebula was a star cluster so far away that the individual points of light became blended together. The reason for this view was that masses of luminosity which were once thought to be nebulae were found to be star clusters when observed through better telescopes. The spectroscope has proved, however, that the light of nebulae proceeds from feebly luminous gaseous material and not from numerous stars close together.

The FORMS OF NEBULÆ vary greatly; those already shown are irregular, but many are more symmetrical in shape. *Slide* 13 *shows the Great Nebula in Andromeda.* Here a central luminous mass is seen to be surrounded by rings of the same material. The rings were apparently left behind as the body of the nebula cooled and consequently contracted; they are probably nearly circular, but appear elliptical because they are viewed at an angle. An ANNULAR NEBULA in which the ring of nebulosity is nearly a circle is shown in *Slide* 14.

Several rings around a central nucleus are shown in the wonderful SPIRAL NEBULÆ represented in *Slide* 15. Upon the rings bright spots are seen, which probably represent stars in course of formation. Similar arrangements of stars can be distinctly traced in *Slide* 16, which shows four clusters of stars photographed by Dr. Isaac Roberts with his large reflecting telescope. The connection between star clusters of this kind and spiral nebulæ can readily be recognised. To obtain these pictures sensitive photographic plates took the place of the eyes of the observer, and were kept with their faces upturned to the starlight for ninety minutes.

THE DUMB-BELL NEBULA represented in *Slide* 17 is another type, in which the nebulous material appears almost of a globular form.

The CLASSES OF NEBULÆ recognised by Dr. Roberts are:—(1) Vast areas of cloud-like matter, gaseous and probably of discrete solid particles mixed. (2) Smaller areas of matter undergoing the process of condensation and segregation into more regular forms. (3) Spiral nebulæ in various stages of

condensation and of aggregation. (4) Elliptic nebulæ. (5) Globular nebulæ. In the last three classes the photographs give clear evidence of the condensation of the nebulous material into stars or star-like forms.

An EVOLUTION OF WORLDS may thus be traced. Just as in a forest, trees may be seen in every stage of growth, so the heavens contain celestial bodies in every stage of development, from irregular nebulæ to stars having no trace of nebulosity. The SPECTROSCOPE furnishes even more decisive evidence of evolution in celestial bodies than visible observations or photographs. When the light of a star is made to traverse a wedge of glass attached to a telescope or long camera, it no longer appears as a luminous point, but as a line which, by suitable means, can be converted into a narrow strip of light or a spectrum. *Slide* 18 *shows a camera fitted with a spectroscope* for observations of this character.

The spectrum of the star Vega, photographed by these means, is shown in *Slide* 19. It will be seen that the strip of light produced by the glass prism is traversed by several thick dark lines and some fainter lines. This slide and also *Slide* 20, which represents the spectrum of Arcturus, were taken under exactly the same conditions, but it will be noticed that the character and number of the lines differ very considerably.

THE SUBSTANCES IN STARS are revealed by the lines in the spectra. Every chemical element has a certain set of lines of its own. By volatilising substances in the laboratory and observing the luminous vapour by means of a spectroscope, the set of lines characteristic of each element has been determined. A comparison of these sets of lines of known origin with the lines observed and photographed in the spectra of stars enables astronomers to determine what substances are in the stars. The thick dark lines seen in the spectrum of Vega represent hydrogen, and there are many reasons to believe that stars having spectra in which these lines are the prominent features are among the hottest stars in the heavens. It is possible on spectroscopic grounds to arrange stars in order of temperature. *Slide* 21 represents a series of spectra of stars increasing in temperature, according to Sir Norman Lockyer's observations.

THE SUN IS LIKE MANY STARS so far as the nature of its light, as analysed by the spectroscope, is concerned. *Slide* 22 shows the spectrum of a star side by side with the spectrum of the sun on the same scale. The two spectra are practically identical; therefore it may be concluded that the sun and the infinitely more remote star have practically the same constitution.

After a star has arrived at its hottest stage it loses heat faster than heat is produced in it, and it consequently cools. The spectroscope indicates that THE SUN HAS PASSED ITS PRIME and is cooling down. It is estimated that in about 10,000,000 years the sun will be a non-luminous body. Eventually, the highly-heated liquids and vapours of which it now chiefly consists will condense to the solid form in which they are represented on the earth, and the final stage will probably be like that of the moon—a dead world—*sans* light, *sans* heat, *sans* air, *sans* everything. *The photograph of the moon shown in Slide* 23 represents a body apparently in this effete condition; and with this view of what may be termed the skeleton at the feast of stars, the lecture may be concluded.

Boys' Interests.—Talk to boys individually, and you shall find no lack of embryo enthusiasm; this one is keen about pictures; that one about moths, or steam-engines, or heraldry, or what-not. But such individual interests and hobbies never come to the light. They blush unseen, if they do not languish and die, during the period of a boy's public-school career: the system as a whole has no use for them; it gives them no recognition, no encouragement.—Rev. Lionel Ford, "Essays on Secondary Education" (Clarendon Press.)

STATE AID FOR MODERN LANGUAGE TEACHING.

REPLYING to a deputation from the Associated Chambers of Commerce, to urge the Government to encourage by a grant the teaching of modern languages in secondary schools, Sir John Gorst summarised, in a very useful manner, what the Government already does to promote modern language teaching.

In the elementary school Code, French and German are both recognised as subjects which may be taught to the boys and the girls in the higher standards of the elementary schools, and for which Government grants are paid. Any other language than French or German, peculiarly suitable to the locality of the school, is accepted by the Department and treated upon exactly the same terms as French or German. The number of scholars who study French or German in the schools has increased with very great and steady rapidity. It was only 10,000 in 1893, and it now amounts to 16,591 scholars who are actually learning in the elementary schools French or German, besides a small number who are learning Spanish, Italian, or some other language. Then there are the evening schools, in which French or German may be taken as one of the subjects of instruction, and grants are paid for it, and also other languages may be sanctioned, and in many cases have been sanctioned; for example, there are evening schools which teach Spanish, Portuguese, and Italian. The students in the evening schools who are learning either French or German amount to 12,344.

In recent times a plan of administering the Science and Art grants has been organised, and is in full operation, which meets certain objections which have been raised. A grant can be made to what is called a School of Science—that is, a school in which a regular course of scientific instruction according to a syllabus prescribed or approved by the Science and Art Department is carried through, and which fulfils certain other conditions imposed upon it by the Department as a condition of recognising it as a School of Science. One of these conditions is that proper provision shall be made for giving literary instruction as well as scientific instruction to the students, and one of the specific conditions which is imposed upon every School of Science now is that at least one foreign language must be taught throughout the school. Therefore, though the Science and Art Department has no power specifically to make grants for the teaching of foreign languages, yet by attaching this particular condition to its recognition of any School of Science, it has given a very considerable stimulus to the study of modern languages in the schools which receive its money.

The local taxation money which the counties and county boroughs in England and Wales have the power to distribute is, roughly speaking, three times as great as the Science and Art grant; and the application of this money is not restricted to science or to art, or even to technical instruction in its narrowest sense, but is—not by any will of the Department, but by the special terms of an Act of Parliament—applicable to modern languages and to all commercial education. Therefore the counties and county boroughs of this country have in their hands a sum of money three times as great as the Science and Art grants, which they have the power to apply and which to a very great extent they do apply to commercial education in general and to the teaching of modern languages in particular. In England, in 36 out of 49 counties, the county authority directly subsidises the teaching of modern languages out of this local taxation money, and in 32 out of 61 county boroughs the municipal council does the same thing. In Wales the modern languages are subsidised in two out of 13 counties and in two out of three county boroughs; but in Wales the counties make large grants to the county schools under the Welsh Intermediate Education Act, and in those county schools the study of modern languages is universal.

In London every one of the secondary schools which is aided by the Technical Instruction Committee of the London County Council out of this local taxation money must teach modern languages as a condition of receiving the grant; and the secondary schools so aided in London are more than half of the secondary schools which exist in London. In the county of Surrey they employ two peripatetic teachers of modern languages who go about to the secondary schools and give lectures and instruction in that subject. In the West Riding of Yorkshire they have established a system of teaching in evening continuation schools by which some of the evening continuation schools are specifically made into evening continuation schools of commerce; and in all of those modern languages of course are taught out of the local taxation money. Then in Liverpool they have established an advanced school of commerce supported out of the local taxation money; and in Halifax the technical school has established a regular four-years' course of commercial education, involving a study of one modern language at first, and of two modern languages before the course is completed.

The Government at the present moment are awaiting the completion of that scheme of secondary education of which the initial step was taken by the Act passed last Session, and Sir John Gorst said he thought that until local authorities are established and the scheme carried at least so far as that, it would not be possible to deal with modern languages as an exception, and to embark in any scheme which perhaps, when the whole scheme of the Government is thought out, would be found to be inconvenient and abnormal. Sir John expressed the hope that the deputation would leave the matter, for the next few months, in the hands of the Government, and be satisfied by an assurance, made on behalf of the Lord President of the Council as well as himself, that this matter is receiving and shall receive the most earnest attention of the Government; and that when their complete scheme of secondary education is before the country, it will be found that this important branch, the study of modern languages, has not been either forgotten or neglected.

ELEMENTARY EDUCATION IN 1898.[1]

THE last report has been issued under the authority of the Committee of the Privy Council on Education in England and Wales. By the provisions of the Board of Education Act the New Board of Education will, from the first day of April next, take the place of the Education Department, including the Department of Science and Art. The Committe of Council, at the time of its supercession, will have superintended for nearly sixty-one years the application of the sums voted by Parliament for the purpose of public elementary education in England and Wales.

Number of Scholars in Elementary Schools.

Since the presentation of the last report the number of scholars on the registers of public elementary day schools inspected in England and Wales has increased from 5,507,039 to 5,576,866. This is an increment of 69,827, as compared with 84,050 in the preceding year, and with 123,520 in 1895-6. The average attendance has increased from 4,488,543 to 4,554,165. In percentages, the number of scholars on the registers of public elementary day schools has increased 1·26 per cent., as compared with 1·54 per cent. in the preceding twelve months. This year, as last, the percentage of increase of infants on the register has been larger than that of older scholars. The number of infants has increased from 1,972,331 to 2,012,623, and that of older scholars from 3,534,708 to 3,564,243. For every 100 children on the school registers, the average attendance was 81·66, or ·16 more than last year. The percentage of average attendance is naturally higher among the older scholars, and has risen from 87·66 in 1897 to 87·79 in 1898. In the case of infants also there has been a slight improvement in the percentage of average attendance. In 1897 it was 70·47; this year it has risen to 70·79.

Free Education.

There are now in England and Wales 17,008 free public elementary day schools, containing 4,870,615 free scholars. There remain only 95 schools (as compared with 101 in the preceding year) which refuse the fee-grant. The number of schools which, while receiving the fee-grant, continue to charge such fees as the law allows, has fallen from 2,945 to 2,834. The number of fee-paying scholars in all classes of public elementary day schools has declined from 735,142 in 1897 to 706.251 in 1898.

On the registers of the public elementary day schools in England and Wales on the annual grant list on August 31st, 1898, out of a total of 5,601,249 children, no less than 1,203,047 were under six years of age, and only 762,962 were over twelve.

Cost of Education per Child.

It must be borne in mind that, roughly speaking, "provision" means the cost of erecting school premises, "maintenance" the cost of keeping the school at work when the premises are completed. In both Board and voluntary schools the cost of "maintenance" shows a tendeney to rise. Twenty years ago (1879) it stood at £1 14s. 6d. per child in voluntary schools, and £2 2s. 0¾d. per child in Board schools. Last year (1898) it had risen in voluntary schools to £2 2s. 4¾d., and in Board schools to £2 13s. 9½d., an increase on the amount recorded for the previous year (1897) of 1s. 10¾d. and 7d. respectively.

In the case of voluntary schools the voluntary contributions towards "maintenance," subscribed in 1898, amounted to 6s. 1d. per child in average attendance. (As compared with the amount raised in 1897 this is a decline of 7½d. per child in average attendance.) It should be observed that this amount does not include the contributions paid towards "provision" as distinguished from maintenance.

Continuation Schools.

The following table shows in statistical form the growth of the evening continuation school work in England and Wales during the last four years. Those of the returns which refer to the year ended April 30th, 1898, show a large increase in the number of scholars attending these schools:—

	Number of Evening Continuation Schools (separate Departments) inspected.	Number of Scholars.	Annual Grants.
1895	3,947	270,285	£112,084
1896	4,347	298,724	129,542
1897	4,980	358,628	162,158
1898	5,535	435,600	188,763

In 1897 there were on the registers of these schools 41,832 scholars over 21 years of age. In 1898 this number had risen to 47,110. These figures tend again to show that evening continuation schools are beginning to play an important part in the education of adults. But the majority of the scholars in the

[1] Abridged from the Report of the Committee of Council on Education (England and Wales), 1899.

schools are under 16 years of age; and though the absolute number of scholars over 16 has materially increased during the year, there has been a larger proportionate increase in the number of scholars of younger age.

School Games in Public Elementary Schools.

The movement for making organised school games a more prominent feature of public elementary school life is steadily gaining ground. Much that is valuable can be learnt from a well-played game. Certain kinds of discipline, self-subordination, physical endurance, *esprit de corps*, can indeed be more healthily developed in the playing-field than within the four walls of a schoolroom. Hitherto, the organised games of the scholars in public elementary schools have suffered rather by defect than by excess. It is found that teachers who can take an active part and interest in school games, and spare time out of school hours to teach the boys how to play cricket or football, or how to swim, gain new sources of influence over their pupils, and find many opportunities of saying to individuals among them words which are none the less helpful because not expressed in the form of direct moral instruction.

GEOGRAPHY AS A MEANS OF EDUCATION.[1]

By GEO. G. CHISHOLM, M.A., B.Sc.

WHEN Mr. Graham Wallas, as Chairman of the School Management Committee of the London School Board, did me the honour to ask me to read a paper at this Conference on the Teaching of Geography, I consented promptly, but I will not say rashly. And yet many of you may be inclined to think, when I tell you, as I am about to do, how very limited have been my opportunities for making a practical acquaintance with my subject, that it did indeed argue a good deal of rashness on my part to take in hand such a task. In the teaching of young children I have had very little experience indeed. It is almost solely to more mature students that I have taught geography, as a University Extension lecturer. Now I am well aware how necessary actual experience is in every branch of every calling, and I would assure the teachers that any suggestions I have to make I offer with great diffidence, knowing that it is the judgment of practical teachers that must in the long run be decisive as to what is practical or really most useful in training the young. It was in the hope of eliciting the opinions of practical teachers on the subject that I willingly embraced this opportunity of laying my views before you.

I should tell you, however, that, while not a practical teacher of the very young, I have not been without opportunities of learning a good deal about the teaching of geography in schools. For several years I have had much to do with the examination of school children and others in geography. Tens of thousands of papers have in that way passed through my hands, and in the reports I have had to draw up thereon I have again and again had to dwell on the same defects, and it is chiefly on the basis of that experience that I venture to make any suggestions at all.

And while my lack of the necessary experience in actual teaching creates in me no little diffidence in making these suggestions, I may without hesitation add that that feeling is somewhat modified by the fact that I have nothing very novel to urge. My general principles are only such as have for a long time received the sanction of the best theory as well as actual experience abroad, and are now getting acted on in more and more schools at home, and among these many of those under the London School Board. All that I would try to impress, on the basis of such experience as it has been my lot to acquire, is certain corollaries from these principles which, it seems to me, are too generally overlooked.

It will be well at the outset to give some precision to our ideas of the nature of the subject. The dictionary definition of geography as "a description of the earth's surface" is far too vague to be of any practical use for our present purpose. I presume that it will be generally admitted that it is chiefly the earth as the abode of man that one has to consider in ordinary school teaching. This aspect of geography is what is called anthropogeography, which is defined in a recently published and very valuable text-book as having for its subject "to study the distribution of the varieties of mankind, their degree of culture, and the manner of their groupings and movements."

This, of course, is a study of wide scope and very intricate character, but by way of leading up to it the most practical mode of looking at the matter, it seems to me, is to keep the idea of distribution of population before our minds as our principal guide, to consider all that relates to that as of primary importance. The questions, then, that geography would have to concern itself with are such as these: why certain regions are more densely peopled than others; what are the conditions which enable some regions to offer room for a vast expansion of population; why in the more or less densely peopled regions population comes to be aggregated at certain spots; that is, why towns and cities have come to stand where they do, and acquire the relative importance which actually belongs to them. I need hardly say that it would be absurd to attempt to present such ideas all at once to the child's mind. The idea of distribution of population is a guide for the teacher, not for the pupil, who need not know at first whither he is being led.

But if this idea is to serve as our guide, the first deduction I would make is that geography is not a study that consists chiefly in the getting by heart of proper names. In geography, as in every other branch of learning, what is of importance are things not names, and the use of names is merely to indicate the things that we are talking about. It is enough to mention that as a step in our argument, for I am sure that on that you are all agreed.

But if this is admitted, the problem arises how we are to get into the child's mind at the earliest stage of the teaching of geography ideas about those things with which geography is concerned, the things that will enable them in the long run to understand something about the distribution of population.

To that I am ssatified there can be only one solution, the method of teaching in the elementary stages by means of home-knowledge, what the Germans call *Heimatskunde*, a method which, I am glad to know, is already familiar in London Board Schools. It takes as the starting-point the knowledge which the child has, or may be led to acquire by its own observation, of its own surroundings. I will not attempt to describe the method in detail, but I will just indicate some of the knowledge that we may count upon in leading a child to the essential ideas of geography, not confining myself to what belongs strictly to *Heimatskunde*. In most parts of England a child may be taught to observe the difference between steep, or at least sloping, and level streets or roads. He knows the difference between summer and winter, that it is only in summer that plants grow, and that plants are apt to wither in times of drought unless they are watered; he may even know or be taught to observe that some plants don't thrive in cold summers. Perhaps he knows the difference between cold and warm winds, and may even be got to perceive the advantage of shelter from cold winds. He knows, or may easily be brought to understand, that things sold in shops come from a distance. If he lives in a

[1] Paper read November 17th, 1899, at a Conference on the Teaching of Geography, under the auspices of the London School Board.

town, he knows that butter, flour, fruit, vegetables, and so forth, are not produced in towns.

I need not make any suggestions as to how to apply that knowledge or as to what the stages are at which that application can best be made, for all that you know better than I do. But there is one point on which I would lay some emphasis, and that is the importance of getting children to understand and bear in mind at all stages from the earliest onwards the difference between level and steep streets or roads, for on that difference the importance of the study of the physical features of a country everywhere in a large measure depends. It is, of course, by no means the sole reason for studying the physical features of a country with a view to our guiding idea—distribution of population—but it is in all cases one great reason.

And this brings me to the most important of the corollaries that I would draw from the fundamental idea as to the teaching of geography, and that is that no child is at a stage to learn anything of the geography of a country until his imagination is so far developed that he can be brought to entertain some broad idea, however simple, of the physical features of that country. He should, for example, be able to conceive that in one part of a country he might be able to go for mile after mile in any direction without having to make use of any steep roads, that in other parts he might be able to travel long distances at a greater height than the highest mountains in England, but might from time to time be compelled to descend into deep and narrow troughs, and that in other parts, again, he would be compelled to wind out and in among mountains which everywhere rose close at hand on both sides. The lack of this understanding is, perhaps, the most general defect that I have had to notice in the examination papers that have passed through my hands. A description of a region, according to the ideas of a schoolboy or schoolgirl, is too often a list of names of towns, rivers, and mountains, more or less wildly remembered from a map or a page of a text-book. Again and again I have felt prompted to say in my reports that a great part of geographical knowledge consists in the answer to the question about some district—What kind of a country is it to cycle over? If, for instance, you wanted an easy, rapid ride, would you rather go from Metz to Stuttgart, or from Mainz to Basel, and on what ground would your choice be based?

But, further, while numbers of teachers appreciate the fundamental importance of physical features, I am afraid that some of them still have too narrow an idea of what physical features are, or what those physical features are which are most worthy of study. Mountain chains and rivers, lakes and coast-lines, seem to make up in the minds of a good many all the physical features of a country. Now this is a great and serious mistake. As I have already hinted, it is just as important to know where there are extensive elevated regions, whether properly called ablelands or not, or where there is a broad succession of mountain chains and valleys, as where there is a mountain chain sufficiently long and definite to have a name in a text-book. I may even say that that kind of knowledge is even more important than that of the names of mountain ranges, and for that reason I have pleasure in drawing attention to some cheap maps that are now being prepared by a firm lately founded in connection with the Geographical Association, with the idea of improving geographical education. These maps are intended to give prominence to the idea I have just expressed.[1]

To this kind of teaching I have heard the objection urged that it is unsuitable for children because wanting in definiteness. I remember, after one of the lectures on the teaching of geography delivered thirteen years ago under the auspices of the Royal Geographical Society, hearing a teacher, pointing to a beautiful map of Scandinavia hung on the wall of the room, insist that, however beautiful, however valuable that map might be as a representation of the physical features of that peninsula, it was not a good map for school purposes. The child, he protested, must have something definite to grasp, and for that reason he would rather have for teaching purposes a map on which the mountains were shown by a continuous black line than such a map as was there displayed. That objection has remained impressed on my mind, but the more I have thought of it the more strongly do I feel that it is based on a wrong idea of what constitutes definite teaching. The idea of a vast high region broken up into more or less detached masses by deep clefts, and studded here and there with lofty mountains, is just as definite as that of a long line of mountains, but the difference in the case of Scandinavia is that the one is definitely right and the other definitely wrong.

One other somewhat general misconception or oversight with regard to physical features I would lay before you, and that is, that the importance of valleys as distinguished from the rivers that flow through them does not seem to be adequately appreciated. The fact is, that in numberless cases the valley is of much more importance as a physical feature than the river that flows through it, even though the river may be one of considerable size. Even a glance at the very beautiful maps which I now hand round[1] will, I think, be enough to bring this home to you.

I have said that in the teaching of geography we were concerned not with names, but with things. I have now to add that in no case is it enough to learn about those things the mere position in latitude and longitude or its equivalent, even if those things happen to be towns. All towns that are worthy of mention in school teaching owe their importance more or less to the character of the physical features, and in every case their position should be defined with regard to those physical features. Even if we have nothing to say, except that a town is in the middle of a great populous plain, or something similar, that position should be clearly set forth. But the importance of the relation to the physical features is more striking where mountains and valleys have to be considered. It is an essential part of the geography of the city of Bombay, not merely that it stands on an excellent natural harbour, but that it lies at no great distance from that great wall of the Ghâts which so long shut it off from its proper hinderland. That should be clearly brought home to the child at all stages at which it is proper to teach anything at all about the city of Bombay. So also it is an essential part of the geography of Marseilles that it lies at the mouth of the Rhone-Saône valley, of San Francisco that it is the one outlet of the rich Californian valley, of Buffalo that it lies above the Falls of Niagara and practically at the west end of the Mohawk valley, of Montreal that it lies just below the rapids of the St. Lawrence, of London that it lies at the highest part of the Thames that can be reached by ocean vessels and the lowest that can be bridged.

I would take this opportunity of drawing the attention of teachers to the excellent text-book recently published by Messrs. Newnes under the title of "The International Geography," in which this point of view is maintained throughout. It may seem unbecoming in me to refer to that work, inasmuch as I am myself one of the contributors to it, but my contributions are trifling, and the excellence of the work is entirely due to the care with which it was planned and supervised by the editor, Dr. H. R. Mill, librarian to the Royal Geographical Society.

One other practical hint I would give, and that is that, in the practice of map-drawing for school purposes, children should always be taught to indicate the extent of high grounds, however roughly, and that the outlines of the maps to be copied should be simplified to such an extent as to allow of the same map being frequently copied. This is the system of map-draw-

[1] Specimens of the hand-maps of Messrs. Dickinson & Andrews were handed round.

[1] Sheets 23, 24, 26 and 27 of "Vogel's Map of Germany" on the scale of 1:500,000 were handed round.

ing in schools instituted by the veteran Prof. Kirchhoff, of Halle, and pronounced by Dr. Supan, the learned and able editor of the most important geographical periodical in Germany, to be the sole correct one. Specimens of the model maps on this system I now hand round.[1]

If geography is taught from the first in the manner I have indicated, then the elementary stages of geographical teaching form the natural preparation for the higher stages, including the special applications of geography, such as historical geography and commercial geography. The higher stages will be to a large extent a mere development—a widening and deepening of the knowledge gained at the elementary stages. To illustrate this take a case that I have already instanced, that of San Francisco. At the earliest stage it will be enough to mention that it is the one outlet of a large and rich valley. Later on the child may learn the dimensions, climate, and products of this valley, and at a still later stage how and why the climate and products resemble those of the Mediterranean region, central Chile, the south-west of Africa, and parts of Australia.

Then as to the application of geography to special branches, take historical geography. In this branch of study we have to inquire what light the facts of geography throw upon the course of history. A typical study in genuine historical geography is J. R. Green's "Making of England," but the mere mention of that book will be enough, I think, to satisfy those who are acquainted with it that the subject is hardly suited for school years. But the sound study of geography in its general aspects is a necessary preparation for such a special application. The study of physical features sometimes suggests and sometimes solves, or helps to solve, the problems of historical geography. Among its problems are such as these: How did California come to be acquired by the United States from Spaniards? How did the French come to settle only in Lower Canada—leaving Upper Canada, with a climate better suited for the products of French soil, to be occupied by English "Loyalists"? How was it that the plains of northern Italy were so long in acquiring a dominant influence on the fortunes of Italy?

To the first of these questions an answer is already prepared in the knowledge of the isolated position of the valley, and of its natural attractiveness for a nation of adventurers accustomed to a similar climate at home. We may find an explanation of the fact to which the second question refers in the same physical feature that has fixed the site of the city of Montreal—the rapids of the St. Lawrence, which placed a limit to the advance of French settlers up that stream. And the answer to the third question, as to the plains of northern Italy, is suggested by the obvious fact that those northern plains, their forests now cleared, their swamps in a large measure drained, their surface waters carefully managed, through the labour of centuries in the interest of irrigation, are no longer what they once were when Celtic and other tribes first founded on these plains their scattered settlements. On the other hand, when one stands in front of the cathedral of Milan and watches the coming and going of traffic in all directions, how easy it is to picture to oneself those ceaseless currents stretching out to the remotest valleys of the Alps and the Apennines. One then begins to understand why, when Roman civilisation had subdued these plains, Roman emperors for a hundred years hardly ever entered Rome, why Milan during that period was the real capital of the Roman empire of the West, why a bishop of Milan thundered against Imperial power before ever a bishop of Rome dared to do so.

Time forbids my attempting to illustrate the true nature of the difficult problems of commercial geography, but I may add one other illustration that belongs to both history and commerce. If there has been a proper study of the Alps from the point of view that I have indicated, the schoolboy or schoolgirl may, perhaps, know little about Mont Blanc or any of the other giants of that system, but they will know at least that where the system is widest there is a great cleft across it from north to south, enabling one to traverse the entire system, in sight of some of its loftiest and noblest peaks, by surmounting only a single pass, and that a low one, under 4,500 feet in height. They can then be readily taught to understand why this route should have been followed in pre-historic times by the Etruscans, when they went to exchange their bronzes and earthenware for the amber of the Baltic; why over this pass the Romans laid one of their trans-Alpine roads, from Verona to the modern Ratisbon (their Castra Regina); why Theodoric the Ostrogoth, the Dietrich von Bern (Verona) of the Nibelungenlied, stationed himself like a watch-dog at that city when he heard of commotions beyond the Alps; why, during the Middle Ages, when the political relations between Germany and Italy were so intimate, this route was so often followed by the Holy Roman Emperors starting from Ratisbon; why, during the same period and later, it was so important to the commerce of Venice and Florence; and lastly, why along this route was laid the first modern carriage-road across the Alps, and afterwards the first trans-Alpine railway.

But while historical and commercial geography as systematic studies are probably too advanced for schools, may I, in conclusion, take the time to urge that one thing might be done in schools in connection with the subject of geography better, perhaps, than any other? At a time when, through the fault of nobody in particular, competition is becoming ever keener, and nations are being driven into more or less hostile rivalry through mistaken notions of national interest, backed by national antipathies, due mainly to mutual ignorance, the cultivation of wider sympathies seems to me a crying need in education. This, perhaps, might be accomplished by good reading-books giving a faithful but sympathetic picture of the life of the people in different countries, and showing how much we all owe to each other by the triumphs of peaceful industry over nature.

[1] Some copies of the "Zeichenatlas" of Kirchoff and Lehmann were handed round.

SOME NEW PHYSICAL APPARATUS.

II.

In an article which appeared last month we dealt with a selection of pieces of scientific apparatus recently constructed, after the designs, for the greater part, of experienced teachers and men of science, by a few of the well-known firms of instrument-makers. It is worth while to point out that the order in which various makers' catalogues are considered is that in which they have come into our hands, and in no way indicates any order of preference on our part. Teachers of practical science must naturally be left to make their own selection, our object being merely to place before them information of what is being done by different manufacturers.

There is, moreover, a natural disposition to allow geographical considerations alone to decide where the apparatus for the science side of the school shall be obtained, and for the want of a little research, many science teachers remain in ignorance of useful and ingenious aids to their work which possibly cannot be obtained locally. Facts such as are here brought together should afford unfortunately situated teachers some guidance in knowing where to look for what they want; and in some cases there can be little doubt a more judicious expenditure and a considerable economy will result.

Messrs. Baird and Tatlock have just issued a second supplement to the 1897 edition of their voluminous catalogues. This

firm seems prepared to supply every requisite for the study of any branch of science. They have lately arranged specially fitted workshops for the manufacture of laboratory fittings of all kinds, and the supplement before us gives details of well-designed laboratory benches, both fixed and portable, fume cupboards and other necessary pieces of furniture.

From numerous novel pieces of apparatus which we have noted, the new form of ozone apparatus (Fig. 1), designed by Mr. J. S. Braime, of the Royal Naval College, is particularly handy. The inner tube and the outer jacket are filled with a solution of sulphuric acid, one part by volume of acid to two of water. The Rhumkorff coil is connected to the electrodes which are indicated in the illustration. The U-tube at the bottom of the instrument is partly filled with a slightly coloured solution of strong sulphuric acid which serves admirably as a pressure gauge.

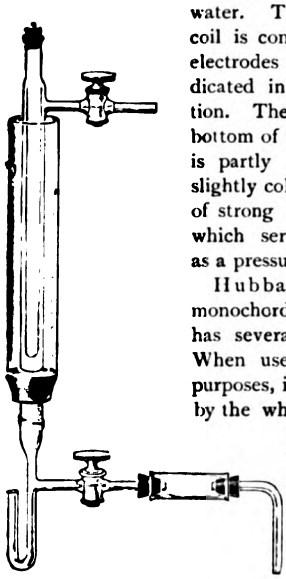


FIG. 1.—Braime's Ozone Apparatus.

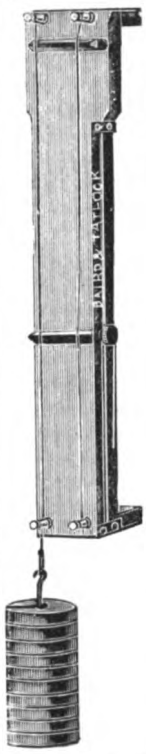


FIG. 2.—Hubbard's Vertical Monochord

Hubbard's vertical monochord (Fig. 2), too, has several advantages. When used for lecture purposes, it is easily seen by the whole class. As the back of the instrument serves as a sounding-board, the pitch of the note emitted by the vibrating strings may be readily compared with that of a standard tuning-fork. When employed by the student for experimental purposes, the length of the vibrating string is easily adjusted by means of the movable bridge. The stretching force acts directly—all friction being avoided. The strings being merely clamped by the top screws, are easily replaced by others of different diameters or material.

The new "Carey Foster" bridge (Fig. 3) of Messrs. Everett & Co. has been made to the special designs of Messrs. C. V. Drysdale and A. D. Hughson, for the Northampton Institute, Clerkenwell. It embodies many new features, one of the most important being its capability of measuring very low resistances with the same degree of accuracy as may be obtained in the ordinary way on coils of much higher values. All mercury cup contacts are let in flush with the top of the ebonite support of the bridge and carry massive copper connections below. The ratio coils are wound in pairs on one bobbin, so as to ensure equality of temperature between them. The contact maker is mounted on an arm of such a radius that 10° movement is equal to 1 cm. of slide wire, the position being read off by means of a vernier. The contact piece is worked by a differential spring arrangement, thus protecting the wire from injury and ensuring an equal contact pressure.

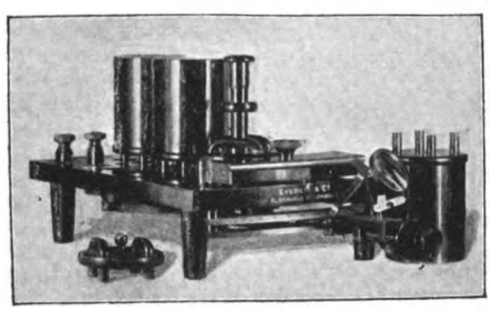


FIG. 3.—"Carey Foster" Bridge.

The apparatus for the measurement of linear coefficients of expansion was also designed and made for the Northampton Institute, Clerkenwell. Three copper tanks (Fig. 4) are arranged on a base-board side by side with a non-conducting partition between them; the two outer tanks are connected together by

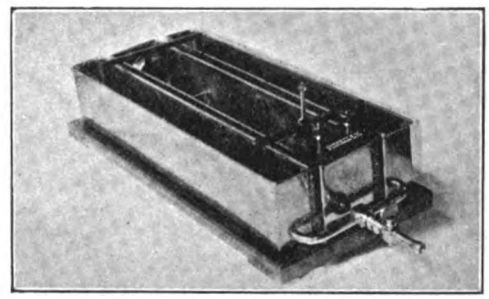


FIG. 4.—Expansion Apparatus.

Y-tubes and stop-cocks, so that water may be circulated freely through both of them. The main framework consists of two end frames connected to one another by two brass rods which are immersed in the water contained in the two outer tanks; the end frames are in this way kept at a constant distance. One end frame carries a finely divided micrometer head reading on a fixed index, and one end of the rod under investigation bears against the point of this screw; the other presses against a point in a lever, of special design and construction, carried by the second frame. When the rod expands it causes the lever to rotate about a vertical axis, the rotation being measured by the deflection of a spot of light reflected from a small concave mirror attached to the upper end of the lever. The test rod is supported on rollers and immersed in oil in the middle tank of the apparatus. This oil is heated by electricity in such a way as to give great uniformity throughout the bath, and is so arranged as to be connected directly to the lighting service mains.

Messrs. Gambrell Bros. produce a large variety of forms of resistance coils and boxes. The resistance coils are arranged in decimal sets, and are for use when great accuracy is required. The sets of 10 resistances are arranged in such a way that by shifting the plug nearest the terminal end the resistances are ready for use either in series or parallel as may be required. Any long internal copper connections have been carefully avoided, the instrument being connected from end to end with stout copper leads, not exceeding an inch in length. By this system not only may one set be checked by the sets on either side of it, but a box with five sets has as low a range as an ordinary box with six, and a box with six will measure down to ·01 ohm.

The enclosed plug resistance boxes which Messrs. Gambrell manufacture will become increasingly popular. These resistance boxes are provided with blocks and plugs mounted on an ebonite board as in the ordinary pattern, but the blocks are enclosed, only the plug heads being allowed to extend outside the case. The plugs cannot get lost, as immediately a plug is released from the blocks it flies to the top of the lid by means of a suitable spiral spring, and remains out of circuit. No dust

can get into the instrument, as there are two covers over the blocks. An enclosed resistance box is more trustworthy, and has a longer life than the ordinary pattern. It should be noted that a cheap model for school use can be obtained.

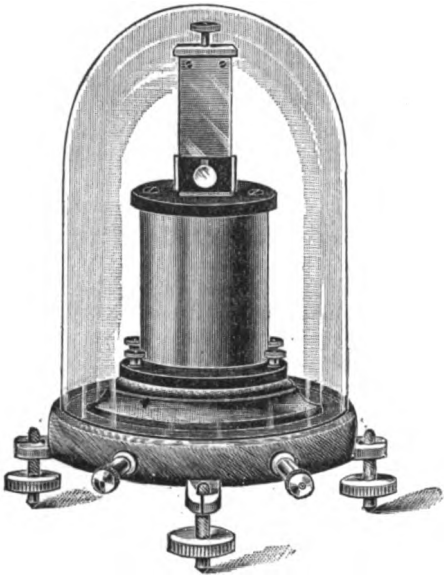


FIG. 5.—Gambrell's Galvanometer for school use.

Fig. 5 shows a galvanometer for school use issued by Messrs. Gambrell. It is provided with two circuits of 1,500 ohms, capable of connection in series to give 3,000 ohms, or in parallel to give 750 ohms, and a suspended Kelvin astatic system and controlling magnets.

FIG. 6. Spring Dynamometer.

Messrs. W. & J. George, Ltd. (late F. E. Becker & Co.), have a large number of novelties with which the teacher of practical physics should make himself acquainted. The spring dynamometer, made after the design of Mr. D. Rintoul of Clifton College, is shown in Fig. 6. The spring rests in a groove and carries a hook to which the cord can be attached. A cross bar makes it possible to take a reading with a fair degree of accuracy. The adjustment at the top provides a means of re-setting the spring.

The dial resistance box (Fig. 7) is a cheap and trustworthy instrument for students' use. It reads from ·1 ohm to 99·9 ohms, or from 1 ohm to 999 ohms, as desired. The necessary resistance is obtained by setting the movable arms on the proper studs. The apparatus made by Messrs. George, Ltd., or proving Boyle's law which is shown in Fig. 8, is of a very

FIG. 7.—The Dial Resistance Box.

satisfactory kind. Its parts and the method of using can be easily understood by an inspection of the illustration.

Messrs. George Philip & Son have recently placed on the market two remarkably cheap and serviceable sets of apparatus for instruction in experimental science. For thirty shillings, a cabinet of apparatus can be obtained containing everything required for performing instructive experiments on the principles of levers, parallel forces, pulleys (and their various combinations), wheel and axle, inclined plane, and the screw. There is no excuse for teaching mechanics by text-book and diagrams while such an inexpensive means of demonstrating mechanical principles is available. Another cabinet of apparatus contains not only the things required to explain the so-called "mechanical powers," but also apparatus and materials to illustrate British and metric systems of measurement of length, area, volume and mass, forms of matter, indestructibility of matter, distillation, density, specific weight and gravity, the barometer, centre of gravity, the parallelogram of forces, composition and resolution of forces, conversion of rectilinear into circular motion, angular measurement; and to show that heat, radiation, electricity, and chemical action are forms of energy. As experimental work is now regarded as essential in teaching elementary science, there should be a large demand for simple apparatus of the kind contained in these cabinets.

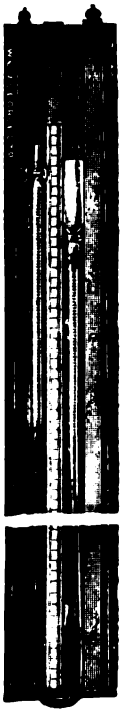
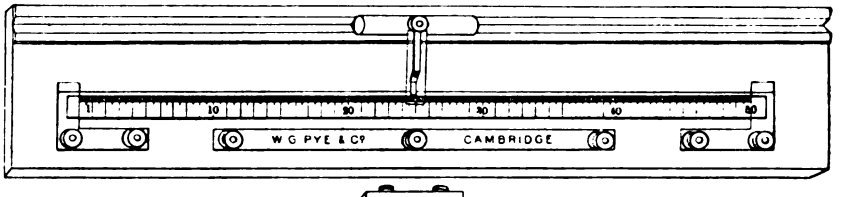


FIG. 8. Boyle's Law Apparatus.

Messrs. W. G. Pye & Co., Cambridge, lay themselves out to supply physical apparatus



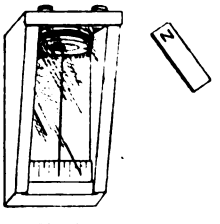


FIG. 9.—Simple Wire Bridge and Galvanometer.

which is substantially constructed to withstand the rough usage that scientific instruments usually meet with at the hands of beginners. Fig. 9 shows a half-meter wire bridge, with an improved style of contact maker, as used by Dr. Hoffert, Senior Inspector of H. M. Science and Art Department; and a simple galvanometer for use with the bridge, also suggested by him. In this galvanometer the needle is suspended by a fine unspun silk fibre, and carries a long light pointer which passes over a millimetre scale. All its parts are in view to the user, so that the action of the instrument can be easily explained. It is very sensitive, and is a good substitute for an ordinary reflecting instrument.

Fig. 10 represents an ordinary American timepiece of good quality fitted with a long centre seconds' hand, and a sixty-minute recorder. This serves admirably for timing experiments where a stop-watch is usually employed, and, for most physical purposes, will do as well as an expensive chronometer.

Messrs. Isenthal, Potzler & Co. are best known for their Röntgen Ray apparatus and numerous forms of instruments for electro-medical practice and research, and have not very largely developed the school apparatus part of scientific instrument

FIG. 10.—Seconds' Clock.

manufacture; but teachers who are purchasing electrical appliances would do well to acquaint themselves with the numerous newer forms of voltaic cells which are to be obtained from this firm and the many patterns of vacuum tubes which are manufactured by them.

Mr. T. M. F. Tamblyn-Watts is selling a combined tangent galvanometer and magnetometer (after the pattern of Stewart and Gee) which can be used to compare the magnetic moments of magnets. In conjunction with a vibration magnetometer, it serves to determine the horizontal component of the earth's magnetic force; and it can, of course, be employed as an ordinary tangent galvanometer. The instrument (Fig. 11) consists of a compass box, the needle of which is provided with an agate centre and aluminium pointer and a floor of plane mirror; also a galvanometer ring, wound with a single turn of thick and nine turns of finer wire; a sliding piece supporting the compass box,

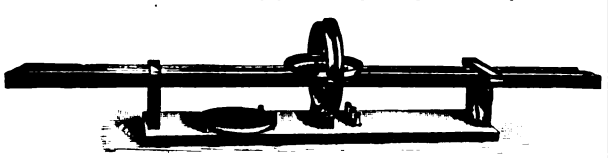


FIG. 11.—Tangent Galvanometer and Magnetometer.

provided with boxwood scales divided into millimetres and T pieces with brass edges for reading the scales. The needle of the compass box can be raised or lowered. The whole arrangement is convenient and its price very moderate.

Mr. Tamblyn-Watts has also devised an apparatus to illustrate the revolution of the earth. This consists of an electro-magnet in the form of a helix wound around a soft iron core fixed vertically in a wooden base with terminals. A soft iron ball is swung as nearly as possible in a circle to commence with, the electro-magnet being placed somewhat out of the centre of the path described. When a current is sent through the electromagnet the swinging ball changes its oscillations from a circle into an ellipse, the velocity of the ball gradually increasing until it is drawn to the end of the core, representing the ultimate fate of the earth in rushing into the sun.

The illustrated catalogue issued by Messrs. Harry W. Cox, Limited, not only gives full information respecting the numerous forms of electrical instruments made at their extensive works, but also provides admirable practical hints to beginners on the use of X-ray apparatus. The complete outfits for work in radiography, at prices varying with the size of the instruments, which are manufactured by this well-known firm, should be examined by all science masters who are proposing to experiment in this new branch of electrical science.

The new "Record" contact-breaker, in respect of which Mr. Cox has applied for Letters Patent, is extremely simple in construction, and not liable to get out of order. It gives a prolonged period of contact with a very sudden break, thus affording the necessary time for the thorough magnetic saturation of the core, the result being that a longer and fatter spark is obtained with less battery power. The new electrolytic current interrupter, which is manufactured by this firm according to Dr. Wehnelt's plan, also deserves to be widely known.

Mr. Adam Hilger, who is well known by his optical instruments to all men of science, has perfected a cheap direct vision pocket spectroscope, mounted with a transmission diffraction grating of 14,438 lines per inch. With such a spectroscope 3½ inches long the separation of the yellow sodium lines is distinctly seen.

CURRENT GEOGRAPHICAL TOPICS.

By A. J. HERBERTSON, Ph.D., F.R.S.E., F.R.G.S.

The Political Geography of South Africa.

OUR attention is so concentrated on South Africa at present that it is still the current topic for the teacher of geography. It is worth while looking at the region south of the Zambesi as a whole to see how far it is a unity and how far it is made up of regions of marked geographical individuality. Such considerations are of supreme importance in times like the present, when political equilibrium is upset, and a new equilibrium must be organised after the fighting is over.

The frontiers of the different states a few months ago were mainly arbitrary, and had little geographical meaning. Two of these, at least, remain undisturbed—those between British territory and (1) German on the west, and (2) Portuguese on the east.

The British-German frontier follows the meridian of 20° E. in the south to 21° E. in the north, with a remarkable tongue of German territory only a few miles from north to south but running east as far as the Zambesi north of the Chobe or Kwando river. This boundary runs through semi-desert land, very thinly inhabited, and is a natural frontier in so far as there is little intercourse between the settlements east and west of it. It is one of those natural frontiers that could be shifted even a hundred miles or two one way or the other without doing serious injury to either state, unless it were found that gold or other valuable mineral existed in that otherwise indifferent land.

The Portuguese hold the coastal plains of the east, parts of which are covered with dense jungle, and parts of which are drier, with a relatively poor vegetation, *e.g.*, Gazaland. Europeans do not thrive in any part of this region, but some of it may become very profitable if properly planted. The frontier, parts of which have not been precisely delimited, lies roughly along the top of the escarpments that rise above the plain. The plateaus beyond are much healthier than these Portuguese plains, and so far the frontier here may be considered to have some justification from a geographical point of view. Two of the great routes to the plateau, those followed by the railways from Beira and from Lourenço Marquez, cross this territory, and link with a certain community of interest plain and plateau.

Delagoa Bay is one of the few good natural harbours on the east coast. It is protected by two small islands on the

east side, the opening to the bay being on the north; and although the present approach to Lourenço Marquez leaves much to be desired, vessels having to unload into lighters, well-planned harbour works should make it much more convenient and important than it is at present. There is no port so capable of forming a great harbour either east or south of Natal or Cape Colony, Port Natal alone approaching it in natural advantage.

The Transvaal Portuguese and Transvaal Zulu frontiers run along the top of the first escarpment above the coastal plain. A well-watered, fertile, not very healthy terrace runs between it and the main escarpment of the Drakensberg, which farther south forms part of the frontier between Natal and the Orange Free State.

Basutoland is the Wales of South Africa, and is almost one-third larger than the principality. It is a mountainous land, difficult of access, which has never really been occupied by the white man. European settlement is prohibited, and the land, formerly part of Cape Colony, is now governed by a Commissioner under the High Commissioner for South Africa.

In Cape Colony there are three marked escarpments, one rising above the south coastal plain, one above the Little Karroo, and one above the Great Karroo. Beyond the northern escarpment the land sinks but little to the Orange river, beyond which there is an equally slight rise, the Witwatersrand forming one of the highest regions. The rivers flow in gorges below the general level, and in times of flood they act as barriers, but during most of the year they can be crossed by fords or ferries (the "drifts") where they are not bridged.

The great routes cross the terraces and climb up the escarpments to the plateau from East London, Port Alfred, Port Elizabeth and Cape Town, the latter the only good port of the four. The lines from East London and Port Elizabeth, the latter with a branch to Port Alfred, join in the Orange Free State and run to Pretoria; but they are joined together, and to the line from Cape Town to Bulawayo by a railway which runs parallel to but south of the northern frontier of Cape Colony. These lines are of vital importance in the present war.

The frontiers between the Dutch republics and British territories on the plateau, and also between the different British possessions themselves, are not of physical importance even where they follow a river course. The veldt varies but little, save in being somewhat richer in the less dry regions. The interests of the inhabitants were therefore fundamentally the same until the discovery of diamonds in the tongue of land near the confluence of Vaal and Orange, and of gold in the Witwatersrand. The former led to an adjustment of the frontier with the Orange Free State, and explains the anomalous course of the boundary in this region. The latter has given rise to the present political troubles with the South African Republic, whose bounds between Limpopo and Vaal are easily enough traced although not of physical importance.

Except for the coastal plain and the lower parts of the river valleys in the northern portion, Africa south of the Zambesi is relatively uniform in character. There are considerable differences if the extremes are compared, but the transition is gradual. The tropic of Capricorn may be considered a rough boundary between the lower and warmer and in some places moister plateaus and river valleys of the northern part, and the higher, cooler, and drier plateaus of the southern part. In the northern part few whites will live in the lowlands, and only the higher plateaus are really healthy. In the southern part the plateau is very healthy, the coastal plains much less so, but still salubrious enough for the white man to live and work.

The dryness of the climate makes all the plateau area pastoral rather than agricultural, except in the extreme north and in regions where irrigation is possible. The coastal regions on south and east are suited for agriculture. There is room for a reciprocity in products between the two regions with the most marked geographical differences—plateau and plain—and need for a greater development, more particularly of agriculture. In 1897 Cape Colony had to import about £720,000 worth of wheat and flour, and even Natal, relatively richer agriculturally, imported £164,000 worth of flour, meal and bran. No doubt some of this found its way to Johannesberg and other non-reproductive centres. The mining centres tend to become relatively densely peopled with men of various races and diverse ideals, requiring a very different and much firmer government than semi-nomadic pastors or settled farmers, who flourish best with a minimum. Hence there arises a difficult problem in shaping the local government to local needs, while preserving the healthy economic life of the whole.

ITEMS OF INTEREST.

GENERAL.

ARRANGEMENTS have been made for several series of test papers for the examinations of 1900. In our January number we shall publish the first of five test papers in each of the compulsory subjects, together with French, for the London Matriculation in June next; the first set of six papers on Genesis, St. Luke, English Grammar and Essay, English History (1066-1399), "As You Like It," Geography, French, Arithmetic, Algebra, and Euclid, for the Junior Oxford Local Examination in July, 1900; and the first of six tests in St. Luke, English History, English Grammar, Robinson Crusoe (Part I.), Geography and French for the Preliminary Oxford Local. Copies of any of these papers, in a form suitable for distribution in class, will be supplied at a cost (post free) of sixpence net per packet of twenty-five. Application should be made to the Editors; and in view of the fact that it was impossible to execute some of the late orders for the Cambridge Local papers, Headmasters would do well to write to us at an early date.

THE lantern is now recognised everywhere as a useful adjunct to school teaching, and it is becoming so easy to hire slides of one kind and another that we are sure many teachers will be glad of assistance in arranging lantern lectures on subjects a little outside the ordinary curriculum. The advantages attached to bringing a variety of subjects before the attention of boys and girls in such lectures are manifold, and we hope the custom of occasional evening lectures with pictorial accompaniments will spread. We publish the first of a series of lantern lectures this month, and are making arrangements for others on different subjects to appear from time to time. Prof. Gregory has been to some trouble to arrange a set of slides which can, by special permission, be obtained on hire from Messrs. Newton & Co., 3, Fleet Street, London. The slides, with the notes, should provide the material for an interesting and instructive lecture on astronomy.

THE authorities at Felsted School are to be congratulated upon the successful inauguration of their new science buildings which were recently opened by Dr. Garnett, of the London Technical Education Board. The laboratory building is the gift of the Rev. H. E. Hulton, of Great Waltham, one of the governors of the school, and is about 100 feet long by 27 feet

broad. In it are 80 lockers for the use of the students, 12 sinks, working benches for 24 boys, and at the end is a balance room. Adjoining this laboratory is the lecture-room, which can be easily darkened, and is supplied with an electric current for arc-lantern demonstrations. A satisfactorily equipped physical laboratory with a special room for optical experiments has also been provided, and the whole suite of buildings is lighted with acetylene gas. There can be no doubt, as Mr. Munby, the science master, said at the opening ceremony, that great advantages will be felt from this increased accommodation for the science teaching of Felsted, and that the governors, in supplying ample fittings for the buildings, have paid the generous donor the best compliment possible.

THE collection of essays, edited by Professor Spencer, of the University College of North Wales, under the title of "Chapters on the Aims and Practice of Teaching," which was first published by the Cambridge University Press in 1887, has, we are glad to notice, reached a second edition. The book was suggested by the widespread interest amongst the people of Wales during the first half of the present decade—an interest which shows no signs of flagging—and its constituent chapters are from the pens of writers whose knowledge and experience, as the editor says in his preface, "entitle them to speak with authority on the teaching of the several subjects of which they treat." It is gratifying to know that, since this admirable symposium appeared, forward steps have been made in the direction of securing a more satisfactory system of secondary education in this country, and Professor Spencer's description of England as a place "where so much is said about the organisation of secondary education and so little done" is much less true to-day than when the sentence was written. The book has already secured a considerable measure of popularity among secondary teachers, and those who have not yet added it to their library would be well advised in securing a copy at once.

THE annual report for the year 1898-99 of the Oxford Delegacy for the training of teachers shows that twelve students entered the College in October, 1898. At the end of the academical year there were twenty-two students on the books. Of the fourth-year students, one was placed in the first class of the final Honour School of Natural Science (Chemistry) and one in the second class (Physiology). Of the third-year students two obtained a second class in Physics and Modern History respectively, and one a third in Chemistry. The results of the Government Certificate Examination (Part I.) in July may be considered satisfactory in view of the amount of work required from the students and the unusual number of University examinations taken by them during the year. These examinations are accepted by the Education Department as an equivalent to the Government Certificate examination (Part II.) The exhibition offered at Brasenose College was awarded to Mr. C. W. Bramley after an examination held in March, 1899. The Delegates record their gratitude to the Warden and Fellows of New College for their generous offer of an exhibition to candidates for admission into the Day Training College in October, 1900: the examination for this exhibition will be held in March, 1900. The authorities of the Wesleyan Higher Grade School have allowed the Master of Method to make use of their school for part of the practising work. During the past year the ordinary expenses have been covered by the Government grant.

A NUMBER of educational conferences will be held in London, at the Imperial Institute, early in January, 1900, in connection with the preliminary exhibition of objects of pedagogic interest intended later for the Paris Exhibition. The usual winter meeting of the College of Preceptors will consequenty not take place during the coming Christmas vacation, as the authorities at Bloomsbury Square intend to co-operate with the lecturers and others at South Kensington.

Two of the papers in the October number of the *Journal of School Geography*, of which Dr. A. J. Herbertson is the Associate Editor for Great Britain, will well repay the teacher of geography for the time taken to study them. Mr. Emerson's article on "Some suggestions for Excursions with Elementary Classes" gives many hints as to how to utilise field-work in the teaching of geography, and Mr. Goode's description of how to rig up Foucault's pendulum in a school will provide a convincing proof of the earth's rotation.

THE current number of *Child Life* is rich in information respecting the development of methods for the teaching of young children. It is much to be desired that other branches of the great body of secondary teachers would emulate the enthusiasm of kindergarten mistresses. The continuation of Miss Kate Stevens's researches contained in the present issue of this interesting quarterly is well worth the attention of all educationists.

A LETTER, signed by Messrs. F. W. Foat and W. K. Hill, is being circulated among members of Convocation of the London University with a view to obtaining fifty signatures, so that the clause in the University of London Act which requires the Statutory Commission to consider any recommendation made and signed by not less than fifty members of Convocation may be utilised in connection with the recommendation to the Commission that a separate Faculty of and degree in Education should be established. It will be remembered that an amendment moved by Mr. Foat, and seconded by Mr. Hill, embodying this recommendation, was rejected by the last meeting of Convocation.

WHEN distributing the diplomas, prizes, and certificates in connection with the last midsummer examinations of the College of Preceptors, the Bishop of London delivered an address of the helpful kind for which he is justly famous. The following aphorisms from his discourse are worth repeating:—"You only begin to be of use as a teacher when you discover how very little it is that you can do." "Learning must always be a difficult process, and one that is utterly repugnant to the natural man." "The lower you go down in teaching, the more demands there are upon the teacher; that is to say, the younger the children are whom you are teaching the harder really is the work you have to do." "Every child is really different from every other child." "It is death and destruction to a teacher if he can only say what he has to say in one shape." "The importance of a great deal of your teaching must be that it lies beyond the power of any human recognition at all; that an inspector cannot find it out; and that nobody can; but it must be a secret between the children and you." "If you can get a child to think, you have done for him the greatest thing you can do."

THE report read at the recent annual meeting of subscribers to the British School at Athens states that excavations have been carried out at Phylakopi in Melos, at Naucratis in Egypt, and at Pherae (the modern Velestino) in Thessaly; and a member of the school supervised the work undertaken by the authorities of the British Museum in the island of Cyprus. The chief corporate undertakings of the school in the past session were the excavations at Naucratis and at Phylakopi (Melos).

THE principal results of the excavations at the last-named place were the discovery of a very perfect Megaron of Myce-

næan type, with surrounding court, well, &c., and very well preserved houses, both of the Mycenæan and of the successive earlier settlements. Phylakopi had already been laid bare to at least as great an extent as Mycenæ, Tiryne, or any other site of the same description. Though it can hardly claim to vie with these in romantic interest, its archæological importance, as an epitome of the "Mycenæan" and earlier periods on the coasts and islands of the Aegean, is scarcely inferior to theirs.

The new conditions in which Crete has recently been placed, and the final emancipation of the island from Turkish rule, has at last rendered it possible to organise a serious effort to recover the evidences of her early civilisation. How important are the results which a thorough investigation in this field holds out to archæological science may be gathered from what has already been brought to light. The great inscription containing the early laws of Gortyna stand alone as a monument of Greek civic legislation. The bronzes of the Idaean cave have afforded a unique revelation of the beginnings of classical Greek art. Further researches, to which English investigation has largely contributed, have brought into relief the important part played there by the Mycenæan and still earlier civilisations; traces of what is believed to be an indigenous system of sign writing, anterior to the use of the Phœnician alphabet, have recently been found; and indications have come to light attesting an intercourse with Egypt going back to the third, perhaps the fourth, millennium before our era.

The "Alliance Française" at the "Université de Caen" announces a Christmas Holiday French Course to extend from December 28th to January 18th, 1900. Classes will be held every day except Sundays and New Year's Day. The fees are for the morning and afternoon classes £2 13s. for the three weeks, and for the evening classes £1. We observe that special classes for the French versification of the London University B.A. examination are to be held daily from 5.30 to 6 p.m., and classes for the study of the French texts for the Honours B.A. of the same University will be held from 6 to 6.45 p.m. every day. Intending students should communicate with the English representative on the Committee of Management, Mr. W. Robins, 9, Northbrook Road, Lee, London, S.E.

The system of making special Government grants for specific purposes becomes more and more discredited. Sir John Gorst, in his reply to a deputation from the Associated Chambers of Commerce, an account of which will be found in another part of the present issue, referred to this growing distrust of what has been a more or less popular system. More recently, in his address to the students and friends of Saltley Training College, the Archbishop of Canterbury referred to the same question. *The Times* reports His Grace to have said:—"He confessed he did not like the system of making special grants for special subjects, and consequently telling the master that he must teach this, that, and the other in order to get a grant. He would abolish all those specific grants, and leave the masters to handle their schools in the best way they could, each after what suited his own personal character and knowledge, while the managers would be acquainted with local needs. He looked forward to educational authorities being entrusted with large discretion, because he knew when it came to the point they would be very ready at all times to let masters have their own say about it before they settled what was to be done in a particular school."

At a meeting of the Cheshire Chamber of Agriculture on October 30th, several resolutions dealing with education in country elementary schools were adopted. The meeting was of opinion that rural education might be made more suitable; that the curriculum generally followed is better adapted to town schools; and that the introduction into country schools of teaching of a practical kind is the main requirement. The necessity for a re-adaptation of time-tables with a view to introducing lessons to stimulate the powers of observation of the children was also urged. Any desire for the teaching of science or agriculture as such was disclaimed. What is maintained by this Chamber of Agriculture is that a re-casting of the methods of country schools is necessary, and that it should be done in the spirit of the provisions recently introduced into the Code.

The aid to public secondary schools under the scheme of the Somerset County Education Committee, which has been in operation for several years, continues to make increasing demands on the funds at the disposal of the committee. Except in some cases where special grants are made, the payments take the form of capitation grants of £2 for each day scholar, and £3 for each boarder, subject to the provision that if any grant is made at all the minimum amount is £100 per annum. The schools receiving grants are open at all times without previous notice to the inspection of the Director of Technical Instruction, or other officer appointed for the purpose by the county committee. Annual maintenance grants are made to twelve public secondary schools throughout Somerset, and in these schools the appointment of science and technical teachers is subject to the approval of the county committee.

The returns relating to secondary and technical education during the school year 1897-98, which have been collected by the County Councils' Association, are of a most exhaustive nature, and should prove of very great value. The statistics have been compiled from replies furnished by county authorities to a set of questions circulated by the directors of the Executive Council of the Association. With the exception of Cornwall, Huntingdonshire, and the Welsh counties, all the county councils of England and Wales have sent particulars. The returns furnish full information as to the expenditure of a Government grant for education which is three times as great as that administered by the Department of Science and Art.

School gardens are becoming increasingly popular. From the last report of the Somerset County Education Committee, which has just been published, we observe that school gardens were carried on during last year at six centres throughout this county. The gardens were laid out by the County Instructor in Gardening, who gave advice as to their general management. A local instructor was appointed in each case, and though the work was commenced rather late in the year and the season as a whole was not a favourable one, the results were as a rule distinctly satisfactory. At most of the centres the pupils took a keen interest in their work, and raised very creditable crops of a variety of vegetables.

Similarly, the garden in connection with the School of Horticulture established by the Essex Technical Education Committee at Chelmsford has been the means of developing a keen interest in the practical side of applied botany. The garden covers an area of three acres, and is entirely devoted to educational uses. It is divided into five main sections: a botanical garden in which the plants are systematically arranged in orders, according to the natural system of classification; a vegetable garden well stocked with all useful English-grown vegetables in season; a fruit-plot for growing varieties of fruit, and demonstrating different forms of trees; a fruit-plot to be used as an orchard; an experimental plot for trials of new plants and competing varieties.

The West Ham Municipal Technical Institute, which was the scene of a disastrous fire in the early morning of October 22nd, was one of the best equipped of the metropolitan techni-

cal schools. The buildings, which have been open for less than two sessions, cost £80,000, and the damage caused by the fire is estimated at upwards of £40,000. The institute was covered by insurance to the extent of £47,000, and it is believed the total damage will not reach this amount. The whole of the upper floor of the building, including the chemical, art, and women's departments, the engineering and physical lecture theatres, the drawing office and the engineeering laboratories have been completely gutted. The electrical and physical laboratories were flooded, and a great many expensive instruments have been consequently much damaged. The fire commenced in the advanced chemical laboratory, but its origin is absolutely unknown. Adjoining the Institute and forming part of one main building, is the Free Public Library, but there is no internal communication. Though much less damage was done to the library buildings, and the whole of the valuable books were, with much labour, saved, this fire should raise the general question of the advisability of placing valuable books in a building which is not completely isolated.

THE Local Examinations and Lecture Syndicate of the University of Cambridge, in their Twenty-sixth Annual Report, draw attention to the signs of continued advance which a survey of the work of the past session reveals. The number of courses delivered in the session 1898-9 was 119, as against 103 in the session 1897-8. Of the 119 courses 44 were on scientific subjects, 96 on historical subjects, 28 on literary subjects, and 11 on subjects in the department of art, architecture, and music. These courses included 1,170 lectures, as against 990 in the previous session. More than one-third of the lectures, namely, 456, formed sessional courses of twenty-four lectures each; 492 formed terminal courses of twelve lectures each; of the remainder 210 lectures were given in the form of short courses of six lectures each and twelve lectures in the form of pioneer lectures. The corresponding figures of the previous session were 432 lectures forming sessional courses, 384 forming terminal courses, 148 forming short courses, and 26 pioneer lectures.

IN his presidential address to the members of the Association of Headmasters of Higher Grade Schools and Schools of Science, at their annual meeting on November 4th, Mr. Dyche discussed the place of higher-grade schools in a national system of education, and maintained they were an organic outgrowth of elementary schools. They came into existence because School Boards had to provide accommodation for those children who remained at school after passing the seventh standard. It is clearly desirable, in the interests of the efficient management of existing and future higher-grade schools, that the law shall so be amended that their legality, instead of being implied, as at present, shall be explicitly stated. Mr. Dyche, speaking for an association which numbers among its members practically all the headmasters of schools which are at the same time higher-grade schools and schools of science, says that his association has confidence both in the ability and impartiality of the distinguished permanent officials who are now at the head of the Departments concerned. It is satisfactory to know that, when a scheme for the proper management of higher-grade schools is drawn up, the association will be prepared to subordinate all other aims concerning the schools to one aim only—that higher-grade schools may be carried on in that way which will best serve the public interest.

THE Report of the Cambridge Higher Local Examinations, which was presented to the Senate on October 24th, shows the number of candidates offering themselves in different years. The number of candidates in June, 1869, was 36, in 1879 it had reached 741, while in June, 1889, the number had increased to 898, notwithstanding that 200 candidates had been examined in the preceding December. In 1897 the increase is by no means so marked; in June of that year the entries reached 875, and there were 255 in the December examination of 1896. As was pointed out in the July number of THE SCHOOL WORLD, the number of candidates in June of this year was 854, and last December 292.

IN the last volume of the "Proceedings of the South-Eastern Union of Scientific Societies," which has lately appeared, Mr. C. Bird, Headmaster of the Rochester Mathematical School, deals with the question of science in education. Mr. Bird maintains that the claim of science to a place in the school curriculum is now fully admitted. This claim is two-fold—there is the practical value of scientific knowledge in itself, a view which appeals strongly to many parents, who naturally wish their boys' education to have a bearing on their future work; and there is the educational value of the scientific method of teaching, which, perhaps, chiefly appeals to the schoolmaster, but is really of the utmost importance from every point of view.

DEALING later with the introduction of natural history subjects into a school curriculum, Mr. Bird, in summarising his views, says: "The fact is that we attempt too many subjects in our schools already, and the introduction of any new subject must mean the putting out of one of the old ones. It is very easy for an outsider or a professor to argue in favour of the teaching of a favourite subject or giving more time to it, but any argument of this kind ought to be accompanied by an equally powerful argument against some other for which the new one is to be substituted."

AN association to be known as the Cambridge University Appointments Association has been formed. The objects of the new body are:—(1) To establish and distribute information respecting appointments which can be appropriately filled by members of the association; (2) to establish and organise means of communication between candidates for such appointments and the persons or bodies making the appointments. The first board of management includes the names of Lord Farrer, Professor Sir Michael Foster, the Master of Jesus, the Master of Sidney Sussex, the Master of Trinity, Sir Raymond West, Sir William White, Professor Ewing, Professor Sims Woodhead, the Registrary of the University, Professor Giles, the Public Orator, Professor Somerville, Mr. James Stuart, M.P., and others.

THE twenty-fifth anniversary of the foundation of the Froebel Society in this country was celebrated at the Stockwell Training College on November 4th. There was a good attendance of those interested in Kindergarten methods. Demonstrations of teaching children according to Froebel's plans were given, and there was also an exhibition of work executed both by pupils and teachers. In the evening a *conversazione* took place, at which an address was delivered by Madame Michaelis, who has been closely identified with the growth of the movement in this country. It should be pointed out that the Education Department now accepts, in elementary schools, teachers possessing the National Froebel Union certificate. There is hardly a school in the country, secondary or primary, which does not adopt Froebel's system for its younger classes.

THE Civil Service Commissioners announce that an open competitive examination for the situation of Assistant of Customs will be held on January 16th, 1900, in London and at various provincial centres. Any or all of the following subjects may be offered, viz.:—Handwriting, arithmetic, English composition, geography, digesting returns and copying manuscript. Not less than twenty-five assistants will be appointed. The limits of

age are 18 and 21. The commencing salary is £70, rising by £5 annually to £105, with the prospect of promotion to higher classes. Entry forms must be returned to the Secretary, Civil Service Commission, S.W., before December 20th.

IN a recent speech, in which he dealt with the relation between education and the diminution of crime, the Minister of Education for New South Wales said that in New South Wales in 1866 there were four persons per 1,000 in gaol; in 1880, three per 1,000; in 1890, two per 1,000; and at the present time only one per 1,000.

SCOTCH.

AT a recent meeting of the Glasgow Chamber of Commerce, a committee was appointed to consider and bring up a report on Commercial Education. Dr. Jacks, ex-M.P., who has for a long time taken a keen interest in this subject, was appointed convener. The Committee has submitted an interim report of great value and interest. In its main features it greatly resembles that of the Birmingham Chamber of Commerce. It urges the institution of Commercial certificates of three grades for (1) boys from 14 to 15; (2) youths from 15 to 17; (3) young men from 18-22. The scope of the examinations is laid down in each case, and while that is generally satisfactory, there is evidence that the Committee would be improved by the presence upon it of practical educationists.

THE introductory lecture to the class of Education in Edinburgh University was delivered by Professor Laurie, who took as his subject "The Scottish Code of 1899." The lecturer said that the present Code is the most rational that has ever been issued. It is based on thoroughly humanistic principles, and gives no encouragement to the attempt to turn schools into the ante-chambers of alkali works and engineering shops. A man or woman of the highest culture and sensibilities may now find a fitting career in a Board school, and lecturers on method may well use the Code as the text of their lectures. With regard to the Leaving Certificates, Professor Laurie thinks that the time has come for certificates to be given for groups of subjects only. The new Code lays the foundation for a thoroughly sound elementary education, and it is to be hoped that the urgent necessity for a thoroughly organised secondary education will not be overlooked.

At the recent examination of Aberdeen High School (Girls) and Grammar School (Boys), Dr. Walker, H.M. Inspector, reported in strongly adverse terms on the organisation of the schools and on the attainments of the pupils. The reports, which were published in the public prints, created astonishment in the North of Scotland, as both schools have done excellent work in the past, and have been favourably reported on by Dr. Walker. The Rectors of the two schools have replied to the various charges in the report, and have in their turn made most serious charges of negligence and ignorance against the Inspectors. The principal inspector is plainly declared to be incapable of examining orally on account of his deafness. The papers set in the various subjects are said to have been quite outside the field of study professed by the pupils. The papers set in French contain, it is alleged, worse blunders than any made by the pupils who are mercilessly criticised. The least bad are said to have had 3 blunders in them and the worst 23, scarcely any of which can be set down as printers' errors. The following is given as a typical example:—"De *quels* circonstances de la vie de Pierre Courille parle-t-on dans la stance *souscrite?* Repondez *en Français.*" How were the girls of the High School to reply like a Frenchman, as the question asks? "Repondez en français," the examiner really meant, but a mistake of that nature, in conjunction with a wrong accidence like "quels" and a malaprop like "souscrite" is unpardonable. The results of the Leaving Certificates and of the University Preliminary and Bursary examinations show, it is maintained, that the report is untrustworthy. The Rectors' replies have been forwarded to the Department, and developments are eagerly looked for.

IRISH.

THE extensive alteration and enlargement of the buildings of Alexandra College, Dublin, which have been proceeding since the beginning of the year, have put a severe strain on the authorities to provide accommodation for the classes during this long period, as the work of the college has been carried on as usual throughout. The college was originally started in a private house in Earlsfoot Terrace in 1865, and by successive enlargements has reached its present dimensions. The new building, now near completion, will be a very handsome structure. The Jellico Hall will be much enlarged; a new cloakroom, staircase and corridors will be added, and many new class-rooms, studios, and music-rooms. In the adjoining Residence House a large dining-hall and additional bedrooms are provided. The classes of the college are in full working order, notwithstanding that a large portion of the building is in the hands of workmen, temporary accommodation having been found in the residence house and the house of the lady principal.

THE Church of Ireland Training College for National Teachers, Dublin, a fine group of buildings which has been much improved during the last ten years, is in almost a similar state to that of Alexandra College from extensive enlargements now being carried out. In Trinity College, Dublin, the new Graduates' Union, for which funds were collected in 1892, at the time of the Centenary celebrations, are being erected. A long delay took place, owing to the slowness of the board in giving their consent to the establishment of the union, and then their approval of the site and the plans for the building. Last spring, at last, operations began, some old houses in one of the squares of the college being removed to make room for the new union; but during the summer a dispute arose, owing to the employment of non-union workmen, and the building was almost suspended for some time.

THE Hermione Lectures in Art, which are delivered each autumn in Alexandra College as a memorial of the late lamented young Duchess of Leinster, were this year on the subject of "Egyptian Art." Dr. Flinders Petrie, a high authority and practical worker in Egyptology, was the lecturer. The lectures, five in number, were given in the first and second weeks in November, being somewhat interrupted by the indisposition of the lecturer. They were admirable lectures, and finely illustrated. Being almost the first public lectures dealing with this branch of archæology delivered in Dublin, they excited much interest and were largely attended, notwithstanding the bad weather that prevailed at the time.

THE conferring of degrees in the Royal University took place on October 27th, Lord Dufferin, the Chancellor of the University, presiding. As usual, the Queen's College, Belfast, and the Catholic University College, Stephen's Green, carried off most of the Honour Degrees. The latter college is wholly unendowed, except for the teaching of fifteen Fellows of the University. The three Queen's Colleges of Cork, Belfast and Galway receive each £10,000 a-year, and Fellows of the University also teach in them, but being completely secular the Catholic Church discourages Catholics attending them. Hence Cork and Galway have failed to do the work expected from them. Belfast is largely attended by Presbyterian students.

IT has been long felt that, in these circumstances, an injustice is done to the Catholic College in Dublin in not granting

it some endowment. The college has admitted all students except women-students up to the present, and its pupils have been extremely successful in the examinations. This year lectures in various subjects for the Second Arts and B.A. examinations are being given, to which ladies are admitted. Dublin women-students (the majority in the Royal) have hitherto not been able to obtain any teaching from the Fellows of their university.

WELSH.

THE Graduation Ceremony of the University of Wales was this year held at Bangor. The Deputy-Chancellor, Dr. Isambard Owen, who has so completely identified himself with the interests of the University, took the place of the Chancellor, the Prince of Wales, and read a letter from His Royal Highness congratulating the University upon its success and rapid development. In all 70 candidates were presented for degrees. Of these 14 were women and 56 men. Twenty-four took the B.Sc. degree, 45 the B.A., and one, Miss Edgell, the M.A. degree. Miss Edgell, too, was awarded the University Fellowship. One candidate took the B.Sc. degree with first-class honours, three with second-class, and two with third-class honours. Six took the B.A. with first-class honours, nine with second-class, and six with third-class honours.

WHEN it is remembered that it is necessary to reside for at least three years after matriculation at one of the constituent colleges of Aberystwyth, Bangor, or Cardiff before it is possible to obtain a degree, and that these three colleges already number among their alumni a large proportion of the most successful graduates in the University of London, and among their teachers such men as Professor Henry Jones and Dr. Gray—the successors at the University of Glasgow of the present Master of Balliol and Lord Kelvin,—scholars of European fame, such as Professor Herford and Professor Mathews, and educationists like Principals Reichel, Roberts, and Viriamu Jones—it must be admitted that the University has a reasonable ground for complaint against the Incorporated Law Society when the latter refuses to extend to its degrees the same privileges as are offered to other Universities. The privilege not extended to the University of Wales is that of the remission of two years of the Articles of a candidate who has already taken the Welsh degree in Arts. It is to be hoped that the obstacle placed in the way of this vigorous young University by a somewhat conservative Society will soon be removed.

AT a recent meeting of the Association of the Headmasters of the Welsh County Schools, it was resolved to call the attention of the Charity Commissioners to certain apparent irregularities in connection with the dismissal of a headmistress and a headmaster in the county of Glamorgan, and to request them to institute an inquiry into the matter. As is generally known, the headmasters and headmistresses of Welsh County Schools are appointed and dismissed by the County Governing Bodies, and not by the Local Governing Bodies. But in the case of Glamorganshire, which is so thickly populated, an exception was made, and the Local Governing Bodies were given the dower to elect or dismiss their own headmasters or headmistresses. It is complained that this power is being abused, and that headmasters are being asked, on appointment, to contract out of the right which they possess of appointing or dismissing their assistants, and that when they have exercised this right they have been summarily dismissed without cause being assigned.

CURRENT HISTORY.

THERE has lately come to light an autograph document by which William Penn, the Quaker, gave authority to the Provincial Council of his colony to act during his temporary absence in England in the year 1684. The document is in itself comparatively unimportant, but we may note two or three points of interest therein. Penn is obviously the proprietor, under the Crown, of all Pennsylvania. How strange that would seem now-a-days in the U.S.A., where democratic ideas are supposed to be more dominant than elsewhere. He dates his document in 1684, the "Thirty-Sixth Year of ye King's Reign." Charles II. is not "His Majesty" as usual, but his years are dated from the death of his "martyred" father, and therein the Quaker follows the lawyers in ignoring the "usurpation" of Oliver Cromwell. Is Dr. Hays right in assuming that "the sixth month" of 1684 was June? It was not till 1751 that we began legally to reckon January 1st as New Year's day.

SOME years ago, the Hon. Auberon Herbert attracted a certain amount of notice by proclaiming a very thorough-going individualism. In his newspaper, the *Free Life*, he advocated, among other things, that taxation should be voluntary. There was surely more laughter over this proposal than serious discussion, but now, with the Transvaal war on hand, we are having two remarkable illustrations of the working of this "theory." To say nothing of our standing volunteer forces, the Colonies are coming forward eagerly to help the "mother country" in her war for the race-idea in South Africa. And, in contrast to the U.S.A., which grants liberal pensions from the *Government* to the widows and orphans of national soldiers, we are raising a *voluntary* fund to supplement the Parliamentary supplies instead of leaving it to the State.

> How many things by season season'd are
> To their right praise and true perfection.

SIR THOMAS LIPTON has failed to bring back the American Cup. While the contest was doubtful, it occupied perhaps more space in the newspapers and in the public mind than any other matters of common interest. This summer Harvard and Yale competed in athletic sports with Cambridge and Oxford, and we won the odd event. How old the keenness is in such international contests! The cities of ancient Hellas, we know, gave high honours to those who brought home the leafy crowns, which were the sole rewards of victory in Olympic or other games. Among the many gifts which Greece has bestowed on the modern world, none perhaps is of more importance than the spirit of friendly rivalry in matters that interest the whole of the human race.

THE SCHOOL PULPIT.

NOTABLE PASSAGES FROM SERMONS PREACHED IN PUBLIC SCHOOLS.

All are Teachers and all Learners for Good or for Bad.[1]

"Thine eyes shall see thy teachers and thine ears shall hear a word behind thee saying, This is the way, walk ye in it." Isaiah xxx. 20.

IT is a solemn thought to remember that on our own choice of right or wrong depends so much more than the mere act which we choose. In the first place, each choice of right makes it easier to choose right next time; each choice of wrong makes it harder; "the sinful thought once welcomed will come unbidden on another occasion when we do not want it"; single choices of conduct tend to make character; we *can*, of course, act contrary to our character for good or ill; we are free; but it is not easy

[1] The new aisle added to Wellington College Chapel in memory of Archbishop Benson was dedicated by the Bishop of Oxford on Sunday, November 5th, in the presence of the Duke of Connaught and Prince Christian. There is, consequently, a special appropriateness about the sermon preached at the end of the Christmas term, 1896, by the Master of Wellington College, Rev. B. Pollock, M.A., from which our selection is taken by his permission.

to act contrary to our own past. The moulding or fixing of our character, then, follows upon our single actions. But more than this, the moulding of the character of others follows on them too. We are the unobserved, the hidden teachers of others; often and often this influence of ourselves upon others is unconscious and unintentional, but it is none the less real, and there are few sadder thoughts than to remember that some day the veil will be torn aside and those whom we have taught to do wrong will see their teachers in us. You who are in the higher and more responsible positions here have opportunities of influence that will never come again; you may be hereafter in places where the good you can do will be greater and more widespread, but never where its effects will be so certain and so immediate. What greater pleasure could be given to all who love our school than that in these coming holidays those who have entrusted you to the care of this place should be able to say of one and another that he is getting more manly or more considerate, more refined, more unselfish, more industrious, wiser, better, more devout, more generous; and to add, "He has learnt it at school." And such praise will be most valuable if it does not merely mean that Masters in sermons and in private talks set these things before you, but that you live in a place where such things are valued, where many are striving to attain them, and in their own pure efforts after right are unconsciously helping one another by the quiet, voiceless influence of lives, not indeed perfect, but in the main striving onwards and "still upwards."

Those who live such lives cannot tell whom they may be helping, and we who are helped by them receive much of that help all unconsciously, and do not know how much we are indebted to them, how far or how powerfully these influences in them may have spread themselves abroad. Hereafter all this will be plain, and sometimes even now as with a lightning flash some crisis may reveal to us something of the might of some power for good which has all along been helping us. Such was the sudden loss that befell our school and our country in the death of Archbishop Benson. Now, when some weeks have separated us from the acuteness of our own first grief and we have watched the grief of others, we are better able to estimate the influence of that great life. When he was with us we could not tell how much we owed him; it had not occurred to us to count it up; we thought he would remain with us so much longer that we had never anticipated the amount of our loss. And he was a man of such tender personal sympathy and feeling, with such a simple unfeigned interest in all things and all people who crossed his path, that until he was gone and we saw a nation mourning with a personal affection, it was impossible to believe to how many his heart went out or that he should have been able to awake such individual devotion in so large a number, and feel such an affectionate interest in all.

I speak in the presence of those who knew him many years longer than I did, in the presence of some of his colleagues and his pupils; they can tell you much that I never knew; but I like my last words to you this term in our chapel—his chapel—to be on the great teacher who has so largely made our school what it is. Many of you never knew him and never saw him here, but he was, he is—for his work survives him—the teacher, the unseen teacher, of every one in this school. His mind conceived the idea of the school in its present form; his devotion guided its development in every detail; his grand power of work raised it to be what it became in less than fifteen years. His words as they sounded in this chapel, his daily life said to all around him, "This is the way, walk ye in it"; he was born to create and to lead; he was a man to be obeyed. It is almost as a symbol of his life at Wellington that we shall treasure in our chapel a Credence that has been most kindly sent us by his son. The little pillars of the table supported the foundation stone of the College when it was laid by the Queen; the table itself was constantly used by the Archbishop in his private chapel at Addington.

And his love for the place never failed. In the first letter I ever had from him, he told me that the happiest and most vivid years of his life were those at Wellington; and as one came to know him better, one saw more and more how anxious he was still to serve the school. In almost his last letter he said, "I am so glad if I can be of the least use to you. I wish I could be more. To help you (if only I could) and that beloved place would be a joy." Who will ever forget his gracious presence, the kindness of his smile, the expression of affectionate interest in his eyes, the sympathetic movements and gestures of surprise or concern, the look of thunder when he thought of wrong-doing? I can see him now as one night at Lambeth when I had kept him up very late talking of some wrong that had been done to you, he walked away, very likely to another hour's lonely work, repeating as he went, "The poor boys! the poor boys!" He was among the very wisest of men—he never believed that devotion to our Lord Jesus Christ excluded practical good sense, business-like ways, a quick and ready knowledge of men; he was no recluse; with streams of people always calling to see him, and a correspondence which would be the work of a department, it needed his amazing power of work and his untiring energy early and late to cope with his duties; but he never had that paltry, irritable air of being overburdened that takes the bloom off the good work of many busy men; full of conversation, grave or gay, considerate for the most trifling wants of others, bright and cheerful as he sat at his table, no one would have thought of the national, the world-wide responsibilities that rested on him. He never spoke of anything but that it seemed more beautiful, more interesting as it left his lips; he never thought of anything but that in all its imperfection he saw it beautified by the possibility of what it might become. There are men who see the poorer, the meaner side of things; he saw the beautiful, the bright side, the tendency to good in that which had not yet reached it. As he looked back on his days here weaknesses and failures were forgotten; he only saw the school as he meant it to be, as he sacrificed himself to make it, and as it so far fulfilled his hopes. The Wellington of the Archbishop's mind is still something before us and not behind, his ideal for this place it is for you and me to realise; that is a memorial he would love.

A NEW TRANSLATION OF APPIAN.[1]

It is about three hundred and twenty years since the work of Appian of Alexandria, or rather some part of it only, was first presented to the English-speaking world in their own tongue by an anonymous author. About a hundred years after this a second translation was made by an otherwise unknown John Davies. Since that time no English version has appeared until the publication of the edition under consideration.

Looking at the continental history of Appian, we must go back to the middle of the fifteenth century, when the Pope's secretary, Candidus, translated a Greek manuscript, which is supposed to have been lost, into what passed for Latin. It was not until the middle of the sixteenth century that the Greek text was printed by Charles Stephen. Various Italian and French translations, from the Latin of Candidus, were published from 1500 onwards, but it is only when we come to the monu-

1 "The Roman History of Appian of Alexandria." Translated from the Greek by Horace White, M.A., LL.D. With maps and illustrations. In two volumes, lxviii+413 and 554 pp. (G. Bell & Sons.) 12s.

mental edition of Schweighäuser (Leipzig, 1785) that any great advances in the selection of the text, and in the interpretation of the author, are found. Even this editor, however, was not acquainted with several of the codices, which have been collated since his time.

In more recent days Ludwig Mendelssohn, of Dorpat, about twenty years ago, with much pains and critical acumen, worked at the MSS. and produced the exisiting Teubner text. This year has seen in America the completion of Dr. White's translation, destined to take its place with the landmarks of Appian's Bibliography, which, necessarily in brief, are here indicated.

If it be inquired "How far is Appian a trustworthy historian?" we must say at once that he does not come up to the standard of modern requirements; but then neither do any of the ancient writers of history. We must beware of applying nineteenth century canons to second century work. If he did make too much use of imaginative records compiled before his time, at any rate he produced an interesting account of Roman affairs, and that was all that was expected of him. If he does come short of our ideal philosophic historian, on the other hand he does show an impartial, and, to some extent, judicial spirit. His greatest fault, undoubtedly, is a magnificent disregard for mere detail; geographical or chronological accuracy, for instance, must not be sought in his pages. Thus Dr. White, in addition to pointing out the mistakes always quoted against him (as, for instance, his placing Saguntum north of the Ebro and identifying it with New Carthage), has to write many footnotes showing his blunders. Let us, however, in condemning Appian remember that even Cæsar thought Spain lay to the West of Britain!

But, after all, in respect of the main outlines of events, he is probably quite as trustworthy as Plutarch, and more so than Livy. At times he follows, as allowed above, the writings of predecessors which were not history, and endeavours to represent the course of events as fitting in with the poetical or romantic exaggerations of an unhistorical narrative; and so it comes to pass that, where his account is uncorroborated, there is a strongly marked tendency among moderns to withhold belief from it. But in at least one portion of his history, that relating to the events of the third Punic War, he is our sole authority, and we may accept his story, because, as he tells us, he draws upon Polybius, who, being an eye-witness of the events, wrote an account of them which, unhappily, has not come down to us.

Dr. White deserves the thanks of English readers for his translation; it is scholarly and vigorous, and at the same time neat and accurate. The footnotes are few, but sufficient to enable anyone to follow, or correct, the statements of the text, while the preface is full of information regarding the author and his works.

AN INDISPENSABLE HANDBOOK OF GEOGRAPHY.[1]

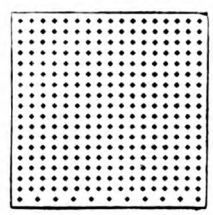
THOUGH geography has been taught in our schools and colleges for many generations, there is much room for improvement both as to the subjects which are studied under this head, and also as to the manner and order in which they are presented to pupils. In spite of all that has been written and said in condemnation of the system of teaching geography by making children learn lists of openings, headlands, rivers, &c., at the very commencement, this plan prevails in many schools, to the discredit of the teachers and the discouragement of the pupils. In Germany, Switzerland, the United States, and elsewhere, more rational methods of teaching the subject have been adopted; but we are a conservative people, and do not readily leave an old road to learning for a new one.

There are signs, however, that geography will in the course of time be made more of a living subject than it is at present, and the aim will be to encourage individual observation of natural phenomena rather than the acquisition of disconnected information. The inspectors of our public elementary schools are given instructions that "detailed matter, consisting of

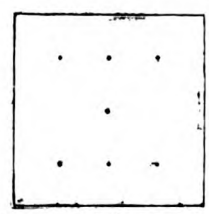
The Arctic Regions.

names conveying no associations likely to interest children, should be excluded from the teaching and examination of a class in geography. Scholars are no longer required to prepare maps." When the spirit of this instruction is manifest in the examinations usually taken by pupils in secondary schools, geography will be taught in a more inspiring way than it is now, and no one will be considered competent to teach it unless he has an actual knowledge of geographical science.

We are induced to make these remarks by an examination of the volume before us. In this work a broader view is taken of the meaning of geography than is found in text-books of the old type. At the outset, Dr. Mill defines the science as follows:—"Geography is the exact and organised knowledge



Average population of a square mile of the United Kingdom.



Average population of a square mile of the Transvaal.

of the distribution of phenomena on the surface of the earth, culminating in the explanation of the interaction of man with his terrestrial environment." This definition will serve to show what the editor of the volume understands by geography, and also to indicate generally the nature of the text.

The first part of the work is concerned with the principles of geography, and consists of chapters on mathematical geography, maps, the form of the earth, the oceans, the atmosphere, distribution of living creatures and mankind, and political geography. In the second part the various continents and countries are dealt with in forty-five chapters arranged in seven divisions, namely, Europe, Asia, Australasia and Polynesia, North

[1] "The International Geography." By Seventy Authors. With 488 illustrations. Edited by Hugh Robert Mill, D.Sc. xx+1088 pp. (George Newnes.) 15s.

America, Central and South America, Africa, and the Polar Regions. The unique characteristic of the work is that every one of the fifty-five chapters in it is contributed by a leading authority upon the subject treated. It would serve no useful purpose to give a list of the seventy distinguished home and foreign geographers whose assistance Dr. Mill has been successful in obtaining in the preparation of this volume. Suffice it to say that each contributor has special knowledge of the subject upon which he writes; so that the volume consists of a collection of expert opinions upon the extent, configuration, climate, resources, people and history, flora and fauna, trade, commerce, and hydrography of every country in the world. This bare statement of fact should be sufficient to commend the volume to the attention not only of every teacher of geography, but of every person who has a library. In plan, in scope, and in treatment, the volume needs nothing to be desired, and we trust that the sale will be commensurate with the merits of the work.

The illustrations scattered through the pages are sketch maps bringing into prominence special features not usually shown in atlases, and diagrams that give clear mental ideas of facts described. Some of the pictures are not altogether satisfactory, but most of them serve their purpose. By the courtesy of the publishers we are able to give here three typical illustrations from the book, representing the Arctic Regions, and the density of the population in the United Kingdom and in the Transvaal.

RECENT SCHOOL BOOKS.

Classics.

Poems of Catullus. By H. V. Macnaghten, M.A., and A. B. Ramsay, M.A. 147 pp. *The Story of Catullus.* By H. V. Macnaghten, M.A. 83 pp. (Duckworth). *2s. 6d.* each. —These are two distinctly attractive volumes, creditable alike to the editors and the publisher. The former book contains a short life of the poet, notes on his contemporaries, and schemes of his metres. There are more of the poems than are contained in the one existing school edition. The notes are not excessive, but useful and to the point, characterised by excellent scholarship and judicious use of the labours of the editor's great predecessors, Ellis and Munro, in the rich field of the "tenderest of Roman poets." In the latter volume Mr. Macnaghten draws with sympathetic touches a life-like picture of Catullus in his love and sorrow, his friendship and hatred, his weakness and sin. His self-revelations are aptly compared with those of Shakespeare in his sonnets, and every stage in his history is illustrated by translations from his shorter poems. In this difficult task a very fair measure of success has been achieved. Something of the lightness and sweetness of a poet like Catullus must inevitably evaporate in a translation, but we congratulate the translator on catching and preserving much of the spirit of his original. The following rendering of the poet's lament, written on one occasion when he could no longer doubt his mistress's duplicity, is one of Mr. Macnaghten's happiest efforts:—

> "None else but me, my lady vows 'tis true,
> None else for her, though Jove himself should sue;
> She vows, a woman to her lover: grave
> Such words upon the wind and fleeting wave!"

Demonstrations in Greek Iambic Verse. By W. H. D. Rouse, M.A. viii.+251 pp. (Camb. Univ. Press.) *6s.*— This is a good book, which should be obtained by every classical master. In the preface the practice of verse-composition is defended on grounds with which we are in entire agreement. The author's system of teaching—he is a Rugby master—is well calculated to attract the greatest amount of interest on the part of the learners, and also to do away with a great deal of the drudgery of merely correcting and amending each individual copy by the teacher. It will also be just what the student, who has to work without a master, needs to enable him to keep up and materially improve what he has learnt at school. Seventy-five pages of excellent hints on Metre and Rhythm, and Language and Style, precede the exercises, twenty-two in number, to each of which about eight pages on an average are devoted. These show the various steps by which good, nervous, spirited and idiomatic verses are produced, and are a veritable education in scholarship and taste.

Second Year Latin. By J. B. Greenough, B. L. D'Ooge, and M. G. Daniell. 497+188 pp. (Ginn.)—Have American boys no holidays? Or do they, having once begun Latin, lay aside all other studies? We are led to ask these questions, because the editors intend this almost ponderous book, together with "any First Latin Book," as "a sufficient course in Latin for two years." It contains about ninety pages of easy Latin, much of it by modern scholars, and including some Plautus, Terence and Horace, besides other verse, followed by 135 pages of shortened Cæsar—a rather extensive programme for a second year! There are several maps and more than a hundred illustrations bearing on the text; the notes are too full of references to American grammars to be of much use on this side of the water, but otherwise are satisfactory. There is a good series of exercises for oral and written work, and the vocabulary is very full. The etymology is not always up to date.

Euripides. Hippolytus. By J. E. Harry. xlv.+175 pp. (Ginn.)—This is one of the (American) Series of Greek authors. Professor Harry has produced an excellent edition of this, the finest, as we think, of the plays of Euripides. He has made good use of the great work of Wilamowitz-Möllendorff, without following him slavishly. At the beginning is a keen appreciation of the poet and his characteristics, interesting studies of the characters of the play, and a discussion of the myth. A very important feature of the edition is to be found in the plates, which are reproduced from ancient paintings bearing on the story, with descriptive comments. The notes are at the foot of each page, and display literary taste and erudition without excess. Critical notes and metres find a place in an appendix, and there are also good indexes. We do not like the insertion of the last two lines of a quotation from Schlegel in the first note on page xxviii., which has reference to the *creation by the ancients* "of a perfect image of human nature."

Edited Books.

Macaulay. Essay on Milton. By J. H. Flather, M.A. 122 pp. (Pitt Press.) *1s. 6d.* —This is another of the scholarly, thorough, and withal most readable editions of English classics which we are now well accustomed to expect from the Dean of Emanuel College, Cambridge. It would indeed be hard to plan any treatment of this subject more comprehensive than the introduction to this little volume. Besides the most obviously necessary accounts of Macaulay and his work, the editor deals with "Definitions of Poetry" in a short chapter worth the attention of all who are studying or teaching rhetoric; "Johnson's Life of Milton," "English Politics in 1825," and "Macaulay's Style." To these he adds an exhaustive chronological table covering the period from 1608—1674, A.D. The notes are rather lengthy, but exhaustive. A book as fertile in suggestiveness as it is accurate in scholarship.

Chaucer. The Squire's Tale. By A. W. Pollard. 54 pp. (Macmillan.) 1*s.* 6*d.*—Mr. Pollard's qualifications as an editor of Chaucer are so thoroughly well known that any volume from his pen dealing with this subject deserves attention and wide use. The introduction is a mine of learning, if anything rather adapted to university than to average school requirements; and the notes are mai ly rather occupied in elucidation of Chaucer's peculiar phraseology than with historical or philosophical matters. A very valuable section contains illustrations of Chaucer's grammar which will be useful to students of early English grammatical forms. The glossary is extensive and exhaustive. A small book but a valuable one.

English Satires. With an Introduction by Oliphant Smeaton. 298 pp. (Blackie.) 3*s.* 6*d.*—This is a charming volume. The dainty binding not at all unnaturally raises our expectation; the contents of these pages gratify us in a higher degree as we proceed to read them. The selection of illustrations is an eminently judicious and careful one, and the introductory essay shows nice critical appreciation and sound scholarship. This is a book to serve as a basis for a long article: to do justice to it in a brief notice is almost impossible. Suffice it to say that it worthily fills a place in the Warwick Library of English Literature and more than sustains the previous reputation of these admirable anthologies. "To manifest the trend of satiric development during the centuries elapsing between Langland and Lowell" is an undertaking in which discrimination must go hand in hand with fulness of culture. The compiler of this volume has proved himself completely fitted for his task, which he significantly dedicates to the memory of the late Dr. Grosart.

The Eversley Shakespeare. Vol. VIII. By Prof. C. H. Herford. 417 pp. (Macmillan.) 5*s.*—This volume, which is a little smaller than some of the foregoing volumes in the series, deals with "Julius Cæsar," "Hamlet," and "Othello." The editor takes us over familiar ground with the same air of acute, accurate and genial comprehension to which we have grown accustomed in reading this particular edition. It is interesting to note the evident sympathy which Professor Herford feels for the suggestion that Shakespeare may have connected the idea of Wittenberg with Giordano Bruno. But even so, is it not questionable whether the dramatist had any real insight into the philosopher? Both look large to us because they are thrown into relief by the lapse of ages. They must have appeared much smaller to their contemporaries, especially where no personal acquaintanceship existed.

The White Ship. By D. G. Rossetti. 12 pp. (Ellis & Elvey.) 6*d.*—This is a clearly printed edition of Rossetti's well-known poem, without notes, introduction or any other matter.

As You Like It. By Stanley Wood. (Dinglewood Shakespeare Manuals.) 48 pp. (John Heywood.) 1*s.*—This series is now widely and favourably known, and as Mr. Wood follows the order in which Shakespeare's plays are selected by the Local Examination Board, whose taste is very catholic, there seems a prospect of a complete set of these manuals at some future time covering the whole range of Shakespeare's works. This particular little manual is the work of a sympathetic and intelligent educationist who evidently not only loves his profession but also loves Shakespeare. It will bear most favourable comparison with those already issued in this series.

The First Epistle to the Ephesians. By Rev. G. W. Garrod. 160 pp. (Macmillan.) 2*s.* 6*d.*—A first impression made by a survey of this volume is that a very unnecessary amount of space has been wasted upon the peculiar arrangement of the text; a second grows to a conviction that this is without exception the best students' edition (not even excepting the "Cambridge Bible for Schools") at present in the market. It has been prepared with a strict eye to the requirements of the examinations set for students in Church training colleges, and as a comprehensive digest of all such information as is likely to be required in such cases will be found in the highest degree serviceable. The introduction takes up every point of any importance which bears upon the subject matter, and will be found of great use to many masters who may have to prepare upper form boys for the Local Examinations, as well as for the purpose it is designed to effect. The detailed analysis is very detailed indeed; it might have been called minute; and the notes are so arranged that every point is fastened upon the memory as much by its position on the page as by its matter. The references, which are very full, are separately worked out. We commend this most useful volume to all teachers.

Popular Studies in Mythology, Romance and Folk Lore. 36 pp. No. 1. *Celtic and Mediæval Romance.* By Alfred Nutt. 6*d.* No. 2. *On Folk Lore.* By E. S. Hartland, F.S.A. 43 pp. (David Nutt.) 6*d.*- These little pamphlet-like treatises are most remarkable for the severe condensation and compression of the matter they contain. Both embrace a wide and almost complete survey of the subject in hand, and deal with it in a masterly, clear and simple fashion. They make good introductions to these subjects.

History.

English History. By E. S. Symes. 296 pp. (Arnold.)—The general history is well, though slightly told. The constitutional side of history is scarcely dealt with, and is not up to date. The pictures are good and the extracts from chronicles interesting, though not so prominent as the preface would lead us to expect.

England in the Nineteenth Century. By C. W. Oman. viii.+276 pp. (Arnold.) 3*s.* 6*d.*—It is a doubtful question whether it is possible to write a history of our own times in due proportion, and in many such attempts that have appeared lately, the gross want of perspective becomes too palpably absurd. If, however, such stories are to be read at all, there can be no better small guide to the subject than this little book. Mr. Oman writes well and clearly, and the only fault we have to find is that he allows his own opinions to appear too evidently on some points which would be better treated impartially. Specially is this mistake, as we think it, to be found in his treatment of Gladstone and the Irish question.

Geography.

Africa as seen by its Explorers. Edited by E. J. Webb, B.A. xi.+260 pp. (Arnold.) 2*s.*—We have subjected this work to a practical test. We asked boys of various ages what they would most like to know about Africa, and the topics of most interest seemed to be—the natives, their manners and customs; the oldest tribes; ancient civilisations; the Pyramids; the Nile; the diamond fields; the parts already explored, &c. Mr. Webb emerges out of this ordeal triumphantly. His extracts from the writings of explorers are well-chosen and arranged, and there is not a dry page in the book. It may with profit be adopted as a class reader, and, at any rate, every school library should possess a copy. We cordially recommend this little volume.

The United States and their Industries. By the Rev. William Parr Greswell. 91 pp. (Philip & Son.) 1*s.*—Here we have another exceedingly interesting and well-written book.

It is divided into 28 chapters, averaging about 3 pages in length. The author evidently knows how to interest boys and girls, and to make them think for themselves. His remarks on Indian Reserves, Boundary Treaties, the Value of Rainwater in California, Life in the Backwoods, are only a few of many excellent features. There are no maps; in other respects Mr. Greswell has given us an eminently satisfactory text-book—sufficiently full, accurate, scientific, and very cheap.

Mathematics.

Elementary Algebra. By C. H. French, M.A., and G. Osborn, M.A. xiv.+350 pp. (J. & A. Churchill.) 4*s.* 6*d.* (or, without answers, 3*s.* 6*d.*)—This is a praiseworthy attempt to write an algebra which the ordinary human boy may be induced to read. Whether it will be successful in this respect, experiment only can decide. In any case, it is sure to prove a very useful class-book, and gives an excellent idea of the actual methods of two experienced teachers. The explanations given are very simple and detailed; at the same time, the book is free from the tiresome twaddle and "baby talk" which some writers mistake for simplicity. The large number of examples which may be worked orally in class is an excellent feature of the work, and the chapters on factors and quadratic equations are unusually good for a book of this grade. There is one point which calls for criticism: the authors try to maintain the *erroneous* proposition that the object of division in algebra is to find out "how many times the divisor is contained in the dividend." Half-conscious of their illogical position, they give the division of $x^2+3x+10$ by $x+1$ first according to descending powers of x, and then according to ascending powers. Thus brought face to face with two obviously different results, they calmly assert that the *answers are really the same*, because (!) in each case dividend = quotient × divisor + remainder. It is really time that this matter was discussed in a more satisfactory way even in elementary text-books. Then, with regard to minor matters, the use of $6h$ for "six horses" is undesirable, as the letters used in algebra should never denote concrete quantities; the word "sum" is improperly applied to expressions like $b-a$ (p. 11); and it would be a good thing, in the chapters and examples on factors, to treat "forms" and "functions" simultaneously; that is, the factorising of (say) x^2-3x+2 and $x^2-3xy+2y^2$ should go together, and be regularly treated as one problem.

Newton's Laws of Motion. By P. G. Tait, M.A., Sec. R.S.E. viii.+54 pp. (A. & C. Black.) 1*s.* 6*d.*—Convinced that taking notes of an oral lecture is a pernicious habit, Prof. Tait has written this summary of kinematics and dynamics to save the student from his note-book "and its insidious but fatal allurements." What purpose this outline can serve that is not provided for by Clerk-Maxwell's "Matter and Motion," we cannot quite understand, but, like all its author's productions, it is vigorous and stimulating. Some of the statements are far from lucid: thus (p. 8) the statement, that, "when its length is taken as so many inches, yards, miles, &c., the vector is regarded as the instrument by which a point is carried, or displaced, from one position to another," is hardly intelligible. It is introducing a needless complexity to regard a vector as the "*instrument*," &c., and besides, what possible meaning can be given to the initial phrase? In what way is the general aspect of a vector changed when its length is taken as so many inches, &c.? Again (p. 49), it is said that, when a flexible chain runs through a tube with speed v and under a tension T, "each unit of length of the chain presses on the *convex* side of the tube with a force T/ρ, and it presses on the *concave* side with a force mv^2/ρ." This is not only misleading, but positively inaccurate. However, in spite of these blemishes, the essay thoroughly deserves to be read; it shows us how a veteran physicist regards the foundations of his science, and this is worth more than many immaculate but spiritless compendia.

Optics: a Manual for Students. By A. S. Percival, M.A., M.B. xii.+400 pp. (Macmillan.) 10*s.* — So far as we are able to judge, Dr. Percival has accomplished a difficult task with conspicuous success. Writing primarily for ophthalmic students, he has provided them with a treatise on geometrical optics which is at once clear and scientific, and includes all that an eye surgeon is likely to require. The chapters on lenses are remarkabiy good, and include the application of Gauss's theory of cardinal points. The work concludes with a very interesting chapter on the human eye as an optical instrument. The numerous worked-out examples of corrections required for specific defects of vision add greatly to the value of the book. It would perhaps be advisable to insert, in a subsequent edition, a diagram showing the passage through an eye-piece of several small pencils of light. Students generally have a very vague notion of the way in which images are actually formed, and the diagrams in many current text-books are very misleading.

Plane and Solid Geometry. By G. A Wentworth. Revised edition. x.+474 pp. (Ginn & Co., Boston, U.S.A.)—This book is remarkable for the excellence of its print, and the clearness and beauty of its diagrams, especially those which illustrate solid geometry. In other respects the treatise presents those good points which distinguish the best class of current American text-books. There are plenty of easy exercises, and figures and hints are given with many of them. It is curious that Mr. Wentworth, like others of his countrymen, imagines that it can be proved that the circumference of a circle is equal to the limit of the perimeter of a circumscribed polygon; it is a capital exercise to discover the fallacy which his argument on pp. 219-221 involves. It should also be noted that in the figures on pp. 435, 455, the point P happens to be so nearly on the directrix that PG seems to touch one of the circles used in the construction: this, of course, is exceptional, and the position of P ought to be changed.

Science and Technology.

Magnetism and Electricity. By J. Paley Yorke. viii.+264 pp. (Edward Arnold.) 3*s.* 6*d.*—Is a well-printed volume in which the subject is taken as far as is required for elementary examinations. We are doubtful of the wisdom of employing + and − signs to represent respectively north-seeking and south-seeking magnetic poles. The author is not always careful to explain technical terms when they are first introduced. The order of treatment is not happy, *e.g.*, the first four chapters on magnetism are followed by one entitled "Electricity," in which a few fundamental facts of frictional electricity are described, and the idea of potential introduced by various analogies. This branch of the subject is then left, and it is only when Chapter XII. is reached that the subject of Electrostatics is resumed, after all that the author has to say on Voltaic Electricity has been read. The book contains 145 clear illustrations, and 100 questions are supplied at the end of the volume.

A School of Science Course in Practical Physics and Chemistry. By Henry Hills, B.A., B.Sc. Four pamphlets, 6*d.* each *net.* (G. Philip & Son.)—These pamphlets contain a syllabus of lectures and practical work for a two years' course in physics and chemistry. Only one side of the paper is printed on, and the student is instructed to "cut out neatly the experiment or lesson and paste at the head of a page in the practical work-book, or in the lecture note-book." Since the

syllabuses are those of a successful teacher they should prove useful in guiding inexperienced teachers in the selection of subjects for their science courses.

Beasts: Thumb-nail Studies in Pets. By Wardlaw Kennedy. xvi.+152 pp. (Macmillan.) 4*s.* 6*d.*—The boy who is fond of animal pets will read this book with unalloyed delight. In easy and happy style, and with a touch of quiet humour, Mr. Kennedy describes the habits and characteristics of a number of animals kept by him, among them being frogs, snakes, lizards, rats, and tortoises, an armadillo, and a mongoose. Natural history cannot be learnt from books, and no pretence is made to teach it in the present volume. What books can do, however, is to show that animate nature is full of interest, and cultivate the sympathetic spirit, which is a desirable quality in every human being. Judged from this point of view, Mr. Kennedy has succeeded in producing a volume which will be the making of many naturalists—using the word to mean observers of natural life, and not collectors of specimens for stuffing. In one chapter the remark is made: "Tadpoles

develop legs in a few weeks, and lose their tails and become frogs. Then why should some tadpoles, which were put in my aquarium at Easter, remain tadpoles and nothing more till the end of December"? The answer is probably, insufficient or unsuitable food. If tadpoles are not fed properly, they may never develop into frogs. One of the most interesting pets described is a mongoose, an animal which Mr. Kipling has immortalised in "Rikki-Tikki." The motto of this little animal is, "Run and find out," which spirit of investigation leads to many comical experiences. This amusing little animal is shown in the accompanying illustration from Mr. Kennedy's book, and we are confident that every boy who reads about him will consider that a tame mongoose is the one thing needed to make his happiness complete.

Field and Folk Lore. By H. Lowerison. 77 pp. (David Nutt.) 6*d.*—The writer of this capital little book is the well-known conductor of the "Clarion" Field Club, and a lecturer to the Co-operative Holidays Association. Hence he has an intimate knowledge of the difficulties which confront the beginners in Nature-studies. If, as he assures us, it was the case in his experience that out of a class of sixty boys in a London Board school, aged 8 to 13 years, only four could name the buttercup and the daisy, it is high time that such little volumes as this came into use. A chapter by Mr. Alfred Nutt on Folk Lore is a valuable addition.

Inorganic Chemistry for Advanced Students. By Sir Henry Roscoe, F.R.S., D.C.L., LL.D., and Arthur Harden, Ph.D., M.Sc. viii.+432 pp. (Macmillan.) 4*s.* 6*d.*—This book is sure to be widely popular. Taking it for granted that the contents of Roscoe and Lunt's "Inorganic Chemistry for Beginners" are known by the reader, the authors deal with the other non-metallic elements mentioned in the syllabus of the advanced stage of the Science and Art Department, and then proceed to treat of the chemistry of the chief metals and their compounds. These chapters are suitably interspersed with lessons explaining the leading points of chemical theory. A particularly valuable feature of the book is the well-arranged series of 196 experiments, to be performed by the student, all of which satisfactorily illustrate the properties of the substances described in the text. The summaries and questions at the ends of the chapters will prevent the unnecessary work of writing out notes. We know of no better book on the parts of the subject with which the authors are concerned, and can with confidence recommend it for students preparing for the Senior Locals and the Intermediate Science and Preliminary Scientific (M.B.) Examinations of the London University.

Miscellaneous.

Thirty Hymns for Public School Singing. By J. H. Skrine. 60 pp. (Skeffington.) Price 1*s.*—The Warden of Glenalmond, inspired with the very laudable desire to provide hymns appropriate to school life for the members of our more important educational bodies, has here collected thirty written by himself which have been used both in his present charge and at Uppingham. The tunes intended to accompany them are specified in the well-known Church collection of Hymns Ancient and Modern. In most cases the tune will be found much more impressive than these words; but whatever these hymns may *not* be, as poetry, they may be found serviceable in the interests of piety at school. We would respectfully remind the author as an encouragement that the law of the survival of the fittest is much less stringently applied to hymnody than to any other kind of verse-writing.

The Learners' Prayer-Book. 508 pp. (Henry Frowde.) 1*s.* 6*d.*—This is a new way of teaching theology. It is said to be designed "for the use of those who have not been well instructed in the meaning of the Book of Common Prayer." All may be understood (by the initiated) from the use of the little adverb "well." In theology it always seems to mean those who adopt the teacher's point of view. In the present instance a number of "simple notes" are appended to each page; which "simple notes" have the advantage of brevity combined with a precision of theological statement which should settle everything; should make doubt an impossibility, and even render reasonable questions superfluous. Those who like this sort of thing may find this volume serviceable; but it is more than possible that many wiser people will not widely encourage its use. Perhaps it ought in fairness to be stated that the notes are not obtrusively favourable to any one of the Church parties.

Introduction to Rhetoric. By W. B. Curwin. 262 pp. (Ginn & Co., Boston, U.S.A.)—Perhaps no higher commendation could be given or required for a work of this kind than to say of it that it is thoroughly interesting. The study of rhetoric is often at a discount on the score of the apparently arbitrary nature of the rules laid down for its mastery, and these in the majority of instances are truly of an irritating character. Mr. Curwin, on the contrary, tries to show that "much of rhetoric is but a systematic study of such arts as are unconsciously used by the girl who is a good story teller, or the boy who wins his fellows to his way of thinking." This is an apparently simple account of a very difficult subject, but the author is full of conviction, and in his fervour he contrives to interest if not to fascinate his reader. It is quite clear that all the study of rhetoric in the world will never make a novelist, a playwright, nor even a critic, as criticism should be understood, but as a literary exercise in colleges and the upper forms of schools it could hardly hope for better precept and example than is contained in this little book.

The Students' Commercial Book-keeping. Part I., Elementary. By Arthur Fieldhouse. 145 pp., 50 Exercises, 330 Questions. (Bean & Son, Leeds.) 2*s.*—"The fact that it has been found necessary to prepare a fourth and enlarged edition within four years of its publication is sufficient testimony to the value of the book." (We quote from the prospectus.) May we suggest that, in the fifth edition, the second "by" in par. 54 be altered to "to"? The book is well arranged, and the explanations are quite clear. We think more exercises should be given on the making of the more elementary accounts, and the addition of answers would materially increase the value of this otherwise practical work. Teachers in secondary schools will find it useful in preparing boys for the University Locals, &c.

The Child's Song and Game Book. By H. Keatley Moore. vi.+90 pp. (Swan Sonnenschein.) 3*s.* 6*d.* net. — This book is evidently written by one who knows children well. The words are simple yet fanciful, the music pleasing and refined. The games illustrating the songs are capital, and while arousing interest will prove of educational value. We cordially recommend this production.

Book-keeping Exercise Books. (Macmillan.) Set A, 10*d.*; Set B, 1*s.*—Set A consists of Journal and Ledger; Set B of Journal, Ledger and Cash-book. These books are composed of nicely tinted paper, and are put together in a convenient form. The Journal contains 12 pages, each of 29 lines; the Ledger has spaces for 36 accounts, each of 13 lines. Care has been taken to make the books as nearly as possible like those used in business houses.

Hints on Tone and Pronunciation. (For children's singing classes and church choirs.) By A. H. Peppin. 32 pp. (Nisbet & Co.) 1*s.*—The author says in his preface, "This is not meant to be a treatise on singing, but is intended to supply the needs of teachers in elementary schools and of choir-masters who have to make the most of the little time they can get." The directions are clear and concise, and, if followed conscientiously, will prove very useful. We notice the exercises are written in both notations—a distinct recommendation.

A Key to the Use of the Stave Modulator (for both tonic sol-fa and staff teachers). By John Taylor. 36 pp. (G. Philip & Son.) 8*d.*—This little volume will be found very useful in showing the chief points of similarity between the tonic sol-fa and stave modulator. The immense advantages derived from combining the sol-fa and staff notations are now almost universally admitted. As illustrating these, the book deserves success.

The Students' Phonographic Shorthand Exercises. By A. Fieldhouse, F.I.P.S. 140 pp., 142 Exercises. (Jubb & Son, Huddersfield.) 2*s.*—The author claims that, by the use of his book, the student will acquire a practical knowledge of the phonographic art in one-half the time formerly devoted to this subject. Certainly the exercises in the "Manual" and others of Pitman's books stand in need of improvement, and Mr. Fieldhouse has evidently taken great pains in the compilation of those in his work; they contain many excellent features, amongst which very careful graduation is prominent. Another good point is the omission of all words which may afterwards be written in any other way. Several printer's errors exist in the copy sent to us for review, *e.g.*, *begruge* on p. 30. These will, no doubt, be removed in future editions.

PRIZE COMPETITION.

Result of No. 8.

IN the answers which have been received to the Geography Test-paper published in the October number, the work of the girls was superior—infinitely superior in every respect—to that of the boys. There was not a single well-drawn map in any of the boys' answers, consequently Questions 1 and 4 were badly answered. It is a well-known fact that examiners in geography like answers to be illustrated by sketch-maps; no boy thought it worth his while to illustrate the answers to Question 2 in this way. Only 3 competitors (all girls from the same school) drew the section of Europe along the 45th parallel of latitude well; the answers of these three were of exceptional merit. The journey from London to Zurich was, on the whole, well described. The question about earth-products (No. 6) was also answered satisfactorily.

The best set of answers from the boy competitors was that sent by

W. A. Williams,
Wilsford House School,
Devizes.

The best sets of answers from the girls were three from the Bloomfield Road School, and there was little difference in the excellence of these papers. After careful examination, however, that sent in by

Mabel F. Barnes,
Higher Grade Girls' School,
Bloomfield Road,
Plumstead, S.E.,

obtains a few more marks than either of the others, and the prize is awarded to her. We take this opportunity of congratulating the teachers and pupils concerned on the admirable nature of the work submitted from this school.

Competition No. 9.—English Essays.

This month we offer two prizes of books, each of the published value of half-a-guinea, to be chosen from the catalogues of Messrs. Macmillan & Co., Ltd., for the two best essays on any one of the subjects named below, whether from boys or girls. The rules for the competition are as follows:—

(i.) Every essay sent in must be accompanied by a coupon (p. 4).

(ii.) No essay received after Friday, December 15th, 1899, will be examined.

(iii.) The decision of the Editors is final, and will be published in the January, 1900, number.

(iv.) One prize will be awarded to the boy *or* girl under 15 years of age on December 15th, who sends in the best essay: the other prize to the boy *or* girl over 15 years of age on the same date, who sends in the best essay.

(v.) The competitor's age must be stated on every essay, which must also be endorsed by the form master or mistress, certifying it to be the unaided work of the competitor.

(vi.) Replies should be addressed to the Editors, THE SCHOOL WORLD, St. Martin's Street, London, W.C.

(vii.) The essay must not exceed 500 words, and may be written on any one of the following subjects:—

(*a*) The War in the Transvaal.
(*b*) The Abuse of Football.
(*c*) Consideration for Others.
(*d*) The Pleasures of Winter.

OUR CHESS COLUMN.

No 12.

THE following prizes are awarded on the result of the October competition. The prize for schools goes to

The Nonconformist Grammar School,
Bishop's Stortford,

from which fourteen correct solutions were received.

Another is awarded to

J. H. Francis,
Friends' School,
Saffron Walden.

Correct solutions were also received from:—A. D. Punchard, N. P. Wood, N. B. Dick, A. V. Poyser; from L. Shillingford, E. H. Colman, C. Mellows, L. H. Pascall, T. A. Poulter, H. S. Stowell, W. J. Denston, W. Simpson, G. Hawkes, J. C. Todman, F. P. Townsend, H. W. Jones, H. Dickins, H. Smith (all of Bishop's Stortford); from A. F. Roper, D. Hopkins, J. Hess, H. J. Ardley, N. Falconer, L. Stapleton, J. Dickinson, S. E. Hopkins, A. Maude, H. T. Willson, W. J. Wickenden (all of Saffron Walden); and from A. V. Bakes.

In the November competition there are twenty-two possible mates. The result will, I hope, be to hand in time to be printed at the end of this article, as well as the position of the leaders in the monthly competitions. The problem given has, as I expected, been much admired.

I am glad to be able to record the information that my suggestions about combining football and chess fixtures have been adopted (1) by King Edward's High School, Birmingham, and Tettenhall College, (2) by Friends' School, Saffron Walden, and Nonconformist Grammar School, Bishop's Stortford. The last named club has a fairly heavy programme this term—viz.: five correspondence games and about half-a-dozen ordinary matches, besides tournaments in the club itself. Well, school chess-players will never regret the time they give to their favourite game out of school hours. I am quite sure of that. I wish all headmasters would adopt the plan of Mr. Hunter, of York Bluecoats' School, who cuts out this column every month and pins it on the boys' notice-board.

Whilst speaking of teachers, I must express my indebtedness for interest taken in this column to Mr. C. D. Whittaker, headmaster of Taunton School; Mr. Haslam, headmaster of Harrogate New College; Mr. W. J. Wood, of Tettenhall College; Mr. F. O. Lane, of King Edward's High School, Birmingham; Mr. Gower, of Saffron Walden Friends' School, and Mr. L. W. P. Lewis, of Newport Technical School. The secretaries, too, of those schools whose names regularly appear in our columns must not be forgotten. A secretary's lot is not a happy one, I know. Honour to whom honour is due.

As this competition will be the last of the present year, I have decided to give an exercise of a slightly more difficult character than usual. Last month I gave a problem, but added the key-move. This time I propose to omit the key-move. I will content myself with saying that it is not a check. Here is the position:—

White (10 pieces): K on QKt8, Q on KKtsq, R's on KR4 and KB3, Kt's on QB6 and QB3, B on QKt6, P's on QB2, Q2, KB5.

Black (9 pieces): K on QB5, Kt's on QKt4 and QKt6, B's on Q5 and K7, P's on QR5, QKt5, Q4, KB3.

White has to play and mate in two. One prize will be given to the school sending in most correct solutions.

RULES.

I.—Postcards only.
II.—Give name, date, and school address.
III.—Answers must reach
The Chess Editor,
THE SCHOOL WORLD,
St. Martin's Street,
London, W.C.,
on or before December 15th.

Result of November Competition.

The school prize is awarded to
The Bluecoats' School,
York.

Will J. L. Plumbridge and L. H. Pascall, Nonconformist Grammar School, Bishop's Stortford, please play off for the other? They were the only two to give all the solutions. Others were received from:—N. P. Wood (21); A. D. Punchard (17); E. Colman (16); N. B. Dick (16); A. V. Poyser (16); E. Handy (14); J. Dunford (14); B. Shaw (14); W. Brown (14); L. Shillingford (13); H. S. Stowell (4); H. Dickins (4).

Leaders' positions:—N. P. Wood, 9.45; A. D. Punchard, 8.77; N. B. Dick, 8.72; A. V. Poyser, 8.72.

CORRESPONDENCE.

The Editors do not hold themselves responsible for the opinions expressed in letters which appear in these columns. As a rule, a letter criticising any article or review printed in THE SCHOOL WORLD *will be submitted to the contributor before publication, so that the criticism and reply may appear together.*

Suggested Application of Principle of Practice.

IN finding the value of the product of a decimal fraction and a compound quantity, the method of practice combined with reduction (mental or otherwise) has advantages over the methods usually recommended in text-books. To make the application clear, consider the problem:—Fnd the value of 452·625 of £8 12s. 6d.

By practice and reduction in full the solution is as follows:—

	452·625			
	8			
	3621·000	value of 452·625 of	£8	0 0
10/- = £½	226·3125	,, ,,	0	10 0
2/6 = ¼ of 10/-	56·578125	,, ,,	0	2 6
	£3903·890625	,, ,,	£8	12 6
	20			
	s17·8125			
	12			
	d9·75			
	4			
	f3·	£3903 17s. 9¾d.		

The working is much shortened by approximation and mental reduction.

	452·625
	8
	3621·000
10/- = £½	226·3125
2/6 = ¼ of 10/-	56·5781
	3903·890
	£3903 17s. 9¾d.

The method usually employed for dealing with this class of problem would be as below :—

£ s. d.				
	452·625			
	8			
3621 0 0	£3621·000	value of 452·625 of	£8	0 0
271 11 0	s5431·500	,, ,,	0	12 0
	12			
	6·000			
	2715·750	,, ,,	0	0 6
s. d.				
11 6 9 226 9	d2721·750			
	4			
¾	f3·000			
£3903 17 9¾			£8	12 6

J. H. BEECROFT.

County School, Wrexham.

[A distinguished mathematician to whom we have shown the above letter remarks: — "In such problems as this the practical man will probably prefer to decimalise the money at sight and use 4-figure logs. or a slide-rule. The working entirely by decimals seems best when the 'practice' involves more than 2 aliquot parts being used. There is no doubt that a *mixture* of decimals and aliquot parts is often very convenient, and this is the point of Mr. Beecroft's letter."—EDITORS, SCHOOL WORLD.]

Experiments on Boyle's Law and Gravity.

IN the November number of THE SCHOOL WORLD Mr. Hadley describes an apparatus for proving Boyle's Law. I should like to point out that an almost similar apparatus was invented by me some thirteen years ago when Demonstrator of Physics in University College, Liverpool. A description of it appeared in *Nature* for March 8th, 1894. My tube was mounted on a metre rod and fixed on a stand so that it could be rotated in a vertical plane. I may mention that one of the vertical measuring rods, or "Point Cathetometers," made by Max Kohl and other German firms, is a most useful adjunct.

I should also like to point out that the apparatus for determining "g" mentioned on p. 382 of the October number of your paper is due to Professor Whiting, of Harvard (?) University, and was published in his book on "Physical Measurement." I have had it in use for about six or seven years, and find it gives very good results. The introduction of a sliding weight to vary the position of the mass-centre is due to me.

WM. RHEAM.

The Institute, Liverpool,
November 13th.

CALENDAR.

[*Items for the January, 1900, Calendar should be sent in by December 17th.*]

December, 1899.

Friday, 1st.—Return forms for London University Matriculation, January, 1900.
Entrance Scholarship Examination begins at Highgate School.

Monday, 4th.—Return forms for Teachers' Diploma Examination (January, 1900), College of Preceptors.

Tuesday, 5th.—Higher Certificate Examination, National Froebel Union.
Examinations of Cambridge Teachers' Training Syndicate begin.
Junior Forms and Pupils' Examinations of College of Preceptors begin.
Preliminary Examination of Institute of Chartered Accountants begins.
Entrance Scholarship Examination begins at Oundle School.

Wednesday, 6th.—Entrance Scholarship Examination begins at King's School, Canterbury.

Friday, 8th.—Return forms for Diploma Examination, Trinity College of Music, London.

Monday, 11th.—Cambridge Local Examinations begin.

Tuesday, 12th.—London University Examination in Teaching.
Intermediate Examination of Institute of Chartered Accountants begins.
Scholarship Examination, St. Catherine's College, Cambridge.

Saturday, 16th.—Entrance Scholarship Examination, Merchant Taylors' School.
Local Theory Examination, Trinity College of Music, London.

Tuesday, 19th.—Final Examination Institute of Chartered Accountants begins.

Friday, 22nd.—Return forms for London University Preliminary Scientific (M.B.) Examination.

Tuesday, 26th.—Return forms for Preliminary Examination of Pharmaceutical Society.

[Entrance Scholarship Examinations are held at Haileybury College, Leeds Grammar School, Marlborough College, Wellington College, and Wesley College, Sheffield, during December.]

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