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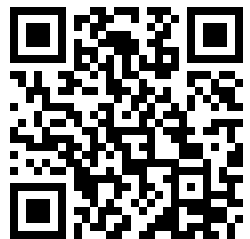
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SIXPENCE.

PSYCHOLOGIST AND TEACHER.

By C. LLOYD MORGAN, F.R.S.
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BEFORE we ask what is the relation of teacher to psychologist, let us enquire what are the aims of the one and of the other. The aim of the psychologist is to study and formulate the laws and conditions of mental development, or, in other words, to interpret and explain the orderly growth of that body of experience which is effective in thought and conduct. The aim of the teacher is to afford to his pupils the conditions most favourable to their mental development, or, in other words, to minister to the orderly growth of that body of experience which is to be effective in thought and conduct.

Now, at first sight, it would seem that, since both psychologist and teacher are dealing with mental development—both with the orderly growth of experience—their relations must be exceedingly close; that the practice of the one must necessarily be founded on the laws which have been formulated by the other. It would even seem, and is sometimes boldly contended, that the teacher is dependent on the psychologist for the principles on which the art of education is based. But, if we desire to approach the subject in the spirit rather of a judge than of an advocate, there are several considerations which tend to show that the dependence of educational procedure on the results of psychological method is not so close and direct as extremists strive to maintain. In the first place, many able and eminently successful teachers, and among them the greatest, have had no psychological training; they have remained, either from lack of opportunity or from want of inclination, wholly outside the sphere of influence of a scientific treatment of mental phenomena. In the second place, there are others, not less successful, who have diligently sought inspiration from psychological text-books, and have sought in vain. In the third place, we have not the data which would warrant the assertion that the man who is among other things a trained psychologist is also and for that reason a more skilful and sympathetic

teacher than he would otherwise have been. It may be so; but from the nature of the case we cannot, from a judicial point of view, say more than this, even if we can confidently affirm so much.

Furthermore, it does not necessarily follow, that because both psychologist and teacher have to deal with mental development and the orderly growth of experience, the analytic procedure of the one is of essential value to the synthetic methods of the other. Nay, rather, observation has not improbably forced upon our notice the fact that the analyst is frequently apt to dwell so exclusively in the plane of his analysis as to lose touch with the broader and more synthetic aspects of the phenomena with which he deals. Not he who can most exhaustively unravel the diverse factors which co-operate in the attainment of some form of skill—say, in playing billiards—is necessarily himself the most skilful player. Nor is the man who is most deeply versed in the science of acoustics a better musician than Handel or Beethoven. The fact that the teacher, as artist, deals with the self-same mental development which the psychologist, as man of science, endeavours to explain cannot be regarded as in itself sufficient ground for the assertion that the procedure of the one must be dependent on the principles elaborated by the other. Indeed, it may be urged that the constructive methods of art are so divergent from the analytical methods of science that it is unreasonable to hope for helpful and fruitful interaction between them.

And yet I am firmly convinced that there may be helpful and fruitful interaction between psychologist and teacher if they will but approach each other in a spirit of mutual sympathy and with a genuine desire to render assistance where their spheres of work inter-penetrate. The teacher who is worth his salt has a keen insight into character, knows well what his pupils can assimilate, appreciates by a subtle sense he can scarcely, if at all, define, the difference, not only in mental capacity, but in mental process, between the boy of seven and the lad of seventeen; he has quite definite and clear notions as to the manner in which, and the conditions under which, valid and serviceable experience is built into the tissue and fibre of

mental muscle and has learnt the relative values of the firm flesh and sinew of hard-won knowledge and the accumulated fat of merely second-hand information. All this is just what the psychologist endeavours to explain; it is an aspect of mental development he has, with all the assistance he can get, to grasp in its entirety prior to his analysis. He has, therefore, much to learn through the sympathetic help of the teacher. On the other hand, all his analysis has for its final end and aim a fuller and more complete understanding of the broader and more general trend of the same mental development. And although the analysis he deems necessary to attain this end may often seem to the teacher too subtle and too detailed for educational purposes, yet the constructive synthesis must, in so far as it is valid and true to nature, be of service to the teacher, just as the results of scientific botany are of value to the practical horticulturist.

If this be so, it is the synthetic rather than the analytic side of the psychologist's work which will most strongly appeal to the teacher. And this is the aspect of psychology in which many text-books are deficient; so that the teacher who turns to them for inspiration is lost in a maze of detail of which he fails to see the purpose and end.

There is some analogy—an analogy sufficiently close to be of use for purposes of illustration—between the relations of teacher and psychologist on the one hand and those of naturalist and morphologist and physiologist on the other hand. The naturalist is a close observer of the life-histories of animals and plants in their free and open-air surroundings. He studies them as wholes and is often impatient of the minuter work of some of his scientific friends in the examination of organs and tissues and microscopic details. But he often has a wonderful insight into the ways of animals and the habit of plants, and the relationships they bear to each other. In his field of work, if the work be good, he is eminently practical and relies on the results of experience. He gets hold, perhaps, of a text-book on zoology or botany, written, maybe, to meet the requirements of a London Degree Syllabus; and he finds little or nothing therein to help him in his work in the field. He is like the teacher who knows by practical experience the relation of boys to each other and to him in the educational field and who turns to the text-book of psychology with hopeful expectation, only to replace it on the shelf with disappointment. But if the naturalist perseveres in his study of the works of zoologists and botanists, he finds that one result of their labours is what is now termed bionomics, which is essentially a return to the broader and more synthetic aspect of the study of animals and plants with the deeper insight begotten of close and patient analysis. And he finds that the meaning of many relationships with which he was already familiar in a general way has been deepened and rendered clearer. He starts, for example, with a good observational knowledge of pond life, and has not much opinion of those who make a minute

study of processes of respiration; he reads and assimilates Professor Miall's delightful work on the "Natural History of Aquatic Insects," he finds that the modifications of respiration have, after all, a distinct bearing on his own study; he is led to observe himself on these lines, and realises that some at least of the more minute work of the zoologist is eminently serviceable to him as naturalist. So, too, I conceive the teacher, as observer of the natural history of mental development, may, if he pursues his study of psychological bionomics, come to realise that it is in very truth a return to the broader and more synthetic aspect of the study of mental development with a deeper insight begotten of close and patient analysis; and that as such it has a real and fruitful bearing on the principles which underlie the practice of his profession.

It will, however, probably be asked how teachers can most readily obtain the kind of training in psychology which will be most helpful to them in their daily work. The question is not easy to answer, partly perhaps because the problem has not yet been adequately solved. Taking first the case of teachers in training and assuming that they attend classes in psychology, the first thing, I take it, is to develop what may be termed the psychological attitude. Every piece of experience, such as that developed in an object lesson properly conducted with due regard to individual observation and manipulation, has its objective and its subjective aspect. We naturally tend to dwell especially on the former aspect—the properties of the things which are being examined—and to pay little heed to the mental processes which are involved in their apprehension. But for both psychologist and teacher these mental processes are of the greatest importance. Discussions on the heuristic method for example, and those on reform in mathematical teaching, involve considerations of the manner in which mental assimilation can be most effectually secured. The scientific investigator as such can afford to take for granted the manner in which experience is gained, inferences are drawn, and a body of related knowledge developed, the results rather than the psychological steps by which they are reached being in the foreground of his attention. But neither psychologist nor teacher can afford to do so. The one tries to explain, the other endeavours to establish the conditions of such development. Now what should be the guiding principle of the relations of the psychological lecturer to teachers in training? That the examples of mental process—what we may term the subject-lessons of psychology—should be drawn from the practice of the class-room. The stages of the genetic process should be so far as possible made clear. Memory, rising from simple re-instatement through recognition and remembrance to systematic recollection; attention, passive and active; the process of assimilation, the developmental steps by which logical inference is reached, the growth of imagination, the successive stadia of active behaviour, instinctive or quasi-instinctive voluntary and volitional and their emotional ac-

companiments, should be treated by means of comparison of the procedure of children and adults. And then the general principles thus reached should be applied to the disciplines of the curriculum. Take, for example, a lesson in grammar or the analysis of sentences. The sentence describes certain relationships in the external world—what are they and how are they apprehended? What are the relationships in thought corresponding to those of the words in the sentence? How have the verbal relationships come to be symbolic of the natural relationships? Are we dealing with percepts or concepts? Are there any inferences involved and of what type are they? Is the sentence descriptive or explanatory? And so forth. Or take some simple physical research (actually demonstrated before the class), say with Atwood's machine. How do we pass from particular observations to general conceptions? How can we symbolise the results in a plotted curve? What does the curve mean, and what connections in thought are involved? How, for example, do space relations in the curve stand for acceleration and so forth in the experiments? What is the meaning of interpolation in the curve, and what is its relation to the process of inference? What is the nature of verification, and how does the coincidence of results, reached by different methods of observation and inference, beget that mental state we term conviction? Or, take a lesson in history. How are the time relationships implied in dates related to those in the experience of our own lives? How far and at what stage does the child get anything like a definite notion of time scale? How far can the teaching of history be made anything better than the imparting of a body of more or less vague information? At what stage of mental development does the historic imagination cause the events to stand out in dramatic form? Or, again, in a series of lessons in astronomical physiography—say the demonstration that, if physical principles obtain throughout the universe, the earth-moon and the earth-sun systems rotate around their common centres of mass—what faculties are we endeavouring to train? What part does imagination play in such studies, and what is the relation of conception to imagination? These are but samples of the kind of discussion in which the psychologist and his class may take part. For much more can be done (when preliminary questions of definition have been settled) by free interchange of opinion than by set lectures and text-book work.

It is more difficult to suggest what course should be adopted by those teachers, already in the practice of their profession, who are desirous of seeking such aid in their daily avocations as can be given by psychology. But where any number are banded together in an association those who are interested in the matter might read some standard text-book and meet from time to time to discuss those portions which are in closest touch with school studies. If they can secure the services of some psychologist of standing who is interested in the kind of applications of the subject

which bear on class-room methods, who is acquainted with the problems which present themselves to teachers, and who has paid special attention to the comparative psychology of children and adults, these discussions are likely to be more fruitful. But above all it should be remembered that the school is a specialised psychological laboratory, and that it is the problems which there present themselves as matters of practical experience which should form the basis of discussion.

TWO VIEWS OF CULTURE.

I.

By JOHN SARGEAUNT, M.A.
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“THE mental equipment of a cultured man” is in part an outcome of his education. It is not the only, not even the chief outcome; but I am not now to speak either of moral and physical qualities or of that which merely fits a man for his particular calling. On what is left it must always be remembered that *πολυμαθῆ νόον οὐ διδάσκει*, knowledge is not wisdom, and that our theme is but the prelude of the strain, *ὄν δεῖ μαθεῖν*. We, moreover, must make two distinctions. We must distinguish what is in itself ideal and immutable from the changing forms in which the ideal is represented by different generations, and we must distinguish in the individual that which is immediately evident, as shewing itself in the form of assimilated knowledge, from that which the vulgar cannot put to so ready a test, the power of thought and the appreciation of beauty, the æsthetic sense. Of unassimilated knowledge there is no need to say anything: it has been condemned once for all in Bentley's epigram on Warburton, “a huge appetite and no digestion.” A third distinction may suggest itself. Goethe, said a fine critic, had his source in a great movement of thought, Byron his in a great movement of feeling. For our present purpose, however, feeling is only so far to be considered as it is dominated by thought.

The two great faculties of the mind are reason and imagination. In training these faculties education has certain instruments, which are, in the first place, nothing more than instruments, even though in individual cases they take their place in the store of learning. Obvious examples are grammar and geometry. The forms of Attic verbs and the *pons asinorum* are taught not because a man must needs have them, but because they are definite, because they train the reason and strengthen the memory, because they do a work which, at present at any rate, is beyond the power of such subjects as history or natural science. Take an example. A boy of eighteen, who has a taste for mathematics and has been trained in them, will cram within a few weeks enough chemistry to deceive the Civil Service examiners. Reverse the process and observe the failure. Of

the type of instrument, as a training in logic, are riders in Euclid, and what are called in schools "unseens." Now all these instruments go to the making of a man of culture, but it does not follow that they remain as a visible part of his equipment. Their matter may be in part or altogether forgotten, but they have, none the less, had their effect. We can do no more than allude to the many other qualities, such as readiness, observation, the capacity for receiving ideas, and the lasting freshness of the mind, which should have their training in schools and are blent with such moral qualities as industry, humility, and enthusiasm.

The loftiest mind of the seventeenth century found the perfectly educated man in him who is fit "to perform justly, skilfully, and magnanimously all the offices both private and public of peace and war." We can no longer even profess to aim at Milton's ideal. Such an aim would defeat itself. Nor is the scope of our argument the whole field of education. We have rather to consider what the man of culture must know.

Much as the modern world has been affected by the Hebrews, still it is true that our culture is based upon the thought and art of the Greeks. It does not follow that a man of culture must needs know their tongue or tongues. No modern can know Greek completely, no modern can wholly bridge the gulf—*novies Styx interfusa coarctet*—which separates us from Greek life. Through translation and other helps he who has no Greek may get a creditable acquaintance with the spirit of this ancient world. Yet he will lose something directly, and much more in that subtle power which the phrase and the word refuse to transfer to an alien speech. Plato in English can be better understood than enjoyed; the mannerisms of Attic tragedy are apt to grow grotesque under transplantation, and no English version can keep the grandeur of Homer or of Thucydides. The greater the author the more impossible is translation. Look at Shakespeare in a French dress. The translator may imitate the cry of Dryden's Cleopatra:

Up, up, my friend, and rouse the serpent's fury.

He is powerless before Shakespeare's

Poor venomous fool,
Be angry and despatch.

Recent discoveries have stirred a new interest in Greek archaeology, but it must not be forgotten that archaeology has little worth except so far as it illustrates thought whether of literature or of art. Scholarship must ever be the mistress, and archaeology her handmaid.

Above all, in their philosophy the Greeks shewed themselves to be the people that has been "most industrious after wisdom." It cannot be denied that some men of great attainments have been incapable of studying metaphysics. To Macaulay much of Plato was a sealed book, and when he found that a translation of Kant conveyed no meaning to his mind he somewhat pettishly threw the blame upon the "Liverpool merchant" who

had Englished the German. The fault was in himself, and despite his great gifts it makes some of his work inadequate, if not futile. Indeed, the study of history cannot be properly divorced from the study of speculative philosophy. History may, it is true, be regarded as a series of events, a record of stirring actions, of wisdom and folly, of heroism and crime, and as such it has its value in early education; but such a view will not carry us far. "All the epoch-forming revolutions of the Christian world," said Coleridge, "the revolutions of religion and with them the civil, social, and domestic habits of the nations concerned, have coincided with the rise and fall of metaphysical systems." We must look to the philosophy of history, to its bearing on morals, to its power to teach us our own nature. Only in this light is it true that history repeats itself, only by so studying the past can we gain a forward glimpse *τῶν μελλόντων ποτε ἀθίς κατὰ τὸ ἀνθρώπειον τοιούτων καὶ παραπλησίον ἔσσεσθαι*, of the working of human nature in the circumstances that are to be. So Hegel well said that the philosophy of history was the supreme end of philosophy.

And what, then, of the disagreements among historians? They differ not only in the truth and the interpretation of this or that fact, not only on the thought and the spirit of this or that age, but on the whole philosophy of human life. Even Hegel's disciples sometimes come to conclusions that might well astonish their master. For instance, one of them discovers a support, nay, the chief support, of freedom and progress in the Society of Jesus. When glasses can be so coloured, we cannot hope that all men will see alike. Yet we need not on that account cry out, with Walpole, "No history, for that I know must be false." But we must bring to the study of history a sense of evidence, of proportion, of the meaning of great movements, of events as a record of the thoughts of man. Above all, we must bring that elevation of mind without which all learning is but a tinkling cymbal.

From the science of history we cannot separate the science of politics or the science of law. History is the politics of the past, and law is the established and recorded witness of the ideals of an age. On a lower plane stands political economy, an exact science, even if it has not in all points attained to its own exactness. Like geometry, it deals with inevitable consequences. You can no more break its laws than you can break the law of gravity. It tells you, for instance, that one course leads to prosperity and its opposite to adversity. It cannot compel you, it is not its business to advise you, to take either. The law of gravity cannot prevent a lunatic from throwing himself off the Monument, but he knows what will happen if he does.

We are not done with the Greeks when we turn to criticism in literature and art, for its ultimate principles must be sought from philosophy. Here, however, we can, if we choose, take an easier course. A sound critical faculty may be obtained from an intelligent study of the best models. Such

a study will naturally begin with the works of our own people, and in literature at least we have no lack of the best models in prose and verse. It will not take long to see that in substance and in manner Drayton's "Agincourt," for instance, or Tennyson's "Revenge," is poetry, and Mr. Kipling's "Islanders" is not; that Burke's "Letter to a Noble Lord" is of another order than Junius's "Letter to the King"; that "Silas Marner" is a masterpiece, and "The Christian" a monstrosity. It will not, however, be easy to deduce from such a study the true principles of criticism, whose business we are so apt to suppose to be the finding of fault. The critic is a judge whose aim is to see things as they are. Criticism is therefore ideal, while what is called realism sees things not as they are but as they seem. And we must remember that the critic is creative in his own field. If we wish to prove Johnson's claim to be a creator, we point not to "Irene," but to the "Life of Dryden."

In the arts of design we may build our judgment on the same lines. The literary expert may not be an expert in them, but he must have some love, some knowledge of them. Horace Walpole took Strawberry Hill for true Gothic, and Cambridge allowed itself to be disfigured by Wilkins. Some still admire Gilbert Scott and decry Wren. Criticism sees that in Wilkins and Scott there is no thought, no claim on our admiration, while it admires both the temple at Pesto and Giotto's Tower, both York Minster and St. Paul's, for there the artist was subject to his art and found his life by laying it down. It is the same with sculpture, with painting. We come to know the beautiful by loving and studying beautiful things. We have still much to learn, but at least the Alps are no longer to us the howling wilderness of hideous precipices which they appeared to the contemporaries of Pope and Fielding.

I am tempted to declare that Latin is almost vital to culture. The Romans were not an imaginative people but they produced in Virgil the most consummate of artists. Their speech was for centuries, and still almost is, the language of learning. More than one masterpiece of our own literature is written in it. The ancient world has been interpreted by it, and much of its vocabulary has passed into our own.

In the study of modern languages culture is not at one with commerce. It is well but not vital to have a complete colloquial acquaintance with some of them, but the man of culture may not have had the time or opportunity to get it. But he may have, even without it, enough Italian, for instance, to delight in Dante, or on a lower plane in Goldoni's comedies and Mazzoni's novel. To say truth, the learning of a spoken language is something of a knack. There are men who speak French and German almost as a native, and yet are scarcely reasoning creatures. Macaulay took a tutor to teach him the phrases necessary to pass his luggage through the Customs and take his rooms at an Italian inn, and having learnt them, poured upon his tutor a deluge of literary Tuscan.

Early training should, and in fact does, include some of the exact sciences. The man of culture must also know something of the principles and methods of the sciences which have arrogated to themselves the title of "natural." He cannot hope to become an adept in any one of them. His best course is to get a knowledge, sound if elementary, of at least one of them. This will help him to an intelligent interest in them all. Thus equipped he will not be likely to talk of a conflict between religion and science. There can be no such conflict. If geology proves that the cosmogony of the Pentateuch is wrong, he will not rave against the geologist, but will examine afresh his own view of the Pentateuch. He will be grateful to the geologist for pointing the way to a better understanding of Hebrew literature. This is the spirit of Dr. Perowne's farewell address to his diocese. This was unhappily not the spirit of Mr. Gladstone, whose mind was on one subject hermetically sealed. We can, we must, concede all the just claims of a Lyell or a Huxley, but we must still assert that there is a world beyond their ken. We owe much to natural science, we wish to acknowledge and increase the debt, but we will not become the slaves of the retort and the test-tube. We shall still look for higher learning to the groves of Academus, to

Thee, Sion, and the flowery brooks beneath.

I return to my starting point that *πολυμαθία νόον οὐ διδάσκει*. I am not concerned to deny the learning even of some of those who imagine that Bacon wrote Hamlet. It is only to be added that he who writes on this theme must be sadly aware how far he falls short of his own ideal.

II.

By FREDERIC KEEBLE, M.A.
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THE fact that culture is more easily recognised than described is a sure indication that it connotes something more than amount of intellectuality and that it is not determined solely by extent or depth of learning. The encyclopædic student may lack, the specialist may have this grace of wisdom which is culture. Culture is not a fruit borne on only one branch of the tree of knowledge, but on all; so long as each branch is in organic connection with the trunk.

The elements of time and place enter into a definition of culture, the significance of the word grows with the years. Of old, the force of circumstances determined that culture was a something acquired only through the "classics."

Men, bursting feudal bonds in material things, still clung, in what appertained to intellectual things, to the knees of authority. Diffident of their own knowledge of art and science, whole races of mankind turned eagerly to the brilliant past, seeking guidance in the genius of Greece and Rome. Knowledge was a sort of Græco-Roman revelation: Greek and Latin were the "open-sesames" to culture. Centuries have lived on this intellectual

plunder. Universities became the strong-rooms of the booty. The brightest intellects were appointed to guard and appraise it; lesser, to tell the children of its glories. In short, culture passed into the possession of a cult of literary mandarins, and education was fast becoming in England what it had become long since and has remained till now in China.

But freedom has come. Men have learned to dare to ask authority for its credentials. Bacon, Harvey, Descartes, Shakespeare, Goethe, Newton, Kant, Darwin, Pasteur, have added new provinces to the world of learning, and, in doing so, have shown that the Græco-Roman world is no world, but a province. New grandeurs take place beside the old, not in rivalry but in re-inforcement. Thus the content of the word "culture" has been enlarged.

There are still men who stand where their ancestors of 300 years ago stood, and who still guard the plunder. Let none speak evil of these "persistent types." It were as ill to speak evil of *Lingula* or *Equisetum*. Nor need anger be expended on them when they claim to be the sole repositories of culture. The tragic side lies not in the claims of these ancestral forms to have reached perfection, but that they should hold almost exclusive power in higher education.

Yet even here is cause also for thankfulness if we but regard the "classical" people who rule in public schools and universities as regents and not as hereditary monarchs. For they give time for the new learning to devise new methods. The old classical methods are of necessity inadequate; suited for the perfection of imitativeness. The new learning started with the old methods and fortunately and inevitably was overtaken by disaster. The new wine was put in the old bottles. By their present regency, the pure "classics" give the moderns time to learn new methods and to prepare themselves for a place in the oligarchy of learning. Culture includes, then, the old and the new.

Again, in continuation of the statement of what culture is not, it is necessary at the present time to state the truism that "culture" is in no way directly determined by usefulness or uselessness of knowledge. In truth, the whole discussion of utility is a quarrel about words, and depends for its yea or nay answer on the meaning attached to the word "usefulness." It is true we are a planet of shopkeepers, but it is also true that we still sometimes close our shutters as a sign that we live.

Education is a training; but not, as our legislators used to think—not unnaturally if we consider the nature of their interests—a training of winners of the big money-stakes. Nor should the training be of such a nature that these may not be won. The training should be such as enables men to enjoy the race. Culture is the mark of training. It betokens a mind well grown.

Therefore it is only by investigating the training process that a definite idea of the meaning of "culture" may be gained. When this is done it will

be possible to adjudge the value of this or that department of learning as a culture medium.

To train the average mind, there must be provided, in the first place, an ample, but not overwhelming, raw material of facts. These must be of various natures; primarily, of observation; secondarily, of authority. The former are verifiable by the senses, the latter only more vaguely verifiable when criticism is awakened. The first supply of this raw material must come direct from nature, for the sense of realness of knowledge must not be smothered. Book facts must be provided, but most sparingly, especially at first. For books must come to be the servants and not the masters of the subjects of training. To learn to think, the student must know what people have thought: he must also learn to appeal through observation, and later through experiment to nature. Not only to nature beautiful and smiling, but also to nature hard and inexorable.

In the second place, to proceed along with the first though commencing later, the training must include fact-sifting and fact-packing. The mind must be loaded in an orderly manner. The mind's eye must learn its perspective. For this, a *continuous* apprenticeship to the past is fatal. The processes of nature must be shown. Continuity of life and relation of facts must be experienced. The relationship of past and present will thus come to stand out with clearness, and it will be impossible for the training to produce a wholly "past" man or a solely "present" man. Sympathy, the bond which unites individuals into aggregates, and links past and present, will be developed. Another name for this arrangement and appraisal of facts is "scientific method;" though unfortunately it is not realised sufficiently that scientific method is the one and only method of learning, and that its common-sense principles are as true when applied to literature as to biology. The scientific method stands for order and more than order: it stands for the fertile union of imagination and reason, the offspring of which is originality.

From an early period, manual training must help the mental training, for eye and hand are the chief adjutants of the mind. There is a genius of the finger tips something of which all should acquire.

In these practices the student has incidentally reached his goal. He has acquired, by the habit of seeking and handling, sifting and placing knowledge, that degree of mental dexterity of which his brain is capable. He has exercised his fancy, balancing it against his reason; so that, waking at least, he is the master of both. He has gained the priceless result of training, resolution: that intellectual courage without which no brain will go far. The facts which, when assimilated and exhibited, are called knowledge may be likened to the muscles. The proper ordering of this knowledge, the due and purposeful co-ordination of the muscles; this is wisdom. The ease and grace of the movement which makes endurance possible and activity beautiful; this is culture.

Assuming that the foregoing contains a true statement of the essentials of the training process, it remains to ask what subjects offer the best material for this training? Several admit of no doubt. Such are Drawing and Mathematics, Modern Languages, including History and Literature, and Natural Science. Drawing—æsthetic shorthand—is essential, as essential as writing, as an introduction to both art and science. It trains the hand and eye as nothing else does. It enlarges and illuminates the field of vision. In drawing, not only hidden beauty but hidden things are revealed. Drawing is a tool not only of service to the æsthetic sense but also to the brain as a whole.

Mathematics is essential, not only because of its every-day utility, but also because without it *certainty* and *generality*, two abstracts of the highest importance, cannot be grasped, nor the nature of their limitations discovered. Modern Languages and Literatures are essential. They are the only asylums from provincialism. In them the past is summarised and the present indicated. In many departments of thought, at the present moment, England's imports exceed her exports. Only by knowing the languages, may English amateurism be enlightened by a sympathetic understanding of French precision and German patience. Natural Science is essential. By its light alone may we peer into the illimitable unknown, not aghast but with hope. By it alone may knowledge live. It gives to beauty a wider realm and to truth a more awful meaning. The best constructive thought of modern times is to be found in the work of Natural Science. To take one instance only. The work of Pasteur is epoch-making not only in medicine but in the history of mental progress. To be ignorant of the thought-story of Pasteur is to be ignorant of one of the most stupendous mental efforts ever achieved. Admitting that these subjects have substantiated their respective claims to a part in training, it must be asked whether, if training is confined to these subjects, the highest form of culture may be produced? or, to put the matter more directly, is a training in the classics also an essential?

The answer given to this question must depend on that given to another, namely: how far is the spirit, the genius, of Greece and Rome revealed in modern literature and modern philosophy? If, despite the centuries of opportunity for its representation, it is still necessary to go to the original sources, then Greek and Latin are still as essential to culture as they were in the eighteenth century.

The writer thinks that the ancient spirit may be appreciated by those ignorant of the ancient languages. Indeed, he would go further, hazarding the paradox that many of its aspects can be better appreciated by a student of Natural Science ignorant of Greek than by a student of Greek ignorant of Natural Science.

But it is not enough to appreciate the general worth of ancient thought. The trained man must have acquired that sense of style which the "classic" has so exquisitely. Natural Science will not beget

this. It will give business-like orderliness to the expression of ideas; it cannot impart the charm which should invest them. This is one of the special tasks of Literature. Side by side with the other subjects, the literatures of at least two countries must not so much be studied as devoured. The modern literatures are competent to beget a sense and power of style.

Thus the conclusion is reached that the subjects mentioned are sufficient for thorough training and may produce the finest form of culture and that, for this, the study of Greek and Latin is no longer essential. Nevertheless, he would be a rarely foolish man who would advocate the utter banishment of Greek and Latin from all training. For he would be overlooking the diversity which exists in the mental apparatuses of man. For the many, that harmonious development of the faculties which results in culture is best arrived at by training in the subjects already mentioned; but, for others, Nature is mute, the literatures of England, France and Germany are pale in glory beside those of Greece and Rome. Gothic appeals to some, classical architecture to others. Wagner has still some worlds to conquer which at present own other sway.

We would not pass from one narrowness to another. For those whose bent is towards literature, training in Natural Science may be subordinated, though in no manner of circumstance omitted. These brighter minds must assume a heavier burden. Their training must be more catholic. In this training the Classics must play a part and that part may well be a large one. For the general, on the other hand, Classics must as the world advances be ever of smaller value as a mode of training. Modern languages have established their, in some respects, superior claims. Modern literatures have their glories, in some respects more glorious than those of the ancient literatures. But whether it is mainly modern or mainly ancient literature which is chosen as one mode of training, neither the one nor the other can lead unaided to the goal of culture. Nor, on the other hand, can Natural Science replace the languages. The mountains terminate in fine peaks, but they rise from broad foundations.

THAT man, I think, has had a liberal education who has been so trained in youth that his body is the ready servant of his will, and does with ease and pleasure all the work that, as a mechanism, it is capable of; whose intellect is a clear, cold, logic engine, with all its parts of equal strength, and in smooth working order; ready, like a steam engine, to be turned to any kind of work, and spin the gossamers as well as forge the anchors of the mind; whose mind is stored with a knowledge of the great and fundamental truths of Nature and of the laws of her operations: one who, no stunted ascetic, is full of life and fire, but whose passions are trained to come to heel by a vigorous will, the servant of a tender conscience; who has learned to love all beauty, whether of Nature or of art, to hate all vileness, and to respect others as himself.—Huxley.

NATURAL SCIENCE IN GIRLS' SCHOOLS.

By SARA A. BURSTALL, B.A.

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THE value of practical, scientific training, and of some knowledge of natural science as part of a liberal education has not been always recognised. In many girls' secondary schools, and in the minds of many parents, classics, modern languages, mathematics and English subjects have received their meed of attention, but it is often tacitly assumed that girls have no business with physics or natural history, unless they are going to specialise in science or take up medicine. There are several reasons for this. Laboratory work and the teaching required for it are expensive, owing to the equipment and the necessarily small number of pupils one teacher can safely manage. Boys must learn physical science at school as a preparation for professional and industrial life; and so parents demand it for them but not for the girls. Indeed, it is not unusual to find even enlightened parents requesting that their daughters be allowed to give up physics and botany, "as it will never be any use to them."

This is, perhaps, the reason why, speaking generally, private boarding-schools for girls have so little science study in their curriculum. There are also two more personal and less obvious causes: first, that girls often dislike practical work, and prefer subjects that can be learnt out of books—a fact due, it may be, to their more receptive and less original intellectual character as compared with their brothers; and, second, that the authorities of the schools sometimes distrust the effect of scientific studies, positive and rationalistic as these are, on the minds and hearts of young women. There is, doubtless, a real difficulty and danger behind this latter objection: a curriculum exclusively and narrowly scientific may starve and atrophy some of the most important elements of a woman's nature. But this is true in other directions of other subjects also, and is also true for boys, on intellectual grounds alone. It is now being recognised that the "schools of science" have not been altogether advantageous in their effect on knowledge and capacity, owing to the disproportionate amount of time given to one type of studies; specialisation, above all premature specialisation, is bad for most young people in any subject. On the other hand, there are at least two strong arguments for making some amount of natural science compulsory in a girls' education, apart from the general reasons as stated in Herbert Spencer's well-known essay, which are, of course, as true for one sex as for the other. If girls do often dislike practical experimental study, as compared with formal book-knowledge, it is all the more desirable that they should be obliged to get the training laboratory work gives—a peculiar and unique training, such as can be imparted in no other way.

The value of scientific method, of verification and accuracy in observation, is in itself a corrective to the schoolgirl's fatal facility in learning up facts from a text-book, or mechanically reflecting the phrases and ideas of the teacher. It is found, however, that a certain number of girls have a real passion for science, are devoted to it, and often do very well later in college. Further, there is a special value in some knowledge of physics as a preparation for woman's special work in the home; it is a very short-sighted and incomplete view which would consider general elementary science as useless in her education. All the various branches of domestic economy depend on the laws of physics, mechanics and chemistry, from the frying of fish and the washing of flannels to sanitation and the care of children. A girl who has had a simple three-years' course of practical physics, even if only two lessons a week, has learnt how things go in nature, can observe and draw deductions from her observation, can deal with emergencies, scheme and contrive ways round a practical difficulty, has acquired by practical experience some measure of accuracy and resource—no mean possession for the mistress of a household. To some such course of elementary physics may well be added simple outlines of botany and natural history, again largely experimental, and devoid as far as possible of technicalities and elaborate terminology, whether in classification or elsewhere. This can be begun earlier than the physics, as there is less mathematical work in it, and as the experiments do not involve the use of gas jets, balances, mercury and heavy apparatus, all of which mean difficulties for younger pupils. In the junior classes, from the kindergarten upwards, nature-study, in the form of object-lessons, is generally recognised in all grades of schools. It may well become, as it is in many American schools, the central study, round which all the language work, reading, writing, recitation, &c., is grouped. In the American educational exhibit at the Paris Exposition this method was clearly shown, and the best normal-college courses in the States contain for primary teachers a carefully-planned biological syllabus, often arranged according to the seasons, closely connected with common objects, and serving as the foundation of all their ordinary teaching. It will be noticed, too, in English schools how much better is the composition work done on nature subjects by younger children than is that on the literary side. Germination of a seed, which they have seen and watched for themselves, is a far more real and interesting matter to them than the life of an historical character, just as animals are more interesting to the very young child than human beings are. This simple nature-study passes almost insensibly into botany and zoology, which may be pursued in the second and third forms (ages eleven to thirteen inclusive), provided the teaching is practical. This means observation of the living things, both animal and plants; easy biological experiments on the latter, such as can be carried on in a greenhouse or window garden, if not in the open ground; drawing from museum

specimens; elementary classification; and some knowledge of the habits and life history of more important types. (See subjoined syllabus.) In the fourth forms the work may be continued on the concentric system, and at fifteen or sixteen, when girls begin to specialise, they will be ready for formal technical study.

Victoria University has lately introduced the subject of natural history (taking animals and plants together) as an optional group in the Preliminary examination, developed somewhat on these lines; and in so doing has given a marked impulse to sound methods in the schools. For girls especially, the kind of biological teaching favoured by the followers of Huxley, including as it did actual dissection, had become sometimes a real stumbling-block in the way of those teachers who wished to encourage the life sciences. The newer scheme, with which the names of Prof. Miall and Prof. Hickson are associated, is an attempt to find a better way, *i.e.*, one more fitted for average school conditions, but equally sound and scholarly.

The other group of natural sciences, physics and chemistry, has been studied from the pedagogic point of view by Dr. Armstrong, whose heuristic method and syllabus of general elementary science are already well known. Measurement, which is its basis, may be begun in the junior school, in connection with concrete arithmetic and handwork, plans of the playground, &c. Some teachers find it advantageous, however, in practice, to depart from the strict heuristic method, and give demonstration lessons in the form in which physics is begun, an Upper II. or Middle III. (thirteen years of age). In the Manchester High School we have a compulsory three-years' course in simple physics, for the Upper III., Fourth, and Upper IV. forms, of two lessons a week, one being demonstration and one laboratory practice; some very elementary chemistry is introduced in the third year. An attempt is being now made to correlate the physics work with the arithmetic and geometry teaching. Whenever possible the connection of household science is emphasised, and experiments with milk, tea, the making of soap, heating of oil, and similar illustrations from daily life are employed. The form which specialises on housewifery (sixteen and seventeen years of age) has a complete course of domestic science and hygiene, closely related to the cookery, &c., done in the technical part of their time-table. One valuable and interesting result of this compulsory physics course is that girls who have a real taste for science are discovered in time to develop their faculty, and such girls sometimes have no inclinations or ability in other directions. The case of Martin, in "Tom Brown," has its parallels in girls' schools, and if a girl does care for science she cares for it ardently and often excels. The women's movement is not very old, but already there are cases of women doing research work, and if there were adequate fellowships and other opportunities for them they would do more.

Chemistry for girls should not be compulsory, but should be taken up late in a school course

by those who are specialising; this is the view held by several college authorities, who find the work done in earlier years at school often inadequate and superficial, because the pupils are not developed enough mentally to understand what they are doing, and in consequence work mechanically. This error obtains with boys rather than with girls, but it is noticed sometimes with girls who have learnt chemistry in a higher-grade school at too early a stage.

The insertion of natural history and general elementary science into the curriculum, justifiable on the ground of their value alike as training and knowledge, means that the older physical geography and hygiene lessons cannot be given all through the school, as they were in the original high schools a generation ago; there is not room for both kinds of science study if the claims of mathematics and the humanities be considered. Scientific men on the whole discourage the school study of these subjects, as they opine, very justly, that scientifically these depend on physics and chemistry, and should be taught only to students who have some discipline in these basic sciences. But both are valuable as knowledge, and hygiene is obviously most important for girls. The present writer is not prepared with any solution of the problem in this case, except for girls who remain to finish a school course; these can be taught what is necessary in a short course of lessons on laws of health, treated as an information subject, and learnt up like Latin inflections or the provisions of a charter. Physical geography lends itself to demonstration courses, given, say, for a year in the thirds, and then again in the Upper V. Elementary geology can, of course, be taken with those who specialise in science, just as the mathematical girls in the upper part of the school can do astronomy.

Speaking generally, it will be found possible for those who believe in science to give about a third of the school time to it, including, of course, mathematics; with young children constructive handwork, object lessons and elementary arithmetic, will take such a proportion of time; later, three nature-study and five arithmetic periods a week may well be given. When physics is introduced, five to seven periods may be given to this and the correlated mathematical studies, and two to botany or natural history. At fifteen or sixteen years of age, the girl who is to specialise in science must keep up her mathematics, English literature and history, and at least one language, while she should acquire or possess a reading knowledge both of French and German. She may learn three sciences, and at seventeen or eighteen four (physics, chemistry, botany and zoology), though in this case she will have but the minimum of other studies. Some girls who incline to language, history, or mathematics as their special work often wish to keep up one science, and this should be encouraged for the sake of the general broadening of their intelligence. Botany arouses the enthusiasm of some, chemistry of others, while the would-be wrangler should be always obliged

to keep up her physics, an auxiliary subject in applied mathematics.

In conclusion, it may be observed that the suggestions and plans described above are the result of experience and experiment, and that the views put forward, it may be somewhat dogmatically, as to the value of science training and knowledge for girls, are not those of a science specialist, but of one whose personal interests are humanistic and literary. Even on the transcendental side, physical science, like abstract mathematics, has its element of imagination, poetry, beauty and reverence. To know, like the wisest of kings, all the trees "from the cedar that is in Lebanon even unto the hyssop that springeth out of the wall," to discern with the Roman philosopher "the courses of the stars in heaven and the tumid surging of the seas," to catch some whisper of the mighty harmonies force and matter weave and interweave through the universe of phenomena, is not without a message to the soul within us, nay, is to some more eloquent of all that is truest and best in the life of reason, than even the glories of literature, or the vocal and storied record of cities and empires and the deeds of man.

ABBREVIATED SYLLABUS OF SCIENCE WORK IN CERTAIN SUBJECTS TAKEN IN THE MANCHESTER HIGH SCHOOL FOR GIRLS, 1900-1901.

Botany and Natural History.

Junior School.—Here science was correlated with geography.

Form III.—The plant as a whole. Germination. Some common fruits. How seeds are dispersed. Description of some flower.

Distinction between plants and animals. Outside characteristics and habits of mammals, birds, reptiles, fishes. Ex.: rabbit, mole, weasel, cat, duck, pigeon, seagull, owl, parrot, lizard, crocodile, snake, plaice, cod, herring.

Form IV.—The same as the III's., with more attention to detail. Description of most flowers. More examples of animals.

For Girls Specialising in Science.

Form V.—*Botany.*—Types of cryptogams, cells and cell structure done microscopically. About twelve Natural Orders.

Natural History.—Same as Class IV. Also some invertebrates.

Form VI.—*Botany.*—Physiology of plant life as practically as possible. Cryptogams in detail. The chief British Natural Orders.

Physics and Chemistry.

Junior School.—Very elementary demonstration lessons on air and its properties. Measurement of length. Area. Volume. Planning. Curved lines. Relation of diameter to circumference of a circle. Area of circle and cylinders.

Form III., Upper.—Same as Junior school. Also use of balance. Weighings. Comparison of weight and volume. Use of pipettes.

Form IV.—Weight of known volume of water at different temperatures. Relative densities of liquids by sp. gr. bottles. U-tubes. Hydrometers. Relative density of solids, heavier and lighter than water. Lessons on common substances such as salt, chalk. Chemical methods as decantation, filtration, crystallisation. Solution and solubility. All done practically and as simply as possible.

Form IV., Upper.—Heat. Experiments on expansion of solids, liquids and gases. Thermometers; kinds; how to make and test them. Freezing points and melting points. Specific heat of water and other things determined and compared. Latent heat of water and steam. Transmission of heat—radiation, conduction, convection.

For Girls Specialising in Science.

Form V.—Physics.—General properties of matter. Heat and its effects. Specific heat and latent heat. Light—reflection from plane surfaces, refraction, shadows, prisms and decomposition of white light.

Form V.—Chemistry.—Study of air and water and their constituents. The chief non-metals. Simple theory.

Form VI.—Metals in general. Alloys, &c. The chief metals in detail. Equivalents determined. All done practically.

RECENT DEVELOPMENTS IN MATHEMATICAL EXAMINATIONS.

By C. ALMERIC RUMSEY, M.A.
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THERE is an old complaint that governments are slow in their movements: that reforms necessary to the well-being of communities are not infrequently initiated by unofficial action from below before the powerful machinery which alone can make them effective is set in motion by the force of public opinion.

At first sight it would appear, from an inspection of certain data, that in the process of the reformation through which mathematical examinations have passed during the last two decades a remarkable series of exceptions to the usual course of events has been exhibited, in that time after time changes of the most radical character have been made under the direct auspices of state departments, while other bodies have lain dormant in the grip of conservatism. It might perhaps be inferred that high authorities have recently become imbued with a loftier view of their responsibilities than heretofore, and that an application of the same zealous spirit of correction to other matters was about to usher in the millennium.

But this inference is not altogether legitimate; for in its application to the present instance the word "government" must be held to denote not the powers that dominate the British Empire, but those which wield the paramount control over things mathematical. It would, therefore, be well, before deducing from these special considerations any general theorem as to an improved morality in rulers, to make an investigation into the conduct, not of the state departments whose attention has been accidentally called to the matter, but of the universities. Such an inspection, though it reveals much backwardness in the past, yet yields some hope for the future. Committees are now actively at work, and new regulations have been published for Responsions, and for the Oxford and

Cambridge Locals, which are perhaps the most important elementary examinations which these universities conduct. But the improvements which have just been made here are in the Woolwich and Sandhurst papers already a matter of history; and some of the papers on elementary subjects which are set to undergraduates are still in need of radical reform. But though, ideally no doubt, everything should be conducted on the best possible lines, the universities are perhaps not greatly to blame for the lack of reforming spirit which has hitherto existed in their dealings with the examinations for poll degrees and Little Go. The dons know very well that these examinations, however well appointed, will never be taken seriously by the candidates. We must, however, hope to see them brought, in the near future, into line with others of the same order of difficulty; if this is not done, a very awkward situation will be created in some of our largest public schools.

The changes which have recently taken place may, in regard to the causes which have produced them, be classified under two main heads. The first, those which are ordained by regulations, issued at the instance of controlling councils, are by far the most important. They are the result alike of careful consideration of a responsible and constituted body, and of an explicit statement which it is not easy to revoke: they alone can cause radical alteration in the teaching of subjects, and form a determining factor in educational progress. But if of materials furnished by the past a basis for conjecture as to the future is to be formed, it is frequently necessary to look behind these indications of syllabi, and to draw conclusions from the changes made by individual examiners. It is often found that a certain paper progresses in difficulty from year to year, or in some other way alters its character, and though no new regulations may have been published, the circumstances suggest that this will be the case in the near future. The geometry papers in the military Entrance examination form an interesting case in point. These, during the late 'nineties, passed through a period of evident unrest. The examiners were, to judge from the questions which they set, dissatisfied with the syllabus, and did their best, without overstepping its limits, to adapt it to meet the modern improvements in educational method. There was a frequent admixture of drawing and mensuration questions with those in formal geometry; and finally, in 1901, a regulation dispensing with Euclid's order of propositions was issued by the board. This supersession of the old text book in order to make way for more modern methods is a change in comparison with which all others sink into insignificance. The pioneers in the movement were not the military authorities, but the heads of the Science and Art Department, who many years ago decided not to make a knowledge of Euclid's Elements a *sine qua non* for securing a pass in geometry.

This example has now been followed in the naval Entrance examinations, London Matriculation, lower Civil Service, Oxford Responsions,

and many others. The Oxford Local regulations for 1903 contain the following important notice:

Questions will be set so as to bring out as far as possible a knowledge of the principles of geometry, a smaller proportion than heretofore consisting of propositions as enunciated in Euclid. Any solution which shows an accurate method of geometrical reasoning will be accepted. Geometrical proofs of theorems in Book II. will not be insisted upon.

The new syllabus issued on behalf of the "Cambridge Locals" gives a very complete account of the type of questions that will be set in 1903, the whole being entirely on British Association lines. Specimen papers in geometry (Preliminary and Junior) are to be published with the book of papers for December, 1902. In the meantime, we are told that Euclid's order of propositions is to be dispensed with, the papers are to consist of two parts, one a practical section, for which compasses, protractor, set squares, and an inch and centimetre ruler will be required, the other theoretical, in which proofs of propositions will be demanded. Hypothetical constructions are admitted,—*ad lib.* apparently,—there being no statement to the contrary. This is an omission which cannot but lead to difficulties, but such must undoubtedly occur—and in many forms—during a period of transition. There are some, however, which can be avoided by forethought, and it would be well if the example set by the Science and Art Department were followed in a certain particular, with a view to preventing imposture: at the head of its geometry papers occurred the following notice to candidates:

Unless you expressly state the contrary, it will be assumed that you have read GEOMETRY in Euclid, and you will be expected to follow Euclid's sequence, otherwise you must state what text-books you have used in geometry.

It is scarcely possible to find words which will sufficiently animadvert against the folly of those examining bodies which have made the announcement that they will not insist on Euclid's sequence, without accompanying it by this precautionary clause. One or two instances illustrate the class of difficulty that must inevitably arise if this procedure is not adopted: Euclid I. 18 is set: a demonstration similar to that of I. 19, *mutatis mutandis*, is sent up, the result of I. 19 being assumed; or III. 26 is proved by means of III. 27. Now, how is the examiner to know that the candidate has not been taught on a system in which I. 19 and III. 27 are proved independently of their converses, the latter being subsequently deduced from them? He has no choice but to give full marks, though in all probability both answers are what schoolboys expressively call a "fudge." A similar predicament is liable to occur in the case of any two consecutive converse propositions the second of which is deduced from the first. There is, as a rule, no intentional dishonesty on the part of the candidate; he has simply forgotten. Such instances are of frequent occurrence. Less frequently, but sufficiently often to make the case worthy of consideration, are first-book propositions

made to depend upon the theory of proportionals—and all these proofs might conceivably be placed on a logical basis.

Again, the examiner will frequently find himself on the horns of more subtle and philosophical dilemmas than the above. Consider, for instance, the following typical question and a possible answer:

Give reasons to show that similar polygons are proportional to the squares of corresponding sides.

Let ABCDE, *abcde*, be two similar polygons.

Describe squares on AB and *ab*.

Then the whole figures thus drawn are similar, and hence corresponding parts of them are proportional: therefore the polygons are as the squares on AB and *ab*.

Now this argument has probably no philosophical basis in the mind of the candidate. Yet it is absolutely convincing to anyone who has a sense of proportion, not only as a proof of VI. 20, but as a substitute for both VI. 19 and VI. 20. It is, therefore, worth some, if not full, marks. Moreover, it is conceivable that in the text-books used by the candidate the following sequence of propositions occurred: (1) Similar triangles are proportional to the squares of corresponding sides. (2) If similar rectilinear figures be divided by the joins of corresponding points, their corresponding parts are in proportion. (3) Similar polygons are proportional to the squares on corresponding sides.

This is a reasonable arrangement; it differs from Euclid's only by the substitution of ratio of squares for duplicate ratio, and the division of VI. 20 (with the first part slightly altered in form) into two propositions. On this supposition the answer deserves full marks.

It would be easy to multiply instances to show that the present generation of English mathematicians have by no means discharged their duty to posterity by abolishing the use of Euclid. A new set of definitions and axioms, and a new order of propositions, must be established, backed by sufficient authority to ensure recognition throughout the country. When it is remembered that the whole science of geometry is based upon experience, that to some minds the existence of a plane, as defined by Euclid, is a matter of doubt, while to others the above inclusive proof of VI., 19 and 20, would appear perfectly rigid, the folly of leaving each teacher to propound his own axioms must become too palpable to be tolerated. A scheme of propositions for a revised text-book on geometry has been included in the pamphlet on "The Teaching of Elementary Mathematics" by the committee of the Mathematical Association. This committee was composed of masters from nearly all the great public schools, and representatives from other prominent educational bodies. The recommendations consist mainly of omissions of useless propositions and of alterations in the order of others; but Euclid's "logical order" has been retained: *i.e.*, no change has been made which would render any of his proofs invalid. Also certain hypothetical constructions are recommended, such,

for instance, as the bisection of a line or angle, where the possibility is obvious.

The changes which have taken place in ALGEBRA papers are far less noteworthy than those in geometry; in fact, the only innovations which are of great importance are really geometrical in character, and arise from the feeling that the two subjects ought to be interwoven with each other at a much earlier stage than has been usual heretofore. The feeling originally vented itself in the creation of "mensuration," which has formed a section in a large number of examinations; but questions which were at first classified under this head are now frequently set in the Euclid and algebra papers at most Government examinations and in many others. The plotting of curves for statistical purposes or for the solution of equations forms a prominent feature in training colleges, and has recently found a place in the naval and military Entrance papers. There are minor alterations which, though not so easy to place upon formal record as the above, indicate a trend of opinion among examiners, and should, therefore, be not altogether overlooked. Questions involving long analysis are less in evidence than formerly, a larger proportion being of the kind that require an understanding of principles. It is, of course, not to be expected that young boys will be able to discuss the ultimate bases of the laws of algebra. But verifications by substitutions in formulæ and illustrations are frequently a means of bringing home to the learner the issues involved, and, if not formal proofs, supply at any rate strong circumstantial evidence. In this connection that hitherto unprofitable servant, the second book of Euclid, is much in evidence. An Army Cadet paper for July, 1902, contains the question: "Draw figures to show that (1) $(a \pm b)^2 = a^2 \pm 2ab + b^2$, (2) $a^2 - b^2 = (a + b)(a - b)$." The Cambridge Local examination for December, 1903, will demand "illustration or explanation by means of rectangular figures of the identity": $k(a + b + c \dots) = ka + kb + kc \dots$ in addition to those just mentioned.

There is naturally little to record on the side of ARITHMETIC. In the Naval, Military, and Lower Civil Service examinations it has become customary to set two papers, one designed to test accuracy, the other containing questions of mathematical difficulty to test resource. A prominent feature is the requirement of approximate calculations by which answers can be obtained to a given degree of accuracy, recurring decimals having been placed in the background as of less practical importance.

In the region of higher mathematics, such as the Cambridge Tripos, there is continual progress, as might naturally be expected, since it is in this quarter that the attention of prominent mathematicians most naturally concentrates itself. But there has been an extraordinary conservatism shown in the matter of Entrance Scholarship examinations at all colleges. Excepting for the addition of differential calculus, no change in syllabus has been made since time immemorial, although there is abundant evidence, both internal,

furnished by the papers themselves, and external, furnishable by teachers outside the universities, that such is eminently needed.

The internal evidence consists in the ever increasing difficulty of these papers: modern improvements in teaching have rendered it impossible to separate the candidates who present themselves by means of questions demanding only a working knowledge of the subjects below the integral calculus; and examiners have in self-defence had recourse to many of their less important ramifications. This will always supply a solution of the difficulty, but one which is by no means satisfactory. Any tolerable mathematician can, by piling up successive wedges, create with a stroke of the pen a dynamical system the accelerations of whose parts no boy—or man—could discover within the space of three hours, or with Hobson's "Trigonometry" in front of him devise a dozen questions which might serve to differentiate a candidature composed of Senior Wranglers: but the question whether a schoolboy's time is well employed in attacking problems of this character is now being discussed on all hands: nor is there much doubt but that the discussion will shortly bear fruit.

As to the external evidence, it is well known that many of the competitors, especially those who come from university colleges, have actually read subjects above the differential calculus. Moreover, a strong feeling is growing up that a school course should be such as to give a wide grasp of mathematical principles rather than great skill in solving fanciful problems of a highly specialised character. An able boy would have no difficulty in acquiring by the age of 19 a working knowledge of integral calculus, particle and rigid dynamics, and three-dimensional analysis, in addition to the subjects now required of him. Such a course of work would lend an intensified interest to school mathematics, and obviate the tendency to "staleness," which cannot but be engendered by the continual plodding over the same ground which is necessary to success under the present system. Moreover, it would form a preliminary not only to the Mathematical but also to the Science Tripos. If men are to become first-class physicists they must acquire some knowledge of mathematics; and this should mainly be done at school in conjunction with elementary practical work, the higher experiments being in most cases postponed: because, though most schools are able to supply good mathematical masters, few have at their disposal sufficient funds to furnish laboratories suited to advanced work.

A word as to the supersession of Euclid's Elements. This movement, which is a natural consequence of the evolution of geometrical thought, must not be confused with another, the reasons for which are purely didactic, namely, the separation for teaching purposes of the subject into practical and theoretical courses.

The intense difficulty experienced in learning Euclid under the old system has arisen from the fact that the pupil has been required to call

simultaneously into great activity two totally uncorrelated faculties, the geometrical and linguistic. This to an ordinary boy is almost impossible. The two faculties must be trained separately before they are used in combination. Some familiarity with lines and circles must be gained before an attempt is made to argue in concise language as to their properties. If this is not done, the same kind of difficulty, though no doubt in less degree, will always be felt in the teaching of formal geometry, however excellent the system and arrangement of propositions.

That a new system will shortly be adopted may now be taken for granted. But if we are to consign Euclid's Elements to the silence of the upper shelf, we must do so in no contemptuous spirit but with feelings of the deepest reverence and respect. As a text-book it possesses a unique history. A manual of science composed three hundred years before the birth of Christianity, it is to-day, after centuries of scientific discovery, a volume of recognised utility and a model of logical precision. It forms a colossal monument to the intellect of a remote age, demonstrating that our superiority to the Greeks is due only to accumulated knowledge and in no way to an accession of mental acuteness.

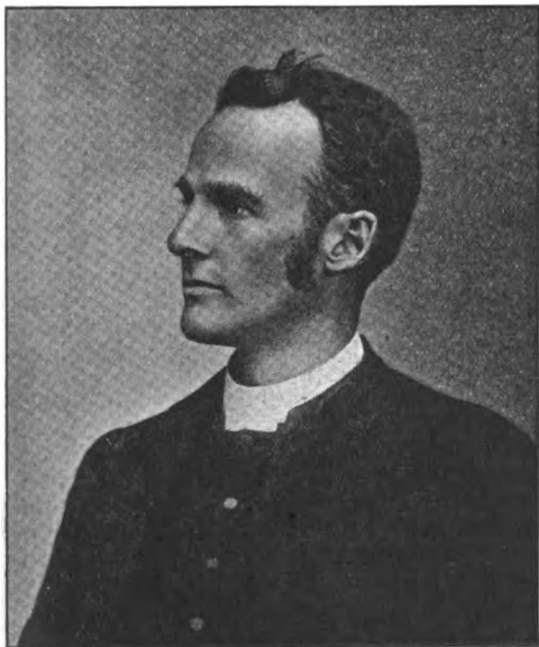
The setting aside of this extraordinary work in favour of more modern methods is but a part of a revolution which is taking place in the education of the country, and but one result of the great truth which is being forced upon her schools. These schools have set the noble ideal of Athenian thought and culture before many generations of Englishmen. If future generations would emulate this ideal they must do so by discovering new sciences and creating new systems; nor must they think, as men have thought in the past, that by gloating over the words of Plato they become the successors of the Greek philosophers.

THE HEADMASTERS' CONFERENCE.

AT the first meeting of the Headmasters' Conference, held at Uppingham in 1869, Thring, the founder of this important educational association, said, "Our schools depend absolutely and entirely on the vitality of progressive work"; and it was this belief which inspired him to set about the arduous work of securing a hearty co-operation between the headmasters of the public schools of England. Of the difficulty of Thring's task there can be no doubt. As Mr. G. R. Parkin says, in "The Life and Letters of Edward Thring" (Macmillan), the Conference "has broken down a deadening isolation, induced a healthy interchange of ideas between public schools, given them a united voice in time of need, exercised a powerful influence on educational questions"; and to accomplish a task of this sort is never easy.

The formation of the Conference is described in

one of the most interesting chapters in Mr. Parkin's book. The headmaster of Canterbury School, Mr. Mitchinson, afterwards Bishop of Barbados, invited, in 1869, a number of headmasters to meet in London to discuss the Endowed Schools Bill then before Parliament, and eventually persuaded Thring to attend. At the close of the meetings Thring rose and proposed that such a gathering should become an annual institution, and then and there invited the first Conference to Uppingham the following December. The meeting in London took place on March 1st, 1869, and on October 23rd of the same year Thring sent out to the headmasters of the public schools the letter of invitation to attend the first Conference to be held at the beginning of the next Christmas



From a photograph by Messrs. Elliot and Fry.]

THE HON. AND REV. CANON E. LYTTELTON, M.A.

Master of Haileybury College; Chairman of the Executive Committee of the Headmasters' Conference.

holidays. The following sentences from this letter indicate clearly what Thring thought such meetings could accomplish:—

"Government is dealing with school bye-laws recently passed, other measures are contemplated, and future Governments will most assuredly take up the question.

"Nothing has been more remarkable than the absence of any decided voice from the great body whose work is being handled by external power.

"Yet a profession involving experience and practice of the most varied and intricate kind ought not to be without a common voice under such circumstances."

Between sixty and seventy invitations were sent out, and twelve headmasters attended at the first Conference. The numerous refusals showed clearly that there were prejudices to be broken down.

But the conservatism of the great schools was soon overcome. After the second meeting, which was held at Sherborne, Thring writes in his diary, "The seven school delusion broken up." The Headmasters of Winchester and Shrewsbury had attended the second meeting, and the Headmaster of Eton had joined the Conference soon after. From this time the Conference steadily gained the confidence of public-school headmasters, and increased in public importance.

The annual meetings have since taken place regularly, being held in succession at Highgate, Birmingham, Winchester, Dulwich, Clifton, Rugby, Marlborough, Harrow, Eton, Wellington, University College School, Charterhouse, Oxford, Merchant Taylors' School, Shrewsbury, and Bradfield College. Three meetings have been held at the College of Preceptors, and two meetings each at Eton, Winchester, Rugby, and Sherborne. The meetings of 1901 took place in the Senate House at Cambridge, and those of 1902 at Tonbridge.

The executive of the Conference is its committee of nine members, three of whom retire each year, and can only be re-elected after the expiration of a year. The committee for 1902 was as follows:—

Rev. Dr. Gray ...	Bradfield ...	retires in 1902
Rev. Dr. Tancock ...	Tonbridge ...	" "
Rev. Dr. Warre ...	Eton ...	" "
Rev. G. C. Bell ...	Marlborough ...	retires in 1903
Rev. W. H. Keeling ...	Bradford ...	" "
Mr. J. S. Phillpotts ...	Bedford ...	" "
Rev. Dr. Gow ...	Westminster ...	retires in 1904
Rev. Dr. James ...	Rugby ...	" "
Rev. the Hon. E. Lyttelton ...	Haileybury ...	" "
(chairman)		

In addition to this there are several standing sub-committees charged with special duties. These are as follows:—

Parliamentary: Revs. the Hon. E. Lyttelton (chairman), G. C. Bell, Dr. Fry, W. H. Keeling, R. D. Swallow.

Universities: Revs. Dr. Gray (chairman), H. M. Burge, A. H. Cooke, Dr. Field, Dr. Rendall.

Public Examinations: Revs. Dr. Gow (chairman), M. G. Glazebrook, and S. R. James, and Messrs. J. E. King and A. T. Pollard.

Professional Questions: Revs. G. C. Bell (chairman), Dr. Flecker, H. W. Moss, Mr. J. S. Phillpotts, and Rev. Dr. Tancock.

With reference to the chief matters which have engaged the attention of the Conference and its committee, we cannot do better than quote from an article by the Master of Marlborough in the current issue of the "Public Schools' Year Book" (Swan Sonnenschein): these have been:—

The examination of schools by the Universities; the higher and lower certificate examinations conducted by the joint board of Oxford and Cambridge.

The conditions and arrangements for awarding entrance scholarships at Oxford and Cambridge.

The training and registration of teachers.

The establishment of scholarships, in connection with the University local examinations, for boys of moderate means.

Examinations for the public services.

The teaching of the following subjects (discussed at different meetings): natural science, geography, Latin and Greek verse, history, music, geometry, Greek, modern languages, Latin grammar.

Retiring pensions and other provisions for assistant-masters.

The improvement of school books.

The requirements of Greek in university examinations.

Higher religious education; the enjoyment of scholarships by the sons of the wealthy; the teaching of English grammar and literature; the present means and methods of teaching the Old Testament; an educational museum; qualifications for masterships.

Entrance and entrance scholarship examinations at public schools.

The organisation of secondary education.

Such is a brief account of the history and work of a very important educational association, which has done excellent work in the past and is destined, we hope, to extend its influence and to direct the work of public-school education even more definitely in the future.

GALVANOMETERS FOR SCHOOL LABORATORIES.¹

By H. E. HADLEY, B.Sc.(Lond.) A.R.C.Sc.(Lond.)
Headmaster of Kidderminster School of Science.

AT the present time there are many secondary schools (especially in Ireland) which are equipping physical laboratories. Since voltaic electricity enters into the more advanced parts of a school physics course, galvanometers will certainly be required; and the following suggestions are offered in order that those teachers who have not in recent years had access to a modern, well-equipped laboratory may learn the types of instruments which are most desirable, and so limit their expenditure by avoiding the more expensive, widely-advertised instruments.

In every laboratory there should be patterns of three distinct types: (i.) *Astatic*, (ii.) *Tangent*, and (iii.) *Mirror Galvanometers*. Each type has its educational value in affording applications of fundamental principles, and each type will also be found especially adapted for certain groups of experiments.

An **ASTATIC GALVANOMETER** is suitable for general qualitative work and for all experiments with the simple Wheatstone Bridge. Its chief fault lies in the fact that it is by no means "dead-

beat,"¹ and that much time may thus be lost in obtaining a series of observations (though the needle may, of course, be quickly brought to rest by the judicious use of a bar magnet held in the hand).

The upper end of the silk fibre supporting the astatic pair of needles should be attached to a vertical brass screw, enabling the fibre to be relieved of the weight of the needles when the instrument is not in use. The central portion of the circular scale is frequently cut away, and replaced by plane mirror, which enables readings of deflection to be taken without errors due to parallax. In many patterns a pointer is dispensed with, and the readings are taken by observing the deflection of the upper needle; in this case the diameter of the circular scale must necessarily be small. It is better to have a separate pointer attached to the needles, thus enabling a wider scale to be used; and it would be better still if the pointer consisted of thin sheet metal, with flat surfaces vertical, so as to serve as a damper. Two ivory stops are often fixed into the plane of the scale to limit the swing of the needle to an angle of about 20° on either side of the zero. These stops should be removable: in case they are not included in the instrument, efficient substitutes may be made from two pieces of gummed paper. The instrument should be supported on three levelling-screws: by this means it may always be adjusted so that the fibres coincide with the centre of the circular scale. The coil should be quite open to view, so that students may see the construction.

Instruments meeting these requirements may be obtained at prices ranging from 12s. 6d. to £3 10s.; a convenient pattern has a coil in two parts, of high and low resistance, which is sold at about £1 16s.

Of course, the instrument cannot be used for the comparison of current-strength unless it has been previously calibrated; but a useful modification (known as the "Walmsley Mather," Fig. 1) is

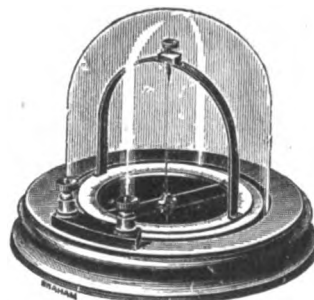


FIG. 1.—Walmsley Mather Galvanometer.

arranged with a coil of special shape so that the deflections are proportional to current-strength; it may be obtained with high and low resistance-coils for £1 10s.

¹ Figs. 2 and 4 are used, with permission, from the catalogue of Messrs. J. J. Griffin and Sons; Figs. 3 and 5 from that of Messrs. W. and J. George, Ltd., and Fig. 1 from that of Messrs. Philip Harris & Co.

¹ The term "dead-beat" implies the rapid return of the needle to rest after being deflected.

A TANGENT GALVANOMETER is of great teaching value in explaining the electromagnetic system of current measurement, and is often of use in the comparison of current strengths. Instruments consisting of a single turn of thick copper rod are practically useless in an elementary laboratory, and the most satisfactory type possesses several coils (wound on the same ring) of different resistance, varying from 0.1 ohm to 50 ohms.

Makers seldom give data of the dimensions of the coils, but it would be advantageous if the following dimensions were given with each instrument:—

- (i.) Inside circumference of each coil.
- (ii.) Diameter of the covered wire used in each coil.
- (iii.) Number of turns in each coil.
- (iv.) Resistance of each coil.

The inner part of the circular scale should consist of plane mirror, and the instrument should be supported on three levelling-screws. If the needle is supported by a silk-fibre, this should be capable of being raised or lowered, since the fibre is often broken when the instrument is carried about unless the fibre is free from tension. The fibre is sometimes attached above to a small brass wire and wound up or down by rotating the wire: this may result in the needle not being over the centre of the scale, and is therefore scarcely the best arrangement. In any case, it should be seen that the fibre¹ may be easily replaced if broken at any time. The instrument is also improved if the needle can be moved horizontally to either side of the vertical coil (Fig. 2); for this

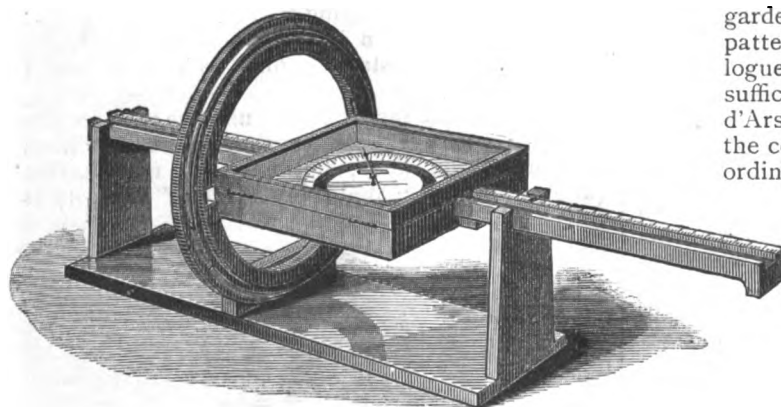


FIG. 2.—Modified Tangent Galvanometer.

purpose several makers have introduced a type which combines a Magnetometer with a Tangent Galvanometer (catalogued at prices varying from £1 5s. to £2 10s., according to finish).

A MIRROR GALVANOMETER is essential for accurate work, and the adjustment of the instrument with its lamp and scale affords an excellent lesson in patience and manipulation. For general

work a d'Arsonval¹ high-resistance galvanometer (arranged as "dead-beat") is undoubtedly the most suitable instrument (Fig. 3); a satisfactory



FIG. 3.—D'Arsonval Galvanometer.

pattern may be obtained for £3 15s. or £4, but the cheaper instruments which are advertised frequently lack the important feature of being dead-beat. The Ayrton-Mather Moving Coil Galvanometer (patent) is a good modification of the d'Arsonval, and is catalogued at about £4; it is arranged for interchangeable coils of different resistances (which can be purchased at extra cost), thus increasing the range of experimental utility. An improved type of d'Arsonval Galvanometer has recently been issued (by Messrs. W. & J. George, Ltd.) in which the magnetic field is stronger and more permanent, and including two interchangeable coils (one "dead-beat," the other "ballistic"). The price of this instrument is £5.

If a "dead-beat" instrument is not regarded as essential, the Stewart and Gee pattern of mirror galvanometer (catalogued at 15s. to 18s. 6d.) will be found sufficient. An important feature of the d'Arsonval type is that it may be used with the coil in any vertical plane, whereas the ordinary mirror galvanometer must be used with the plane of the coil coinciding with the magnetic meridian, unless a controlling-magnet is used. In this latter sense the ordinary type possesses the advantage that it enables students to experiment upon the influence which various strengths of magnetic field have on the readings of the instrument. The mirror attached to the needle (or coil)

may be curved or plane; in the former case the scale must be placed at a definite distance from the galvanometer; if the mirror is plane this distance may be varied, but a lens must be used to focus the cross-wire on to the scale.

A galvanometer is frequently required in the lecture-room, and it may not always be convenient or desirable to fit up a mirror galvanometer for

¹ Unspun silk is readily handled if each end of a length of the fibre is caught in a piece of gummed paper folded once; it may then be stretched along a clean bench, and the attachment to the needle made by means of a spot of melted shellac supported on the point of a hot knife-blade.

¹ In the d'Arsonval pattern the coil is suspended in a fixed magnetic field: while, in the ordinary mirror galvanometer, the coil is fixed and surrounds the suspended magnet.

the purpose; in this case a vertical scale instrument (Fig. 4) fitted with a needle six inches long is recommended, and may be obtained from Messrs. J. J. Griffin & Sons (price 8s.).



FIG. 4.—Lecture Table Galvanometer.

The incandescent electric lamp is the most recent source of light for the lamp and scale used with mirror galvanometers, but in practice it scarcely gives the good results which might be anticipated, for the narrow luminous filament is not nearly so conspicuous as the "full-moon" of light (with cross-fibre) obtained with a paraffin lamp. The best recent improvement is found in a pattern of oil-lamp which consists of a metal reservoir surmounted by a metal chimney (carrying a side-tube with focusing lens), the entire lamp being supported on a vertical brass-rod, which affords every possible requirement in making adjustments. Also, the scale is supported on two rods, which readily allow the height of the scale to be modified (Fig. 5). The writer has not yet

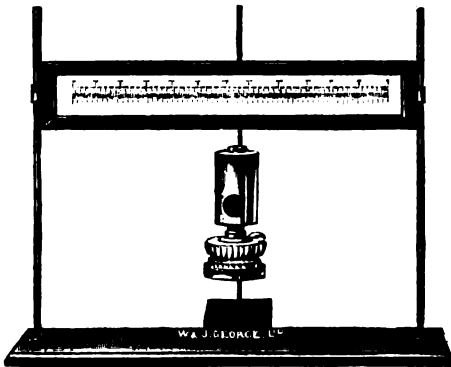


FIG. 5.—Lamp and Scale.

observed any introduction of acetylene as a source of light, but it would seem that the compact and serviceable forms of generators now used for projection-lantern purposes might be found highly useful for experiments with galvanometers.

Much uncertainty seems to exist regarding the relative advantages of the silk-fibre and the cup-and-pivot support for the needles of Tangent Galvanometers and Magnetometers. Undoubtedly the latter support is open to the theoretical objection of friction between the metal point and the inverted cup, with consequent lack of sensibility. On the other hand, the experienced teacher will acknowledge how difficult it is, in the case of

the fibre suspension, to get the fibre free from side-swing, and how easy it is for the student to shake the instrument (especially if on a smooth table) and afterwards spend much time in coaxing the fibre to become steady. Also, broken fibres frequently cause waste of time. The cup-and-pivot support is free from these objections, and its liability to friction errors is readily overcome with sufficient accuracy by gently tapping the instrument before taking each reading.

Frequent waste of time is due to the absence of "damping" in the needles of galvanometers. This fault may be minimised by the use of an auxiliary bar-magnet held in the hand; but it is a matter for surprise that so many simple instruments are still made with pointers of thin wire, which create but slight damping effect. A most serviceable pointer may be constructed from a narrow strip of thin aluminium foil, which, on both sides of the needle, is bent round into a vertical plane; in this manner the broad face of the strip serves as an effective damper, and the foil is thin enough to enable the scale readings of its ends to be read with much accuracy.

THE CHARACTER OF KING JOHN.¹

A BIOGRAPHY of King John, by the authoress of "England under the Angevin Kings," is sure of a welcome from students of our history, and Miss Norgate has not disappointed us. The story is told with the strict accuracy and the minute knowledge of details, even the least important, which we have learnt to expect from the school of Green and Freeman. Every authority has been consulted and his evidence weighed. Stories that used to be current on the strength of some late chronicler are contrasted with the more sober statement of contemporary writers. Especially does this appear in the narrative of the development of Magna Carta. The footnotes give full references and supply material for judgment in doubtful points. But the very excellence of the work thus accomplished leads us to express our feeling that something is lacking. There is scarcely any commentary, any explanation of the why and how of things. The book is an excellent chronicle of events, but it is written, as it were, for the men of John's own generation. We who are seven hundred years away want certain explanations which we feel sure Miss Norgate could give us. We seem to learn why John was lawfully King of England, but we ask in vain who was, on Richard's death, lawful heir of Normandy, of Anjou, of Brittany, or, in the alternative, if there was no law in the matter. We are told (p. 120) that the Pope decided that Grey's election was "uncanonical" and that the monks were the sole rightful electors, but we should have liked to learn how far this "canon" had been recognised in England and whether

¹ "John Lackland." By K. Norgate. vi. + 303 pp. (Macmillan.) 8s. 6d. net.

John's opposition to the Pope's decision was merely personal or was based on "custom."

We have understood that the "northern barons" of 1215 were the new "legal" nobility raised by Henry II's reforms and that they were thus, as it were, the old counsellors of the father rebuking and chiding the extravagant son. Miss Norgate thinks that the statesmanship of the Charter was due solely to Stephen Langton, but she does not clear up our thoughts on these "northerners." And finally, we miss a lengthy judicial decision on the character of John with which the book might have ended. We know that as a man he was bad, and in this book hints are given of things unmentionable; but were his difficulties and defects owing to his badness as a *king*? Miss Norgate draws her evidence as to his "tyranny" almost entirely from the "Articles of the Barons." Is this source above suspicion for this matter? We learn (p. 121) that John's "first need was money, and the difficulties with which the King had to contend in his efforts to raise money were as much greater in John's case than in that of any of his predecessors, as his need was greater than theirs had ever been," and (p. 263) that "a feature of John's home policy" was "his interest in the towns and the trading classes and his constant endeavours to cultivate their friendship."

The readers for whom Miss Norgate probably intends her book do not know enough in detail to do more than ask such questions as we have suggested above, and whether it was not the failure of his foreign policy as against Innocent II. and Philip Augustus that led to the demand for Magna Carta rather than purely gratuitous "tyranny" and "plunder." These questions still await a solution.

A HARROW MASTER.¹

THE memoir of Edward Bowen by his nephew differs in several respects from the best-known biographies of schoolmasters, the *Lives of Arnold* and of *Thring*. It is much slighter. With all his wide sympathies, political and theological, Bowen was not an actor in the public controversies of his time as was *Arnold*, nor is there in his case, as in the life of *Thring*, the growth and fortunes of an institution to relate. Furthermore, he was so much absorbed in his work at Harrow, in organising and supervising the modern side, in teaching his form and in the government of his house, that after his early manhood he wrote comparatively little, even in the shape of letters. The biographer cannot, therefore, leave his subject to speak for himself and let him reveal himself in the intimacies of correspondence. On the other hand, since Bowen's acknowledged literary "remains" are too few to be published separately, they can be added to the memoir without unduly increasing the bulk of the book. All the incomparable songs are given.

To a reader who never knew Edward Bowen,

¹ Edward Bowen. A memoir by the Rev. the Hon. W. E. Bowen, M. A. x. + 417 pp. (Longmans.) 12s. 6d. net.

the biographer appears to be unusually successful not only in describing the interests and habits of the man, but also in conveying something of the subtle aroma of his personality. Nor will the friends and pupils of Bowen alone rejoice in the minuteness with which some portions of his life are portrayed, but the "scientific educationist" too, for whom the memoir is also written. For his power and influence among those who are concerned with education was not due principally to his advocacy of particular reforms or theories, but to his own remarkable character, towards the delineation of which even trivial details contribute.

Four of the nine papers which are placed in the appendix are on subjects unconnected with education. They are sufficient to show that, had he chosen, Bowen might have had a career of great brilliancy as a writer. Among the remaining papers it happens oddly that there is one on each of the three main aspects of education—intellectual, physical and moral. Bowen's views on the first of these are expounded with admirable force and humour in the essay on "Teaching by means of Grammar," reprinted from "Essays on a Liberal Education." Written in 1867 it is by no means without point to-day. Though the main theme is a protest against teaching languages through grammar, the whole essay, which abounds in the soundest precepts, is a compendious dissertation on how to handle boys in a class. As a fine athlete, as well as a fine scholar, Bowen was competent to speak on the vexed question of athletics, and in the essay on "Games" he champions them whole-heartedly against the attacks both of those who would subordinate physical to intellectual training, and of those who would reduce physical training to the formal and unsocial exercises of the gymnasium. "Arnoldides Chiffers" exhibits his views on the Arnoldian theory of "moral influence." Besides the three set papers, glimpses of Bowen's attitude towards other scholastic problems are obtained incidentally in the narrative. His remarks on punishments and on the use of cribs are particularly suggestive. Other essays, and some memoranda included in the body of the memoir, deal with the public and administrative side of education. Bowen makes no claim to be heard on these topics beyond his experience of public schools. He expressed to the Royal Commission his disbelief in the training of teachers, mainly because the teacher he had in mind is a form and house master at a public school. Similarly he objects to examination and inspection by the universities because the public schools stand to lose by the restrictions upon freedom that such supervision might impose. In no place does he pretend to generalise beyond the bounds of his personal knowledge.

The book is to be warmly commended to schoolmasters in search of a healthy stimulus, to the student who is interested in educational theory and practice, and to all those who would care to read the story of what Dr. Wood calls "that unique and beautiful life." To Bowen's pupils and friends it will need no recommendation.

EXPERIMENTAL PSYCHOLOGY.¹

PSYCHOLOGY is making a strong bid for entry into the rank of experimental sciences.

Mr. Witmer's book is well calculated to help this object along. Text-books on this subject are often concerned with somewhat complex and costly experiments. Mr. Witmer has hit on the happy idea of dealing with experiments which dispense with costly and complicated apparatus, and can be carried through by students untrained in elaborate, technical, psycho-physical knowledge. For instance, Mr. Witmer aptly remarks, "To be asked and to answer a question may constitute a psychological experiment." If we only know mind through its manifestations, every time we consciously direct attention to consider mental manifestations, to observe them, to alter their conditions, or even to note accurately any of their phases, we are conducting psychological experiments. The experiments selected for treatment in this book, therefore, are simple and easy. The attempt is further made to class representative examples. Thus the chapters include: Apperception, Attention, Association, Perception of Space, Psycho-physical Analysis, and the Sensation as the mental element. There is an appendix with a list of appliances, materials, and apparatus other than the experimental charts. The book is very enterprisingly produced, and makes the treatment of the subject graphic and interesting. We have, for instance, charts of the following topics: the staircase figure, Thiéry's double prism, Sanford's separated pattern, interlacing rings, illusions of contrasted larger and smaller circles, illusions of filled and unfilled space, simple figures for binocular combination. The simplicity of these experiments is distinctly an attractive feature. The number of charts and diagrams, it will be seen from the title, is considerable. Charts 9-14 consist of six gray strips placed on six differently coloured backgrounds, and constitute a particularly effective series of experiments which speak for themselves.

Mr. Witmer avowedly has endeavoured to present a logical development of the subject by experiments. At the same time, he has had the aim in view of making psychology a mental discipline, and has treated it, so as to say, pedagogically as well as logically. In short, Mr. Witmer has written a manual of psychology illustrative throughout of a special method, viz., the experimental method. Some may think that this method is competitive with the introspective method. But there is a great deal to be said for the view that the experimental method is just as much subjective as it is objective. Whatever light can be thrown upon mental processes, all psychologists should be anxious to obtain.

It seems to us that Mr. Witmer's book would be

of real interest to a student as yet unacquainted with systematic psychology. We are quite clear that it is attractive to those who have read some psychology. It is calculated to stimulate thought and inquiry in the student. We have no hesitation in strongly recommending the book to teachers of psychology who have as yet little knowledge of the latest writings on elementary experimental psychology.

THE EMPEROR CHARLES V.¹

MR. ARMSTRONG, whose work on Elizabeth Farnese, "the termagant of Spain," has long been known, here gives us a biography of the Emperor Charles V., which he originally undertook for the "Foreign Statesmen" series, but which unavoidably outgrew the limits allowed to him by the general editor. It is, of course, unnecessary to say that the work is well done, and will be well worth perusal by our readers. We should recommend them to make for themselves what Mr. Armstrong might have supplied, a chronological summary of each chapter so arranged that each would throw light on the other, and thus a clearer view be obtained of the many-sided activity of the Habsburg. Beyond our general commendation, we would add that here and there, specially in the first volume, the reader will find neat generalisations on the character and behaviour of men. Much light is incidentally thrown on Luther's career, and the reader will find many passages similar to the parallel, on p. 121, between "Barbarossa and Dragut" and "their Atlantic counterparts, England's pirate admirals," or the apophthegm on p. 220, that "many a man writes a decided letter when he will not take decisive action." There is an index, which, full and satisfactory for Charles himself, leaves much to be desired in other respects. The bibliography is treated in an introduction.

The Emperor Charles V. is one of the most interesting and yet most puzzling characters in European history. He inherited vast possessions: Austria, "Burgundy," Spain, and the new world of America, besides Netherlands, were his. But though so widely endowed, he was by no means proportionately strong. Every part of his dominions had its own difficulties, internal as well as external, and none was either able or willing to help the others. He was necessarily an absentee from all but one of his possessions, and though he handed over his Austrian inheritance permanently to his brother Ferdinand from the very beginning, and governed the Netherlands through the regencies of his aunt and sister, he regarded himself, to use Mr. Armstrong's phrase, as "the travelling member of the Habsburg syndicate,"

¹ "Analytical Psychology: a Practical Manual for Colleges and Normal Schools." Presenting the Facts and Principles of Mental Analysis in the Form of Simple Illustrations and Experiments. With 42 Figures in the Text and 39 Experimental Charts. By Lightner Witmer. vi. + 252 pp. (London: Ginn.) 7s.

¹ "The Emperor Charles V." By E. Armstrong. 2 vols., pp. xxxi. + 341 + ix. + 413. (Macmillan.) 21s. net.

and felt the burden of all. He was far from being a despotic ruler in any of his possessions. Every one of them had its local privileges which he was obliged to respect. In Germany the Emperor had long lost all practical power, and Luther's movement, which began with Charles' reign, only made affairs more confused, and gave a further opportunity to the princes to make themselves independent of their sovereign. Externally, too, Charles inherited nothing but difficulties. To say nothing of the permanent hostility of France, which manifested itself in intermittent war, the Turk was an aggressive enemy in the Mediterranean, in Hungary, and even as far as Vienna. While Charles was fighting in Germany at the same time for unity in State and Church, and doing his best to maintain the papal power, he was obliged to oppose the Pope in Italy in his capacity as King of Naples and Duke of Milan, because the Pope was bent on attaining "temporal power." All these various duties Charles was too conscientious to refuse and not great enough to solve. After nearly forty years of ceaseless toil he gave up the conflict, gradually stripped himself of all his dignities and possessions, and retired to the monastery of Juste, not to lose interest in the world he had quitted, but to lay the burden on younger shoulders. At the end of two years' retirement he died, worn out, at the age of 58, and the course of history departed far from his ideals.

THE MOST NOTABLE SCHOOL BOOKS OF 1902.

So many school books are published during the course of a year that it is difficult for most teachers to acquaint themselves with even the most important of them. To assist teachers in making a selection of books in the chief subjects of the school curriculum published during 1902, we have obtained the help of competent authorities in these subjects who have each had a large experience of the needs of classes of all kinds and are at present engaged in teaching. Teachers who examine the books named below will at least have the satisfaction of knowing they are familiar with the contents of most of the best school books published during 1902. In making their lists the gentlemen whose aid we have secured have not confined their attention to those books which have been reviewed in our columns during the last twelve months. In cases where the title of a book is not a sufficient guide as to its contents, a few helpful remarks by the teachers who have compiled the lists have been added.

Modern Languages.

"A History of German Literature." By John G. Robertson. (Blackwood.) 10s. 6d. net.

Well-balanced, trustworthy, and eminently readable.

"Grands Prosateurs du Dix-septième Siècle." Edited by M. Louis Brandin. With illustrations. (Black.) 2s. 6d.

A judicious and useful selection.

"The Principles of Criticism." By W. Basil Worsfold. New cheap edition. (Allen.) 3s. 6d. net.

"Vermischte Beiträge zur französischen Grammatik." Von Adolf Tobler. Erste Reihe. (Leipzig, Hirzel.) 8s.

The second edition, considerably enlarged. An invaluable book.

"Die deutsche Sprache." Von Otto Behaghel. (Wien, Freytag and Tempsky.) 3s. 6d.

A much improved edition of this excellent little book.

"Lectures on the Study of Language." By Hans Oertel. *Yale Bicentennial Publications.* (Arnold.) 12s. 6d. net.

A lucid exposition of the principal problems of linguistics.

"Die Methodik des neusprachlichen Unterrichts. Ein geschichtlicher Überblick in vier Vorträgen." Von Wilhelm Viëtor. (Leipzig, Teubner.) 1s.

A brief account of the reform movement, and of the older methods of teaching foreign languages.

"Über die Verbindung der sprachlichen mit der sachlichen Belehrung. Betrachtungen zur Methodik des fremdsprachlichen Unterrichts." Von Dr. Jul. Ziehen. (Frankfurt, Kesselring.) 1s.

Hints for the teaching of *Realien*.

"Didaktik und Methodik des französischen Unterrichts." Von Wilhelm Münch. (München, Beck.) 4s.

The second edition, thoroughly revised and in part rewritten.

"A First Book of 'Free Composition' in French." By J. E. Mansion. (Blackwood.) 1s.

An admirable manual; the only book of its kind.

Classics.

It is a melancholy fact that, amongst the host of school-books in classics published during the year, very few indeed are worthy of special mention. But there is one which may be said to mark a new epoch in the teaching of Latin, and this must have the place of honour.

"A First Latin Course." By E. H. Scott, B.A., and F. Jones, B.A. (Blackie.) 1s. 6d.

Its distinctive features are these: (1) It does not attempt too much. Both vocabulary and grammar are limited, and everything is driven home by constant reiteration in slightly differing forms. (2) The matter of each exercise is used for retranslation. (3) The method is oral, and the result is a quickness and readiness which is unattainable under the usual methods. This is quite the best book hitherto published for beginners, and we venture to prophesy that this, or others written on the same principle, will supersede all existing manuals.

"Ora Maritima: a Latin Story for Beginners." By E. A. Sonnenschein, Litt.D. (Swan Sonnenschein.) 2s. With Grammar and Exercises.

This book, although written without reference to No. 1, suits admirably for the next stage as being more of a Reader. Here, also, the fact is kept in view that Latin was a spoken language; narrative and conversation are both used, vocabularies and exercises being compiled on the same principle as in the "new method" of teaching modern languages. The story is that of the invasion of Britain. Like No. 1, this book aims at teaching a little thoroughly, and it succeeds.

"Puerorum Liber Aureus: a First Latin Translation book." By T. S. Foster, B.A. (Black.) 1s. 6d.

The subject of this book is the invasion of Britain in the year 43 after Christ, together with sketches of a boy's life, and conversations. It is very good, if not quite so good as No. 2.

"The Latin Period." By C. A. Wells, M.A. (Blackie.) 1s.

An admirable exercise book, which builds up the period from its beginnings. We know of no other book which attempts this. There is nothing for Greek anything like so good as these three books. For a much more advanced stage, we would recommend:

"Greek Prose Composition." By S. O. Andrew, M.A. (Macmillan.) 3s. 6d.

This book combines a sketch of the principles of Greek composition more complete and systematic than Sidgwick's, and it has the great advantage over Sidgwick's that the pieces are not "doctored" to imitate Greek idiom. Sidgwick's book will still hold its own for beginners, but this is excellent for a sixth form. It contains also models of different kinds of style, and specimen versions. The key is generally good, but some of the Greek is questionable.

Of annotated editions, we would mention:—

"The Third Georgic of Virgil." By S. E. Winbolt, M.A. (Blackie.) 1s. 6d.

"M. Tulli Ciceronis Orationes in Catilinam Quattuor." By J. C. Nicol, M.A. (Pitt Press Series.)

"C. Sallusti Crispi Iugurtha." By W. C. Summers, M.A. Reviewed in the present number. (Pitt Press Series.)

For the highest forms or for teachers:—

"The Republic of Plato." Edited, with critical notes, commentary, and appendices, by James Adam, M.A. (Cambridge University Press.) Two vols. 15s. and 18s.

"The Comedies of Aristophanes." Edited, translated and explained by B. B. Rogers. *The Frogs, Ecclesiazseae.* (Bell.) 15s.

An admirable verse translation, with a commentary sound in scholarship and taste, and often original.

In History:—

"A History of Rome, for the Middle and Upper Forms of Schools." By J. L. Myres, M.A. (Rivingtons.) 5s.

In Fine Letters:—

"Demetrius on Style." Edited, with translation, &c., by W. Rhys Roberts, Litt.D. (Cambridge University Press.) 9s. net.

For literary purposes this is the book of the year. The Greek is not classical, but all intelligent persons, whether teachers or learners, will find it both useful and inspiring.

English Grammar and Composition.

"Lessons in the Use of English." Hyde. (Heath.) 2s.

Excellent book: illustrations, poetry, exercises.

"Applied English Grammar." Lewis. (Macmillan.) 2s.

Illustrations; abundance of exercises, oral and written.

"English Grammar." Bryant. (Dent.) 1s. 4d.

A large number of exercises.

"A First Course in Analysis and Grammar." Wilson. (Arnold.) 1s.

"Practical English Grammar." Ritchie. (Longmans.) 2s. 6d.

One of the most satisfactory text-books published.

"Words and Sentences." (Blackwood.) Part I., 6d. Part II., 8d.

An excellent text-book for young children.

"Essentials of English Composition." Tarbell. (Ginn.) 3s.

"Elements of English Composition." Gardiner, Kittredge and Arnold. (Ginn.) 4s. 6d.

"Composition and Rhetoric." Lockwood and Emerson. (Ginn.) 4s. 6d.

"College Manual of Rhetoric." Baldwin. (Longmans.) 4s. 6d.

All very good: the last two for advanced students.

English Readers.

"In Golden Realms, an English Reading book for junior forms." (Ed. Arnold.) 1s. 3d.

"In the World of Books. A Reading book for middle forms." (Ed. Arnold.) 1s. 6d.

Two good books of prose and poetry from early days to modern times; illustrations good and well chosen.

"The 'Globe' Poetry Reader for advanced classes." (Macmillan.) 1s. 4d.

Carefully selected: well edited with biographical notes.

"Junior School Poetry Book." Dr. W. Peterson. (Longmans.) 1s. 6d.

"Senior School Poetry Book." Dr. W. Peterson. (Longmans.) 2s. 6d.

Two books for recitation: no notes.

History.

"General History for Colleges and High Schools." Myers. (Ginn.) 6s. 6d.

"Companion to English History." Middle Ages. Barnard. (Clarendon Press.) 8s. 6d.

"First History of England." (Three Parts.) Clara Thomson. (Horace Marshall.) Part II., 1s. 6d.; Part III., 2s.

"Wales." Story of the Nations. Edwards. (Fisher Unwin.) 5s.

"English History Illustrated from Original Sources." 1399-1485, Durham, 1600-1715, Figgis. (Black.) 2s. 6d. each.

For Use of Teachers.

"Select Documents of English Constitutional History." Adams. (Macmillan.) 10s.

"The Emperor Charles V." Armstrong. (Macmillan.) 21s.

"John Lackland." Norgate. (Macmillan.) 8s. 6d.

"Life of Napoleon." 2 vols. Rose. (Bell.)

Geography.

"The World, with special reference to the British Isles and Empire." (Arnold.) 1s.

"Under Sunny Skies." Youth's Companion Series. (Ginn.) 1s.

"Toward the Rising Sun." Youth's Companion Series. (Ginn.) 1s.

Numbers 2 and 3 may be described as American readers with a geographical bias.

"Africa and Australasia." Macmillan's New Geography Readers. 1s. 6d.

"World Pictures." By J. B. Reynolds. Second Edition. (Black.) 1s. 6d.

A collection of full-page illustrations with explanatory letterpress.

"Man and his Work." By A. J. and F. D. Herbertson. Second Edition. (Black.) 1s. 6d.

"Central and South America with the West Indies." Series of "Descriptive Geographies" by A. J. and F. D. Herbertson. (Black.) 2s.

Stories and descriptions from original sources told in the words of the original.

"Geography of Egypt and the Anglo-Egyptian Sudan." By H. W. Mardon, of the Tewfikah Training College, Cairo. (Blackie.) 2s.

"The Teacher's Manual of Object Lessons in Geography." By V. T. Murché. (Macmillan.) 3s. 6d.

"Meiklejohn's Comparative Method." Twenty-seventh Edition. (Holden.) 4s. 6d.

"Text-book of Commercial Geography." By C. C. Adams. (Hirschfeld.) 5s.

"Introduction to Physical Geography." By Gilbert and Brigham. (Hirschfeld.) 5s.

Numbers 11 and 12 are two American publications, both of great merit.

"Grammar-school Geography." By A. E. Frye. (Ginn.) 6s.

"Britain and the British Seas." By H. J. Mackinder. (Heinemann.) 7s. 6d.

Mathematics.

"An Arithmetic for Schools." By J. P. Kirkman and A. E. Field. (Edward Arnold.) 3s. 6d.

"The Tutorial Arithmetic." By W. P. Workman. The University Tutorial Series. 3s. 6d.

"Examples in Algebra." By C. O. Tuckey. (Bell.) 3s.

This book carries out the recommendations of the committee on the teaching of elementary mathematics, appointed by the Mathematical Association.

"Algebraical Examples." By H. S. Hall. (Macmillan.) 2s.

"Elementary Geometry." By W. C. Fletcher. (Edward Arnold.) 1s. 6d.

A very elementary book, but as it proceeds on the newly adopted plan of emancipating geometrical teaching from the order and formalism of Euclid, it may be found useful beyond the limits of primary schools.

"Primer of Geometry." By H. W. Croome Smith. (Macmillan.) 2s.

Another protest against the order of Euclid.

"Elementary Geometry." By W. M. Baker and A. A. Bourne. (Bell.) 2s. 6d.

This book follows strictly the lines laid down by the Committee of the Mathematical Association.

"Easy Mathematical Problem Papers." By Charles Davison. (Blackie.) 2s. 6d.

This book contains a series of questions in arithmetic, algebra, geometry, and trigonometry, with answers in all cases.

"Spherical Trigonometry." By the late I. Todhunter. Revised by J. G. Leatham. (Macmillan.) 7s. 6d.

Practically a new book, and a great improvement on the original Todhunter.

"An Elementary Treatise on the Calculus, with illustrations from Geometry, Mechanics, and Physics." By George A. Gibson. (Macmillan.) 7s. 6d.

A work most thoroughgoing in its logical method.

"Differential Calculus for Beginners." By Alfred Lodge. (Bell.) 4s. 6d.

This is a work which a high-class schoolboy should find no difficulty in mastering.

"Applied Mechanics for Beginners." By J. Duncan. (Macmillan.) 2s. 6d.

A most useful variation of the ordinary mathematical treatises, and an excellent companion for them. The illustrations are elaborate and good; the subject matter always interesting.

Physics and Chemistry.

"Introduction to Chemistry and Physics." 2 vols. By W. H. Perkin and Bevan Lean. (Macmillan.) 2s. each vol.

"Introduction to Chemistry." By D. S. Macnair. (Bell.) 2s.

"Introductory Chemistry for Intermediate Schools." By L. M. Jones. (Macmillan.) 2s.

"Practical Science." By J. H. Leonard. (Murray.) 1s. 6d. Elementary practical exercises in Mechanics, Hydrostatics, and Heat.

"Practical Exercises in Electricity and Magnetism." By H. E. Hadley. (Macmillan.) 2s. 6d.

"Elementary Practical Hygiene." By W. S. Furneaux. (Longmans.) 2s. 6d.

"Introduction to Study of Physics." Vol. I.: Mechanics, Hydrostatics and Pneumatics. By A. F. Walden and J. J. Manley. (Black.) 3s. net.

"Practical Exercises in Heat." By E. S. A. Robson. (Macmillan.) 2s. 6d.

Useful for Teachers.

"The Elements of Inorganic Chemistry." By W. A. Shennstone. (Arnold.) 4s. 6d.

"Text-Book of Physics for Secondary-Schools." By F. Slate. (Macmillan.) 6s.

"Elementary Inorganic Chemistry." By James Walker. (Bell.) 3s. 6d.

"Light for Students." By Edwin Edser. (Macmillan.) 6s.

Natural History.*Zoology.*

"Comparative Anatomy of Animals," an Introduction to the Study of. Vol. II. Gilbert C. Bourne. (Bell.) 4s. 6d.

"Animal Forms: a Second Book of Zoology." By David S. Jordan and Prof. Harold Heath. (Hirshfeld.) 6s.

"Spiderland." By Rose Haig Thomas. (Grant Richards.) 5s. Suitable for small children.

"Injurious and Useful Insects": an Introduction to the Study of Economic Entomology. By Prof. L. C. Miall, F.R.S. (Bell.) 3s. 6d.

Botany.

"Elementary Plant Physiology." By D. T. Macdougall. (Longmans.) 3s.

"Practical Botany for Beginners." By F. O. Bower, F.R.S., and T. Gwynne Vaughan. (Macmillan.) 3s. 6d.

"Trees in Prose and Poetry." Compiled by Gertrude L. Stone and M. Grace Fickett. (Ginn.) 2s.

Geology.

"Class Book of Geology." By Sir Archibald Geikie. 4th edition. (Macmillan.) 5s.

"The Scenery of England and the Causes to which it is due." By Lord Avebury. (Macmillan.) 15s.

"Britain and the British Isles." By H. J. Mackinder. (Heinemann.) 7s. 6d.

Nature Study.

"Nature Study and Life." By C. F. Hodge. (Ginn.) 7s.

"Round the Year." Short Nature-studies. By Prof. L. C. Miall, F.R.S. (Macmillan.) 3s. 6d.

A cheaper edition of a deservedly well-known book.

**CAMBRIDGE LOCAL EXAMINATIONS.
SET SUBJECTS FOR 1903.****Preliminary.**

Religious Knowledge.—(a) St. Luke i.-xiv., (b) II. Samuel, v.-xx.

English Author.—Scott, "Lord of the Isles," Cantos ii. and vi.; Kingsley, "The Heroes."

English History.—Outlines, 1215-1509. A.D.

Geography.—Great Britain.

Elementary Latin.—Caesar, De Bello Gallico, II.; or, Nepos, "Lives of Lysander, Alcibiades, Thrasybulus, Conon, Iphicrates, Chabrias."

Elementary French.—Perrault, "Fairy Tales."

Elementary German.—Grimm, "Der Wolf und die sieben jungen Geisslein, Die drei Männlein im Walde, Hänsel und Gretel, Die weisse Schlange, Das tapfere Schneiderlein."

Junior.

- Religious Knowledge.*—(a) II. Samuel; (b) St. Luke; (c) Acts of the Apostles i. xvi.
English.—Shakespeare, "Julius Cæsar"; Scott, "Lord of the Isles."
English History.—1215-1509 A.D.
History of British Empire.—1763-1878 A.D.
Roman History.—133 B.C.-27 B.C.
Geography.—Great Britain and Ireland, North America and West Indies.
Latin.—One of—Cæsar, De Bello Gallico, II., III.; or, Virgil, Æneid X.
Greek.—Xenophon, Anabasis, II.; or, Aeschylus, Prometheus Vincutus.
French.—About, "Le Roi des Montagnes," chaps. 1-5; or, Sandeau, "Mademoiselle de la Seiglière" (Comédie).
German.—"Twenty Stories from Grimm," omitting "Aschenputtel" and "Der goldene Vogel"; or, Schiller, "Wilhelm Tell."

Senior.

- Religious Knowledge.*—(a) II. Samuel; (b) St. Luke; (c) II. Corinthians.
English History.—1215-1509 A.D.
Greek History.—510 B.C.-429 B.C.
History of the British Empire.—1763-1878 A.D.
Geography.—Great Britain and Ireland, North America and West Indies.
Shakespeare.—"Julius Cæsar."
Pope.—"Essay on Criticism."
Milton.—"Paradise Lost," v., vi.
Latin.—Virgil, Æneid, X.; Horace, Odes, III.; Livy, V., 1-40; Cicero, Pro Sulla.
Greek.—Homer, Odyssey, IX.; Aeschylus, Prometheus Vincutus; Herodotus, VIII., 1-90; Thucydides, VII., 50-end. (Students must select one verse and one prose subject in Latin and Greek.)
French.—About, "Le Roi des Montagnes," chaps. i.-v., and Sandeau, "Mademoiselle de la Seiglière" (Comédie).
German.—Schiller, "Wilhelm Tell" and "Goethe's Boyhood."

NATURE NOTES FOR JANUARY.

By the REV. CANON STEWARD, M.A.(Oxon.)
 Principal of Salisbury Training College.

Indoor Work.—The winter months afford opportunity for preparing and setting up the skeletons—and especially the skulls—of animals, as of the smaller carnivora, grainivora, and rodents, and of birds.

Geologists can replenish their cabinets, cut down so as best to display the fossil in its matrix of chalk or other soft formation, and work at mineralogy.

The long evenings may be employed in re-arranging the school museum—rejecting worthless specimens—naming, labelling, and classifying. Place fresh camphor in cabinets. Look over herbarium; mount specimens; and complete the naming and full classification. Microscopists may make and mount sections, botanical and biological objects, in sufficient quantity for the use of their classes. Enlarged diagrams for the illustration of lectures may now be drawn, and slides for lantern illustrations may be prepared.

Animal Life.—At this time of the year the different kinds of wild fowl hanging up in the poulterers' shops should be observed, and their names learnt.

Many species of bird congregate, as Finches, Larks and Woodpigeons. The Chaffinch: sexes keep in separate flocks, whence its name *Coelebs*. Brambling, or Mountain Finch, seen in flocks in hard weather. Missel Thrush frequents gardens for berries; Stone-chat, a resident, seen on heaths and commons; Nuthatches may be seen, the only bird that can run down a bough head downwards. The Hawfinch often visits shrubberies in small flocks. The Great Grey Shrike may occasionally be seen. Bats re-appear at end of month. Feed wild birds in hard weather, hanging up a large bone for the Titmice.

The birds that commence to sing are the Redbreast, Wren, Thrush, Missel Thrush, Hedge Sparrow, Greater Titmouse, and at the end of the month, the Lark and Chaffinch. Identify and distinguish them by their song.

The Peacock Butterfly and Small Tortoiseshell have been found, as well as the Winter Moth and the Herald.

THE TRAINING OF TEACHERS IN SECONDARY SCHOOLS FOR BOYS.¹

By the Rev. Canon BELL, M.A.
 Master of Marlborough College.

A PLEA FOR A PARTITION OF THE YEAR OF TRAINING BETWEEN (1) STUDENT-TEACHERSHIP AT A RECOGNISED SCHOOL, AND (2) A COURSE OF TRAINING AT A UNIVERSITY OR A NON-UNIVERSITY TRAINING COLLEGE.

THE Board of Education by its "Order in Council," dated March 6th, 1902, has, in Appendix A, ordered that in future persons desiring to be teachers in secondary schools must (among other conditions) either:—

- (a) Undergo a course of training for one year at a university or training college, or
- (b) Spend at least one year as a student-teacher.

The object of this paper is to urge that the Board of Education should be asked so to modify its order that candidates may be allowed to divide the year between these two methods of training.

It is commonly said that at the present time men of ability are less disposed than heretofore to enter the teaching profession, which seems to offer to them fewer attractions than other careers. The stipulation that intending teachers shall devote a year to training will not add to its attractiveness, and it is most desirable to make the conditions as little uninviting as is possible.

Moreover, some headmasters and many assistant-masters regard schemes for the training of teachers with lukewarmness, scepticism, or even hostility: if such conditions are laid down as will seem to them helpful and practical, such critics or opponents may be conciliated. Otherwise they may stand aloof from a register which imposes training on future teachers. By thus throwing contempt on it, they might wreck the whole scheme, or force the central authority to make registration compulsory instead of voluntary.

Accordingly I shall endeavour to show that the proposed partition of the year is likely to commend itself to existing

¹ A paper read at the Conference on the Training of Teachers in Secondary Schools for Boys at the University of Cambridge, November, 1902.

schoolmasters as being a practical and helpful arrangement. I believe also that candidates would find it more attractive and less burdensome.

(1) The volumes of the Report of the Secondary Education Commission show that many capable experts agree that some preliminary experience of actual school work would be the best way of preparing a man to accept and profit by the teaching and system of a training college or course.

(2) Such experience coming after the long strain of work for a degree would be more attractive and stimulating than the immediate entrance on a new spell of lectures, reading, &c., at a training college.

(3) Without such experience a solid year in a training college might tend to develop the priggishness and pedantry which are sometimes imputed to trained teachers, or it might fail to reveal some of the chief difficulties of actual school-work. These may be smoothed away by the artificial ease of prepared lessons delivered in presence of a training master and fellow-students. But a man who has satisfactorily passed the tests of criticism lessons may find himself quite unable to maintain discipline when confronted by twenty or twenty-five lively boys in his isolated class-room. While they are ingeniously driving him to despair, the headmaster may pay a surprise visit. The hubbub subsides. The return of conditions similar to those of the training class restores the novice's confidence, and he may impress his chief for the moment by the method and form of his teaching; but chaos returns when he is again left to himself. Thus technical training has not unfrequently proved abortive because the candidate has not previously been forced to recognise his own needs and deficiencies.

(4) Again, it may be supposed that each candidate is preparing for work in some particular type of secondary school. There is a wide variety of such types, both in boarding schools and day schools. If a man without any previous experience enters on a training course and continues it for a solid year, it is more than probable that when he begins school work he will find himself amid circumstances with which he has not prepared himself to deal. Whereas a short experience of these circumstances would prompt him to discover in his training course by elective affinity such helps, aids, expedients and suggestions as would hereafter be suitable for his particular work.

So far reasons have been given for a period of student-teachership as a preliminary to a training-course. On the other hand, if the whole year were spent in student-teachership such arrangements as are feasible for technical instruction, supervision, &c., amid the turmoil of school work, would fall far short of the requisite definite teaching of the essential subjects of a training college.

Again, unless adequate safeguards are provided, student-teachers may be exposed to risks similar to those which have beset apprenticeship in nearly every kind of training for crafts and professions. They may be exploited by employers who desire cheap labour, and yet are not willing or not competent to ensure its efficiency. And the profession may suffer by introducing into it men who have been encouraged to cram or practise other faulty devices.

Moreover, even the better sort of headmasters and assistant-masters are rarely competent to give effective training, nor can they spare sufficient time from their manifold duties; while if help is given to the student-teacher by a master of method, it must be somewhat casual and intermittent.

Again, there is much ground for desiring reform in the prevalent methods of teaching some important subjects, *e.g.*, modern languages, including the mother tongue, mathematics, and natural science. A student-teacher who spent his whole year in a school might simply be inured to defective methods and prejudiced in favour of them; whereas the transfer to a training

college might open his eyes to the need and the means of improvement.

Such risks and shortcomings of practical work at a school might be avoided or compensated if the larger part of the year were devoted to a course of systematic training. Assuming, then, that there is advantage in such a partition of the year between the two systems, I pass on to consider some details. If the year is divided, there are strong reasons for assigning the first term of it, and no more, to student-teachership.

(1) Its inherent limitations and imperfections. The analogy of apprenticeship in other professions, and in crafts, has been much insisted on; but it is very misleading. The medical practitioner who takes a pupil has been through a long course of training in the theory and practice of his profession on well-established lines; something similar may be said of the craftsman who takes an apprentice.

But, with few exceptions, even the more experienced teachers in our secondary schools, however successful in their individual class-rooms, have not so far formulated their own theory and practice as to be able to impart it clearly and expeditiously; while a novice who heard their teaching, and watched the management of their forms, would of course pick up useful hints; but his own lack of experience might make him incapable of so analysing many elements of their efficiency as to appropriate them for his own use. And perhaps, in passing from one class-room to another, his untrained judgment might be bewildered by a diversity of methods and devices born sometimes of originality, sometimes of eccentricity or routine.

(2) A single term for the training course would manifestly be inadequate.

(3) The preliminary year is to be followed (according to the provisions of the Order) by a solid year of probation in a recognised school. This is the time when the young probationer, while still under some supervision and guidance, will be best able to make a fruitful combination of theory and practice in work more independent than has hitherto been entrusted to him.

(4) Not all schools would be capable of giving effective help and instruction to student-teachers; it would therefore be an advantage to reduce the number of student-teachers who would apply for admission in any given term, and this would be the effect of this proposal.

(5) Though the conditions of their work have been discussed at the former session of the Conference, a further word about them may be allowed.

The headmaster will doubtless undertake to give such supervision as in his power: but his attention will be demanded for many other duties: it is desirable that he should select a member of his staff to act as adviser and tutor of the student-teacher under fixed conditions.

If the student-teachers come only for one term, any recognised school with over 100 boys might be able to receive more than one during the year—in a large school four or five might be admitted each year if distributed among the several departments. In each case a member of the staff would be appointed to give guidance and supervision for classical, or mathematical, or modern, or scientific work.

But for reasons given before and confirmed by experience, it must be recognised that such internal supervision by the local staff has not been, and cannot be, adequate. The supposed tutors lack both the technical knowledge and the leisure necessary for effective training.

It would be a great advantage if external systematic help could be given by a master of method, or an inspector, who should prescribe and test a course of reading: he should look over and criticise the candidate's notes for lessons, and reports of progress, which notes and reports should be sent to him at

frequent intervals: he should visit the school occasionally to confer with the headmaster and the tutors, to hear the candidate teach, to give lectures and specimen lessons, perhaps in presence of other members of the staff; and to provide that the candidate's course of reading, teaching, and technical instruction shall be duly correlated to that of the training course which is to follow.

For these services the master of method must of course receive fees: but, further, a fee should also be paid to the advising member of the staff in return for his help: otherwise help is likely to be casual and perfunctory. In the report of the joint committee it is estimated that the cost of a training course to the student exclusive of residence would be £30 a year. One-third of this would supply but a meagre amount for fees both to the master of method and the tutor-colleague: but if the student-teacher were receiving his maintenance free, or at a low rate of cost, as might often be the case in a school, he might afford to pay more than £10 for advice and instruction during the single term of school-residence.

It may be hoped that in many cases the new local authority will be able and willing to give scholarships and allowances to aid student-teachers: the central authority might help to persuade them that this would be a most profitable application of the funds disposable for education. In schools that preferred to be independent of the aid and control of the local authority, the governing body would probably think itself justified in subsidising a student-teacher.

The proposed partition of the year might be objected to on the ground that two terms are not sufficient for the many subjects that have to be dealt with in a training course: experts have said that not less than thirty weeks are required for this purpose.

If that is so, an obvious solution of the difficulty would be the following. The scheme of the Board of Education demands two years, one of student-teachership or training, one of "probation." Let these two years be otherwise divided thus: one term of student-teachership followed by a year at a training course: the two terms that remain would be quite sufficient to test the work of a "probationer," and ascertain whether he was fit to receive the final diploma.

A proposal has been made, and influentially supported, that not only may the whole of the first year of training be spent as student-teacher at a recognised school simply under the supervision of the headmaster and his staff, but also that graduates may be allowed to reckon the second year (or year of probation) as running concurrently with the first. There is no doubt something to be said for this proposal on economical grounds; but its adoption will be deprecated by those who feel that such a system would not be adequate for the purpose of training.

GEOMETRY IN RESPONSIONS AT OXFORD.

We have again this month to record another addition to the list of examinations in which geometry studied on modern lines may be substituted for the text of Euclid's Elements. The following notice, signed by Mr. H. T. Gerrans, the Chairman of the Board of Studies, has been circulated:—

Responsions.

The Board of Studies for Responsions gives notice of the following change in the Regulations for the Examination in Stated Subjects in Responsions, viz.:

In the Regulations as to the Elements of Geometry (*Examination Statutes, 1902, p. 18*) the words

"Euclid's Elements, Books I., II. Euclid's axioms will be required, and no proof of any proposition will be admitted which assumes the proof of anything not proved in preceding propositions of Euclid."

have been struck out, and the following words substituted:

"Elementary questions, including propositions enunciated by Euclid and easy deductions therefrom, will be set on the subject-matter contained in the following portions of Euclid's Elements, viz.:

Book I., the whole, excluding propositions 7, 16, 17, 21;

Book II., the whole, excluding proposition 8;

Book III., the whole, excluding propositions 2, 4-10, 13, 23, 24, 26-29.

Any method of proof will be accepted which shows clearness and accuracy in geometrical reasoning.

So far as possible Candidates should aim at making the proof of any proposition complete in itself.

In the case of propositions 1-7, 9, 10, of Book II., algebraical proofs will be allowed."

This change will come into force at the Examination of *Michaelmas term, 1904*. But Candidates who, having entered their names for the Examination in Stated Subjects before the beginning of that term, shall not have satisfied the masters of the schools, will be allowed to offer as one of their subjects, in either of the Examinations held in Michaelmas term, 1904, and Hilary term, 1905, the Elements of Geometry under the existing Regulations.

SOUTH AFRICAN EDUCATION.¹

SIR THEOPHILUS SHEPSTONE was the first Secretary of Education in Cape Colony, and he tried to unite the existing schemes of Huguenots, Dutch Roman Catholic, Wesleyan, and English Church teachers into a general Government scheme. Then came Dr. Muir, who found the education on "farm" schools of a very defective and elementary kind. He started classes for teachers in the subjects of the various examinations. The classes were held twice a year during the vacations at central towns, Cape Town, Port Elizabeth, and Grahamstown.

They were free to any "farm" teacher, and the fare was paid by Government from the "farm" school to the town where the lectures were held. The teacher only had to provide board for herself. After the lectures there was an examination, and if the teacher passed she received a teacher's certificate. This system was well carried out for some years, and at the end of that time no teacher without a teacher's certificate could teach in any Government school in Cape Colony. The elementary examinations have gradually been dropped and the easy teachers' examinations discontinued.

The schools at Ronderbosch, Wynberg, Cape Town, are just like first-rate English or Scottish high schools. The Wellington, Worcester and Stellenbosch schools are taught by Americans. The system under Dr. Brebner in the Orange River Colony was a good deal hampered by a Dutch Raad, many members of which were themselves very untaught, but some of the schools were good, notably those at Bloemfontein and Harrismith. Dr. Mansveldt in the Transvaal was a political agent as well as a superintendent of education, and his duty was to keep out "Ætlander" teachers and pupils by enforcing the teaching of

¹ Abstract of a lecture by Miss P. M. Darton delivered at the Mary Datchelor Training College.

all subjects in Dutch. The "Ætlander" paid 9d. in taxes a head for educating Dutch children. Transvaal schools were not up to those of the Free State, unless as in Johannesburg they were private efforts, like those of Miss Buckland and Miss Orr.

Now Mr. Sargeant has charge of the Transvaal and Orange River Colony, his system is altering matters. He has secured from home a number of well-trained teachers and specialists. The Dutch schools are made into first-rate English ones. Dutch is no longer the medium of all education, but taught as a language like Latin, French and German. The concentration-camp schools will remain as Government country schools, and throughout both States and on all mines there will be excellent Government schools, with well-trained teachers, with no distinction as to nationality. In towns the more advanced schools for the better class will take boarders and day scholars. All schools will be under Government inspection, and sewing, cooking, wood carving and athletics, will be part of the new scheme.

The English and Dutch who have become very wealthy wish to educate their children well, and a journey to Europe is a very easy matter to them. As a rule, their daughters learn French, German, music, and drawing, in Europe. They travel much, and at fifteen are far more accomplished than girls of the same class in England. The average colonial girl is quick and receptive, she is also often superficial, but she is pleasant to teach. She naturally dances well, plays, and paints. She is clever with her fingers, and quick in picking up the manners of those about her.

Many girls come to school with very elementary knowledge of most subjects and no knowledge of Latin, and yet have to pass examinations. The teacher's work is often difficult and wearying in consequence. A good teacher in a good school in a South African town often has to "cram." This difficulty will have passed away in a few years, as the younger girls will have had the advantage of a thorough grounding.

The large schools are fine buildings, with the latest modern appliances, first-rate teachers, and many good pianos. The "farm" schools are also provided with suitable books, maps, desks, &c.

Salaries are not better than in England, and expenses are very much higher. In Natal they are lower than in Cape Colony, and are highest in the Orange River Colony and the Transvaal. Journeys and hotels are very costly. There are lady inspectors for needlework, cooking, &c. At Cape Town there are Extension Lectures; in Grahamstown and Johannesburg, excellent Literary Societies with first-rate intellectual men as members.

Mr. Sargeant's schemes are elastic, and he proposes to adapt the teaching to the needs of different pupils and States.

Salaries are still low compared with the cost of living, but life is worth living, in sunshine and health. At present competition is less than in Europe, but also posts are fewer. A teacher who is engaged by wealthy parents for girls of fifteen or sixteen will, in Johannesburg, probably lose them in six months, as the girls may go to Europe for the hunting season, or for the London season, or a tour to European picture galleries.

Then there are no other pupils to take their place, and the teacher may have to journey to another State at a cost of £10 or £20 to find fresh work.

Hitherto the examinations have been quite different from ours at home. Now doubtless the Oxford and Cambridge Locals will be used as in Natal, and the examinations of the Royal Academy of Music and Trinity College have long been used for schools in all South African States.

The future Colonial girls and boys will have superior chances to the English child—for the teaching and school appliances will all be first-rate—and the climate will give the rising generation advantages in health which England can never afford.

The one drawback seems to be that schools must, for a genera-

tion at least, contain pupils of very varied parentage and development, but—as in railways—there will be no old "rolling-stock" to wear out; buildings, desks, books, and teachers, will all be "up to date."

OFFICIAL HINTS TO TEACHERS.¹

Two recent Blue Books contain numerous hints to teachers from experienced inspectors and deserve careful attention. These reports supply further evidence of the want of foundation for the common belief that nothing of any value to the practical teacher is to be obtained from Blue Books. Whatever the reason may be, it is unfortunately true that the cases in which reports of the kind under consideration find their way into the hands of acting schoolmasters and schoolmistresses are quite exceptional. The plan adopted by the United States Bureau of Education, by which the reports of the Commissioners of Education are circulated among American teachers free of charge, might with advantage be copied by the Board of Education here. Compared with the good effect on methods of instruction throughout the country such a course of action might be expected to have, the cost would be trifling.

The limits of a short article prevent more than a selection to be made from the multitude of good things to be found, and the following results of some hours' browsing are offered in the hope of persuading teachers to obtain the reports themselves. The first selections are from the general report of Mr. T. King, Senior Chief Inspector of schools in the metropolitan division, in compiling which he has made full use of reports sent to him by the inspectors of the various districts included in his division.

The Teaching of Arithmetic.

Speaking of the teaching of arithmetic in the public elementary schools of Chelsea, Mr. Helps, the Inspector, says: "experience shows that the four simple rules can best be taught by dealing with small numbers, first in the concrete, and then in the abstract, gradually increasing these numbers, and that what are called 'problems' should be simply the application of these rules to such questions and matters as occur in daily life."

In the Hackney district, Mr. Stevelly finds that: "sometimes practice lessons in arithmetic savour too much of examination, the teacher merely putting a number of questions on the board, then attending to registers or other business until the class has had time to work the answers, and finally marking these right or wrong. The quick children will have been idle during most of the time allotted to such a lesson, while the weaker ones, though busy, will have learned nothing. It is surely better to put up one question at a time, and let all the class or section work it under the eye of the teacher, who, if the question present general difficulties, may then work it with the help of the class on the board or otherwise, quickly test the correctness of the answers and pass on to another example. In examples on new rules, large numbers should be avoided, as they tend to bewilder or discourage the children."

Mr. Newton, reporting on the Greenwich schools, says: "it has become generally recognised that arithmetic means something more than the working of sums, and there are now few schools in which the scholars cannot give more or less valid explanations of the commoner arithmetical operations. Unfortu-

¹ "General Reports of H.M. Inspectors on Elementary Schools and Training Colleges for the year 1901." 234 pp. (Eyre & Spottiswoode.) 1s.
"General Reports of H.M. Inspectors on Science and Art Schools and Classes and Evening Schools, and of Examiners in Science and Art for the year 1901." 97 pp. (Eyre & Spottiswoode.) 5½d.

nately, a strange misuse of the arithmetical symbols is still too common. This fault can be traced to its source, for a similar misuse of the same symbols disfigures many of the papers worked at the Certificate Examination. The college lecturers on arithmetic might surely impress on their students the objections to pieces of work such as—

$$(1) 65 \div 7 = 9 + 2.$$

$$(2) 12 : 8 :: 15 = \frac{8 \times 15}{12}.$$

$$(3) \frac{\frac{1}{2} + \frac{1}{2}}{5} = \frac{2}{5} = \frac{2}{5}.$$

History and Geography.

Referring to the instruction given in history in the schools of his area, Mr. Newton says: "the writers of the historical readers often fail to remember that books intended for children should leave out many things which find a proper place in reference books intended for adults. It is not to be supposed that historical details are always out of place in children's books. On the contrary, judiciously chosen details aid the memory rather than burden it, and serve to give life to topics which seem lifeless when the details are wanting. Thus, one view of Queen Elizabeth's character is gathered from the specific statement that she owned 400 costumes much more than from the general statement that at times she was frivolous and extravagant. The writer of a school history ought, however, most carefully to avoid descriptions of isolated incidents which, so far as children can see, arise out of nothing and lead up to nothing. Matters such as the Porteous riots, the murder of Mr. Percival, and the like, should find no mention in books written for children. Good historical reading-books are in the market, some of them bear the name of a much-honoured living historian, but unfortunately, the best advertised books rather than the best written ones are apt to be chosen. However good the historical reading-book may be, the teaching of history must be difficult, but the difficulties arise not from the want of time, but from the nature of the subject. It is obviously hard to give the young children of the twentieth century an adequate idea of the great men who lived in the thirteenth or sixteenth."

Mr. Helps reports that "large numbers of children now leave our schools annually totally ignorant of much geography and history—a knowledge of which would add to their pleasure, and interest, and profit in life—because it is the practice (a practice which has been encouraged in the past) to teach these subjects piece-meal in parts and periods. Following this practice, a child who leaves school . . . may have got no further than the Stuarts in history, and may never have heard of the American War of Independence, and events of like importance, or, of say, Egypt or Japan. This method of teaching a subject, bit by bit, instead of broadly, and in correlation with other subjects, pervades our whole system of elementary education. It is a legacy of past 'Codes' when little parcels of information were made up during the year, labelled, and paid for at the end of the year. What we need is more breadth, continuity, and association in the teaching, and, above all, the training of the child to use its own powers of acquisition and research. It is now a common practice to divide the year's work into periods; thus, if Europe has to be studied, instead of first taking a general survey of Europe, each country will be taken in detail. It is obvious that at the end of the year the child will have forgotten a great deal of what he learnt in detail at the beginning, whilst if a general survey were made in the first period, and the ground were covered again, revising and supplementing more fully in each succeeding period, the teacher would be feeling his way, and making sure of his ground all the time. So long as learned Boards of Examiners make fetiches of river basins, treaties, and

such like, it is hopeless to expect a very keen sense of proportion of relative values in the teaching of geography and history in the elementary schools, but more common sense might be exercised in choosing the history for young children. I too often find such subjects as 'The Georges,' 'The Reformation,' suggested for children seven and eight years of age. There is also a tendency to dwell upon wars and battles rather than upon social progress. It seems desirable that the teaching should follow certain broad lines, e.g., expansion of Empire, social progress, inventions, discoveries, great persons of history, changes in constitution, &c."

Disappearance of the Slate.

Mr. Graves, the Inspector in the Southwark district, finds that "the use of lead pencils in writing from the lowest classes in the infant schools upwards is leading to the exclusion of the slate from our schools. And a good thing too. There is no more fruitful source of infection than the cleaning of the slate by the old vulgar method or even by breathing upon it. Children's eyes suffer from writing upon slates, the lines upon which need frequent renewal. Time is wasted by the sharpening of pencils, and unless these are kept of uniform length the handwriting suffers. Children get into a hesitating way of writing and drawing upon slates, constantly rubbing out what they have put down. Finally, the slate contains no lasting record of school work. It is well, therefore, that the slate is being driven from the schools in favour of pencil and pen-and-ink work upon paper."

The Objects of Science Teaching.

Reporting on the West Lambeth district, Dr. Eichholz, says: "there are signs in the laboratory lessons that the boys exercise their individual powers of thought too little, and that their reflective powers are exhausted when they have brought the experiment to a close. The one way to remedy this is to limit the number of experiments. There is no point, especially at the commencement, in getting through a large number of experiments, but it is highly important that the whole bearing of each operation should be fully apparent to the performer. The experiment should be abundantly discussed from every point of view, and a full record kept for future reference. The laboratory course in the elementary school is one more avenue to the development of general intelligence, and the lessons should be given not so much as part of an isolated speciality, but rather as part of the whole school training. The teaching of science is undertaken not with the intention of turning out scientists any more than woodwork is expected to develop carpenters; but what is to be desired is that the processes witnessed in the laboratory will lead to exactness of idea and expression, and to a logical and sequential habit of thought."

Country Schools.

In his estimate of the rural schools in the East Central Division of England, the Rev. C. D. Du Port, one of H.M. Chief Inspectors, quotes from Mr. Holmes, the Inspector of the Oxford district:—"The best of them are truly excellent. The reasons for their success are not far to seek. If isolation is a drawback to the country teacher, it is also a distinct advantage. Relieved from the pressure to which 'birds of a feather' are apt to subject one another when they 'flock together,' the country teacher is free to go his own way, to follow the bent of his 'genius,' to run his favourite hobby as far as it will carry him. One result of this is that, if he happens to be a man of character and ability, he has generally more originality and initiation than the successful urban teacher, whose energies are confined for the most part within conventional channels. His pupils, if less sharp and less

lively than his urban *confrères*, are more amenable to discipline, and more patient and persevering. Also, as the number of his pupils is small, and the number of his subordinate teachers very small, he is able to make his personal influence felt in every nook and corner of the school. . . . Even the hobbies which isolation tends to foster are valuable instruments of education. One teacher is specially strong at natural history, a second at practical mechanics, a third at gardening, a fourth at book-keeping, a fifth at needlework, a sixth at drawing, a seventh at literature, an eighth at outdoor games; and each of these teachers can, if he pleases, make his pet pursuit an effective means of stimulating the interest and developing the intelligence of his pupils. Other teachers, again, being untroubled by attendance officers, throw themselves with extraordinary energy into the work of improving the attendance at their schools. It is worthy of note that there are seven or eight village schools in this district in which the attendance is absolutely perfect, the ratio of actual to possible attendances being nearly 99 per cent., and no child being ever absent except on account of really serious illness; it may be doubted if any town school can show results quite equal to these. . . . Though educational work in the country is carried on under serious difficulties, it has considerable compensating advantages."

The Value of Examinations.

Mr. Rooper's remarks upon Examinations, also included in the Rev. C. D. Du Port's general report, show that if often abused examinations have an important use in school work. "Examinations are an indispensable part of the teacher's craft, and studies which are not properly tested from time to time are seldom thorough. Examinations should be conducted with the strictest formality. Copying and assisting should be serious offences, and the scholars should learn the strictest code of honour in these matters and always to 'play the game.' Examinations should also be periodic, and the children should look forward to them as an agreeable change in the routine, and as an incentive to study. The results should be made clear to the scholars. . . . In the case of the older children the written examination should extend to all the subjects which are studied, instead of being confined to 'four sums and a piece of dictation,' and the marking may well be expressed through figures and the results tabulated, so that the work of the children can be arranged either in classes or in exact order of merit, the former plan being the better plan. Part of the examination should be oral. Oral answering makes children ready, and practice in it enables children to collect their thoughts promptly and rapidly. Success in oral answering depends upon the careful teaching of the mother tongue, and the habit of answering when required in complete sentences. Good oral answering depends upon good oral questioning; and although every examiner flatters himself he is a good questioner, comparatively few question a class really well; because, besides having the subject matter stored and arranged in his mind, the examiner must know how to get in touch with the class, a natural gift which may, however, be cultivated by those who are not endowed with it by nature. It is comparatively rare to find among the scholars in the English schools many who can give a clear and connected reply, in good English, to an oral question; whereas abroad, owing to the high value attached to the proper use of the mother tongue, and to much practice in the art of putting questions orally, the capacity to do this is quite usual among the older children. . . . No teacher should trust to himself exclusively to set his own papers. Each class should be examined by some one who has not taught it. On the other hand, the examiner should be well informed of the exact lines of teaching, and should follow them with attention, for there should be sympathy and not conflict between the examiner and the teacher."

ITEMS OF INTEREST.

GENERAL.

THE announcement of the death of Prof. H. L. Withers, on December 12th, at the comparatively early age of thirty-eight, will be received with deep regret in the educational world. He possessed an exceptionally wide knowledge of educational work, and by his death the country has been deprived of the inspiring influence of a man familiar both with theoretical principles and practical possibilities. Educated at King's College School, London, and at Balliol College, Oxford, he afterwards served for a time as assistant-master in the Wesleyan Elementary Day School, Oxford, in order to acquire experience in the work of teaching. He was also successively a master at the City of London School, Manchester Grammar School, and Clifton College, and principal of the Isleworth Training College. In 1899 Prof. Withers accepted the chair of education at the Owens College, Manchester, and occupied it until his death. He was interested in all educational methods and experiments, and contributed much valuable material to their discussion and advancement. Attractive in personality, receptive in mind, eloquent in speech and sound in opinion on the science and art of education, Prof. Withers was esteemed by all who knew him, and his death has diminished the factors of progress in no slight degree.

BEFORE this issue is published the Education Bill will have passed both Houses of Parliament. The second reading debate on the Bill began in the House of Lords on December 4th, and the Bill was read a second time on the following day, the majority being very large. During the committee stage in the upper house the Government accepted an addition to the section providing that there should be no formulary distinctive of any particular denomination taught at any provided school, by which, at the request of parents, the local education authority may allow such religious instruction, but not at the cost of the rates. An amendment was carried that all damage in schools due to wear and tear should be made good by the local authority. What is known as the Kenyon-Slaney Clause was amplified so as to embody the assurances given by the Government during the passage of the Bill through the Commons. As we go to press the changes made in the Bill by the Lords are being considered in the House of Commons.

THE Delegates for the Oxford Local Examinations have approved the following Regulations for geometry for 1904. PRELIMINARY.—*Geometry*: including the subject-matter of Euclid, Book I, propositions 4-6, 8, 13-16, 18, 19, 26-30, 32-41, 43, and the following or similar constructions: bisection of angles and of straight lines; construction of perpendiculars to straight lines, of triangles and quadrilaterals from given data, of parallels to a given straight line, of angles equal to a given angle; division of straight lines into a given number of equal parts. *Higher Geometry*: including, in addition to the subjects prescribed for preliminary geometry, the subject-matter of Euclid, Book I., propositions 47, 48, and Book III., propositions 3, 14-16, 18-22, 31, and the following or similar constructions: construction of a triangle equal in area to a given polygon, of tangents to a circle, of common tangents to two circles. Questions may be set involving a knowledge of the forms of the cube, prism, sphere and cylinder.

JUNIOR.—*Pass Geometry*: including, in addition to the subjects prescribed in the Preliminary examination, the construction of the circumscribed, inscribed, and escribed circles of a triangle. A knowledge of the forms of the simpler solid bodies will be assumed. *Advanced Geometry*: Questions will be set on the subjects included in the pass geometry paper, on

the subject-matter of Euclid, Book II., Book III., propositions 32, 35-37; Book VI., propositions 1-8, 19, 20, 33, A, D, and on more difficult constructions of rectilinear and circular figures. In dealing with proportion candidates may assume that all magnitudes of the same kind may be treated as commensurable. There will be no change in the examination for Seniors.

THE Delegates give notice that questions will be set so as to bring out as far as possible a knowledge of the principles of geometry. Any proof of a proposition will be accepted which shows an accurate method of geometrical reasoning. In the proof of theorems and deductions from them the use of hypothetical constructions will be allowed. Geometrical proofs of the theorems in Book II. will not be insisted upon. Every Junior or Preliminary candidate offering geometry must be provided with a ruler graduated in centimetres and millimetres, and in inches and in tenths of an inch, a small set square, a protractor, and compasses. Figures should be drawn accurately with a hard pencil. Questions may be set on the use of squared paper.

WE regret that Sir Michael Foster resigned his seat in Parliament at the end of the Session which has just closed. His intimate acquaintance with every detail of secondary education and his wide knowledge of the needs of education in all its grades fitted him in a peculiar degree to represent the University of London in the House of Commons. There are at present three candidates for the vacancy thus created. Sir William Collins, Sir Philip Magnus, and Sir John Williams. The last two are Unionists while Sir William Collins is the Liberal candidate.

THE Board of Education has determined that the Matriculation or Preliminary examination of Universities, which they have hitherto recognised in the case of women students in training colleges as equivalent to portions of the Certificate examination required at the end of the second year of training, shall not, after July, 1904, be so recognised. This decision applies to the Matriculation examination of the Universities of London, Wales and Birmingham, and to the Preliminary examination of the Victoria University. Previous arrangements will remain undisturbed as regards women-students already preparing to take any of these examinations at the end of their second year of training in 1903 or 1904; but the decision will apply to all women-students admitted after the present date.

THE Technical Education Board of the London County Council has arranged to hold another conference of teachers at the South-Western Polytechnic, Chelsea, on January 9th and 10th, 1903. The chairmen for the consecutive meetings are Mr. Ward, chairman of the Education Board; Sir William Anson, Prof. Farmer, F.R.S., and Prof. Callendar, F.R.S. During the first day the addresses will be entirely mathematical, and are to be given by Messrs. Andrews, Castle, Eggar, Siddons and Usherwood. The third session will be given to botanical subjects, when Miss Clarke and Mr. Lacey give addresses. Mr. Newth, at the last meeting, takes up the subject of experimental illustration in the teaching of chemistry, and Mr. Busbridge the making of lantern-slides. Free admission to the meetings will be granted to as many teachers as the conference room will accommodate, by ticket, which can be obtained from Dr. Kimmins, Dame Armstrong House, Harrow, or from Mr. C. A. Buckmaster, 16, Heathfield Road, Mill Hill Park, W.

A PRELIMINARY notice of the first conference of science teachers in the North of England was given in our issue of August last, and a detailed programme has now been sent to us. The conference will be divided into four sessions—two

meetings on consecutive days—presided over respectively by Mr. M. E. Sadler, Prof. Armstrong, F.R.S., Prof. Smithells, F.R.S., and Prof. L. C. Miall, F.R.S. A reception of members of the conference by the Lord Mayor of Manchester, in the new Technical School, Manchester, where the meetings are to be held, will take place on the morning of January 2nd, and the reading of papers will follow immediately. Miss Burstall deals with curricula and Dr. Kimmins with the co-ordination of the science teaching of various grades of schools. The early teaching of science will be discussed in the morning of the second day, the debate being opened by Messrs. W. French and R. L. Taylor, who take up physics and chemistry respectively. Mr. Wager explains the methods of nature study in the afternoon. There will be an exhibition of apparatus, preparations and diagrams, and visitors will be invited to visit Owens College, the Municipal Art School, and to examine the new Technical School. Admission to the conference will be free by ticket, to be obtained from the honorary secretaries, Dr. Lloyd Snape, and Mr. J. H. Reynolds, at the Technical School, Manchester.

THE annual meeting of the Geographical Association will be held in London on Friday, January 9th, at 3.30 p.m., in the Hall of the College of Preceptors, the President, Mr. Douglas Freshfield, in the chair. An address will be given by the Hon. Sir John Cockburn, K.C.M.G. (formerly Minister of Education and Prime Minister of South Australia, and now Chairman of the Australian Chamber of Commerce, London), on the Australian Commonwealth. There will also be an exhibition of examples of all scales and styles of ordnance-survey maps, and Mr. Andrews will give a lantern demonstration in connection with the exhibition.

IN order further to promote the commercial education work of the London Chamber of Commerce, the Commercial Education Committee has, with a view to increasing the supply of qualified teachers of commercial subjects in our schools, offered to admit, at half-fees, head teachers and their assistants to the regular courses of lectures in banking and currency, commercial and industrial law, commercial geography and history, and business machinery and methods.

THE Modern Languages holiday courses arranged by the Teachers' Guild last summer proved thoroughly successful both from the point of view of the committee whose special duty it is to organise them, and also from that of the students who were present at the various centres. The full number of students allowed for at Honfleur was reached, and at Tours there was an attendance higher than on any previous occasion. The Spanish course was a fresh experiment last year, and though the attendance was small, the experience of those who took part in it was so favourable that a repetition has been arranged for 1903. As many as thirty-six county-council students took part in the French courses, viz.: from the West Riding of Yorkshire, 20; from Derbyshire, 5; from Surrey, 2; from Berkshire, 2; from Cheshire, 1; from Wales, 3; from Bradford, 2; from Newcastle-on-Tyne, 1. Courses, lasting from three to four weeks, will be held in August, 1903, at Tours and at Honfleur, and also at Santander, if a sufficient number of entries is received. The representative of the English committee for Tours will be Mr. E. C. Fisher, M.A., Cranbrook School, Kent, and, for Honfleur, Mr. E. W. Hensman, M.A., head-master of the Rawlins School, Quorn. The representative for Santander has not yet been chosen.

MR. JAMES GRAHAM, inspector of schools to the West Riding County Council, in the course of his recent tour around the commercial schools of Europe, made a special study of

modern school furniture. On his advice the Technical Instruction Committee of the County Council has purchased specimens of a number of desks, seats, work-tables, &c., which seemed to Mr. Graham worthy of introduction into English schools. The interesting collection formed in this way has recently been on view in the County Hall, Wakefield, and it would be an excellent thing if the collection could be lent to other counties for exhibition in a similar way.

At a recent conference of teachers and school managers from all parts of the East Riding of Yorkshire, held at Beverley, a representative committee was elected to promote nature-study in the district. Lord Herries presided, and Prof. Miall, F.R.S., delivered an address in which he described what the teaching of nature-study in schools should be. Prof. Miall thinks it is unfortunate that a regular industry has been organised for the supply of ready-made object-lessons and lantern-slides, and he advised his hearers not to use stuffed animals and dried plants in the class-room, but wherever possible to study living animals and plants. If only an hour a week can be spared for nature-study work, it is better not to attempt the study, for, said Prof. Miall, three hours is the minimum to be of any use.

A JOHANNESBURG correspondent of *The Times* points out that, in reply to a memorandum from the Church Committee, representing the general assembly of the Dutch Reformed Church, the Government intimates unmistakably the lines on which the educational policy of the new colonies will be conducted. The Government aims at securing, by means of local officers of the Education Department resident in important centres, a sympathetic treatment of school questions until such time as growing confidence between all sections of the inhabitants of the Transvaal makes it reasonable to introduce popular control of the schools. The teachers will be appointed by the Government. All possible consideration, however, will be given to former teachers in the service of the late Republic, and instruction in the English language, where necessary, will be provided free of charge so as to enable them to take appointments. Opportunity will be afforded for thorough instruction in the Dutch language in the case of all children whose parents make a request for such instruction.

We have received from the Superintendent-General of Education for the Cape of Good Hope his Report for the year 1900. Considerations of space prevent us from dealing with the portly volume in any detail; but the effect of the war upon the supply of schools in the colony is so pronounced that special reference to it is quite justified. Whereas in 1898 there was an increase of 200 schools, and in 1899 a further increase of 132, there was during the first year of the war a net loss of 61 schools. The schools which suffered most were those which supply the wants of the white people in the country districts, which, until the outbreak of the war, had been rapidly increasing in number. On the other hand, the growth of aborigines schools has scarcely, if at all, been interfered with.

THE last annual report of the Minister of Education for New Zealand is another piece of convincing evidence that educational activity is one of the most pronounced characteristics of the component countries of the British Empire. In New Zealand, moreover, the efforts of educationists are not confined to white people. In the report before us we read: "There is now in almost all Maori schools a good deal of manual and kindergarten work done; that the children like it, while the teachers are becoming alive to its beneficial effects on the other work of the school. . . . Such operations as paper-folding, paper-weaving, work in plasticine, cane-weaving, and 'bricklaying' are now regularly taught in most of these schools." There is

reason to believe, too, that the methods now in use are likely to give Maori children a power of speaking English fluently and correctly in a reasonably short time.

A SYNDICATE has been appointed to consider what changes, if any, are desirable in the regulations that affect the mathematical portions of the pass examinations of the University, in particular of the Previous examination. The members of the syndicate are:—The Vice-Chancellor, Mr. C. Smith, Prof. Forsyth, Dr. Hobson, Mr. W. L. Mollison, Mr. C. A. E. Pollock, Mr. W. Welsh, Prof. G. B. Mathews, Mr. S. Barnard, Mr. W. M. Coates, Mr. E. T. Whittaker, and Mr. A. W. Siddons. It is probable that the syndicate will recommend changes analogous to those which have been introduced in connection with the University local examinations, especially as regards the dominance of Euclid.

M. CAPMARTIN, a pharmacist at Blaye, has set an example we should be glad to see followed by English druggists. He has paid into a local bank the sum of £20 which he offers as a prize for the best essay on practical hygiene in schools and for the teaching of elementary hygiene. The winning essay will be printed at M. Capmartin's expense, and 30,000 copies placed at the disposal of the Minister of Public Instruction for distribution in schools.

MESSRS. ARCHIBALD CONSTABLE & CO., LTD., will shortly publish "The Nature Student's Note Book." The volume will consist of two parts: the first, entitled "Nature Notes and Diary," is by the Rev. Canon Steward, whose monthly Nature Notes in our columns have made him well known to our readers; the second part consists of "tables for classification of plants, animals and insects," and has been drawn up by Miss Alice Mitchell, the lecturer in natural science at the Salisbury Training College. Teachers and students of nature study should look out for this volume.

THE lantern is largely used in the lecture-theatres of many colleges, but its value as an aid in teaching does not appear to be so fully recognised in secondary schools. Perhaps one reason for this is to be found in the general impression that a darkened room is indispensable for a lantern lesson. This is a mistake; all that is necessary is to avoid exposing the screen to a strong outside light. We have known a blank wall, or even a window-blind, to answer excellently for the purpose. These remarks are prompted by an examination of the excellent series of lantern slides which Messrs. Sanders and Crowhurst, of 71, Shaftesbury Avenue, W., have prepared from Mr. Oliver G. Pike's photographs of British birds and their nests. Most of these have already appeared in Mr. Pike's popular books on Natural History, and are remarkable not merely for their beauty as pictures, but for their sharpness of definition. It was Tyn-dall, we believe, who said that to know what to look for is the first essential to accurate observation. Lantern lessons with such slides, given during the dark days of winter, will form the very best preparation for the out-of-door nature-study of next spring and summer, for they will show the pupil "what to look for."

THE educational pessimist has been so persistent in recent times that we have heard little of anything at conferences but the shortcomings of our system of education as compared with those of France and Germany. Teachers should find the admirable article in the *Fortnightly Review*, by Baron Pierre de Coubertin, on "Are the Public Schools a Failure?" very refreshing reading. This well-qualified judge has a high opinion of English education, which he has arrived at after examining it by

the standards of an educational expert. In reviewing Arnold's influence on our public schools he attaches most importance to the fact that "never had school life so accurately reproduced the features of society." Examining the question of what sustained the British citizen during the recent war, he comes to the conclusion: "It was neither his pride of race, though that is real enough, nor his invincible faith in his country; it was the habit learned during his education of continually knocking up against obstacles and stopping quietly to consider whether it would be best to get over them or to get round them; it was the habit formed at school of forming an opinion of his own and sticking to it; above all, it was the habit of voluntarily sacrificing his individual interests to the general good." We advise the teacher who is troubled about the question of our educational inferiority to study this article.

THE second number of *King and Country*, the new half-crown monthly review, published by Messrs. Horace Marshall and Son, the aims of which are essentially patriotic, contains two articles which appeal particularly to schoolmasters and schoolmistresses. One, entitled "An Educational Suggestion," is by Mr. A. P. Green, who proposes that some portion of the time now spent at work should be given over to school-work. "All workers up to the age of twenty should have the option of leaving off work at five o'clock in the evening on at least two days in each working week other than Saturday, on condition that they spent two hours at least on each of these evenings in the evening school." The other article, "British Youth and the Empire," is subdivided, the first part being by the Earl of Meath and the second by Mr. J. Astley Cooper. The question discussed is the idea of an Empire Day when the pupils in schools should "take part in patriotic demonstrations and exercises calculated to remind them of their mighty heritage and of the responsibilities attached to the privileges they enjoy"—to quote the Earl of Meath. Mr. Cooper thinks such a day is now unnecessary, when "every day is an Empire Day."

To a recent number of the *Indian Review* the Editor contributes an article on "Higher Education of India," in which he discusses the recommendations of the recent Universities Commission, expressing the hope that Lord Curzon will not carry them into effect. He fears that the Commissioners had exaggerated ideas of the defects of Indian higher education, and that their recommendations may, if carried out, interfere with the progress of education in India.

We learn from the *Revue générale des Sciences* that M. Liard, vice-rector of the Academy of Paris, has arranged a series of conferences of teachers in French secondary schools in which certain of the chief inspectors will explain what should be the methods of teaching adopted and what the objects in view in teaching the subjects of the school curriculum. The first conference dealt with the subject of modern-language teaching, and the methods of the reformers were explained and approved. The next conference will discuss the teaching of physical and natural science.

SCOTTISH.

THE annual meeting of the Modern Languages Association of Scotland was held in the Edinburgh Institution. Prof. Kirkpatrick, Edinburgh University, was elected president for the ensuing year, and Monsieur Charles Martin vice-president. Dr. Schlapp, in his retiring address, said that the Carnegie Trust had so far advanced their cause that in a few years the existing university lectureships were likely to become professorships. The movement appealing to patrons of bursaries to open them to

modern-language candidates on equal terms with classical students had already proved very successful, and should materially increase the number of students of modern languages in the universities. The popular movement in favour of placing modern languages on a satisfactory footing in the schools had gathered strength, and he was certain would soon be powerful enough to overcome even the prejudices of the Scotch Education Department.

AT a meeting of the Western Branch of the Secondary Teachers' Association the following resolutions were unanimously approved in regard to the mathematical papers at the Leaving Certificate Examinations: (1) That hypothetical constructions be allowed. (2) That any proof of a proposition be accepted, even though axioms, definitions or postulates other than Euclid's be employed. (3) That proof of self-evident propositions should not be demanded. (4) That in Euclid, Book VI., incommensurable quantities should not be employed. No reform in the methods of mathematical teaching can be expected till these or somewhat similar concessions are granted by the Scotch Education Department. The examinations under their control determine in large measure the nature of the teaching in all the secondary schools of Scotland, and reform in the character of the examinations must precede reform in the methods of instruction. As the Civil Service Commissioners and the governing bodies of the Oxford and Cambridge Local Examinations have already approved similar recommendations, it is hoped the Scotch Education Department will speedily adopt them.

THE Higher Education Committee of the Glasgow School Board has forwarded the following resolutions to the Scotch Education Department in regard to the proposed Commercial Certificate: (1) In view of the comparatively slight educational value of book-keeping and shorthand, these subjects should be regarded as optional. (2) Commercial papers in modern languages should not be insisted on. A knowledge of business terms can only be acquired in actual business, and this can speedily be done if a sound knowledge of the language on its literary side has been acquired in school. (3) The Board regrets that the Department makes no provision for leaving certificates for the usual curriculum in secondary schools for girls or for the modern side of boys' schools. They regret also that the Department has not taken the simplest means of remedying the defect by withdrawing Latin as a requirement for the leaving certificate when two modern languages are taken.

THERE are already ominous signs that Lord Balfour's desire to carry with him the whole nation in the next educational advance is not likely to be realised. On one hand Mr. Thomas Shaw, M.P., Mr. Bryce, M.P., and others, declare that, while they have the utmost confidence in Lord Balfour and in his ability to produce a measure making for the educational advance of the nation, they have none whatever in the Cabinet who will largely aid in shaping the new Bill. They promise also beforehand the utmost hostility to any proposal to transfer the management of educational affairs from the present popularly elected bodies. On the other hand, a select body of Unionist members appeal to Lord Balfour not to proceed with a comprehensive measure dealing with all branches of education. They strongly favour the introduction of a modest Bill dealing only with secondary and technical education. There is grave danger that after their trying experience with the English Bill the Government may adopt the path of least resistance and introduce only the smaller measure. Lord Balfour has already declared that it is impossible to separate the spheres of elementary and secondary education, and that the co-ordination of all teaching is his aim. In spite of the hostility of one section and the apathy of the other, it is hoped he will take his courage in both hands and press forward the comprehensive measure.

THE first general meeting of the Classical Association was held in the Royal High School, Edinburgh. Prof. Ramsay, Glasgow University, presided over a large and representative audience. In his inaugural address the President said that he did not share in any gloomy vaticinations as to the prospects of classical education in this country, if only its advocates made up their minds to accept the following positions: First, that, however firmly they were convinced that the highest kind of mental training was to be obtained from the classics, there were multitudes capable of a higher training to whom the long and severe methods of classical study were not appropriate; (2) that the highest classical education appealed only to one side—though the most universal and indispensable side—of human culture, while science had opened up not only a new world of future practical possibilities, but also a new mental discipline; (3) that the teachers of the classics themselves should be ready to revise their methods in view of altered conditions; (4) while freely admitting the high educational value which could be obtained from the study of modern subjects, it must be insisted that the methods of any study were of far greater educational value than the content of it. The methods of classical study were severe, long and thorough, and this was what had given the classics their supreme educational value. Prof. Baldwin Brown read a paper on "Some Archaeological Aids to Classical Study," and Dr. Heard, of Fettes College, gave one on "Classical Study in the face of Modern Demands." The meeting was a great success, and the catholicity of the views expressed by the various speakers was the best testimonial to the value of classical studies.

THE Govan Parish School Board has taken a forward step of great importance in regard to the training of teachers. Within recent years they have built and equipped a Pupil Teachers' Centre with adequate class rooms, art rooms, and chemical and physical laboratories. The education at this institution is specially directed to preparing for the University Preliminary examination, and large numbers every year have obtained entrance to the Training College on this qualification. This year those of their pupil teachers who have passed the University Preliminary examination, instead of entering a training college are sent direct to the University, attending classes there part of the day and teaching during the other part. These students receive a salary of £25 per annum for their work in the school and are technically described as undergraduate-assistants. On the completion of their graduation course at the University they will be taken into the Board's service, ranking as certificated teachers, and will have a first claim to appointments in secondary departments. The development of this new movement will be followed with keen interest by all interested in the better training of teachers.

THE Congress of the Educational Institute of Scotland will be held this year in Glasgow. The University authorities have kindly placed their buildings at the disposal of the Institute, and the meetings will take place there. Mr. Sadler, Director of Special Inquiries to the Education Board, is to give an address on "Some Impressions of Educational Work in America."

IRISH.

THE Hermione lectures founded in memory of the late Duchess of Leinster were delivered at the Alexandra College this year by Sir Walter Armstrong, Director of the National Gallery of Ireland, on the five afternoons from November 25th to the 29th. He took as his subject Portrait Painting as a Fine Art, divided under the following headings, to each of which one lecture was devoted: (1) Antique Portraiture, (2) Italian Portrait Painting, (3) German, Dutch, and Flemish Portrait

Painting, (4) French and Spanish Portrait Painting, and (5) British Portrait Painting.

THE Department of Agriculture and Technical Instruction for Ireland announce that they offer for competition among students in Irish schools of art and art classes, and students who at present hold scholarships and exhibitions gained from such schools and classes, four prizes of the value of £12 10s., £10, £7 10s., and £5, for the four best designs for use in connection with the Irish secondary teachers' drawing certificates. The designs are to be distinctly national in character and suitable for reproduction in monochrome. Competitors are to send in their designs to the Secretary of the Department not later than January 31st, 1903.

REPLYING to a question in the House of Commons, Mr. Bal-four expressed the hope that the report of the Royal Commission on Irish University Education would be published before Easter. The Commissioners will probably find it difficult to draw up their report. It is one thing to take evidence, and another to sum it up and give practical form to it on so thorny a subject. Meantime, there appears in the December number of *The Empire Review* what may be regarded as the official Presbyterian view from the pen of the Rev. Dr. McCheyne Edgar. He objects to the creation of any new university, and maintains that Ireland cannot efficiently maintain more than one. This one, the University of Dublin, should become the national university, and should be recognised as such by the whole country and by all religions. The only difficulty is the religious one, and this should be removed, not by abolishing the divinity school already existing, but by allowing the establishment of other divinity schools according to the views of Roman Catholics, Presbyterians, and so on, if they desire it. The various colleges up and down the country should be linked up to Dublin University, and with the concession briefly adumbrated an atmosphere suitable to the various denominations would easily be created. The whole article deserves study.

THE Intermediate Board have issued their revised pass-list for the examinations held last June. In addition to the reduction of marks on the pass papers to which we referred last month, the Board has also reduced the standard of pass required on the honour papers. It was immediately pointed out as soon as the concession on the pass-papers was granted, that a similar concession was necessary on the honour papers, and that for two reasons: (1) if the standard of passing on the honour papers is pitched too high, schools will avoid them, and thereby a low standard of education will be encouraged in Intermediate schools, and (2) those schools and pupils who aimed at a high standard at the recent examinations would be penalised. At various prize distributions held during the past month there have been protests against any further important changes being made in the Intermediate Rules. It is urged that the recent revolution should be allowed a fair trial, but that the Board should oil the wheels of the machine by getting into closer touch in some way with the schools and teachers.

TRINITY COLLEGE has founded, under the presidency of the Earl of Rosse, the Chancellor of the University, an Appointments Association on the lines of the similar association in Cambridge. Its objects are twofold: it undertakes to collect information from its correspondents as to the prospects of the different professions in all parts of the world, especially in the colonies, and it proposes to negotiate between graduates of the University who are endeavouring to find employment and employers who have appointments of one sort or another to offer. There is no doubt that the new association will discharge a very useful and important duty.

WELSH.

THE following are the terms of an amendment affecting Welsh schools to the Education Bill (Clause 12, sub-section 6): "Any scheme for establishing an education committee of the council of any county or county borough in Wales, or of the county of Monmouth or county borough of Newport, shall provide that the county governing body constituted under the Welsh Intermediate Education Act, 1889, for any such county or county borough shall cease to exist, and shall make such provision as appears necessary or expedient for the transfer of the powers, duties, property, and liabilities of any such body to the local education authority under this Act, and for making the provisions of this section applicable to the exercise by the local education authority of the powers and duties so transferred."

THIS amendment, moved by Sir Alfred Thomas, the Chairman of the Welsh Liberal Party, came as a surprise to those connected with the Central Welsh Board. The reason suggested for the amendment was the desirability of avoiding a divided authority and a dual control in elementary, secondary, and technical education. The Welsh members of Parliament have opposed the Education Bill so persistently throughout that Welsh people naturally find it difficult suddenly to be asked to confess that, after all, it would be better to adopt the system proposed for England, when Mr. Balfour himself suggested that the secondary-school system and organisation of Wales might stand outside of the Bill. As has been said: "For some years past Welshmen have been congratulating themselves on possessing the best organised system of secondary education in the world, and now it is in the melting-pot on the motion of the Welsh members."

SUCH is the way in which the matter presents itself to many of the Welsh educationists. Naturally, this view found strong expression at the half-yearly meeting of the Central Welsh Board at Shrewsbury. It was, of course, then pointed out that the county governing bodies have for the last seven years been gathering experience, have begun to find their feet, and are getting into working order. These bodies are entirely undenominational. The Chairman pointed out that it would be the duty of the Board of Education to require that denominational bodies should be represented on the county educational committees, and this would introduce an element which had not been hitherto a feature in the Intermediate school organisation.

At this meeting of the Central Welsh Board the following resolution was carried with regard to the training of secondary teachers: "That in view of the changes brought about by the Education Bill now before Parliament in respect of secondary education, and the consequent greater need for trained teachers in our Intermediate schools, and in view of the new responsibilities of county councils as regards education as a whole, it is highly desirable that greater inducements should be offered by way of maintenance scholarships to enable students to undertake this training." This certainly seems an important question when we remember that there are from 400 to 500 teachers in the Intermediate schools of Wales.

THE Welsh County Schools Association submitted a resolution passed by them to the Court of the University of Wales at their last meeting with regard to the Teachers' Register, stating that in their opinion, before entry on Column B of the Register, a course of training for secondary education and probation in a recognised secondary school should be insisted upon. The Association, therefore, approve of Clause III. of the Schedule to the Order in Council, which ordered the formation of the Teachers' Register. This question was referred to a committee

of the Court for report at the May meeting. It is certainly most interesting to find the Court of a university concerning itself with the training of teachers and qualifications for a Register.

CURRENT HISTORY.

IN the October number of THE SCHOOL WORLD we noted the beginnings of our new Imperial Parliament. Like the old English Parliament, it insists on secrecy, and reporters are not admitted to its meetings. But now a Blue Book has told us something of its doings. Among its conclusions we note specially that it is advisable to adopt the metric system of weights and measures for use within the Empire. This should be good news for all teachers. What joy it would be to get rid of our old enemies $5\frac{1}{4}$ and $30\frac{1}{4}$ yards, of the unrememberable "dry" measure and the various "ells" of foreign origin! We should save at least two years in the school life of every one of our pupils. It may be that *one* clause at least of Magna Carta will at last become the law of the land, and of *all* our British dominions. "Una mensura vini sit per totum regnum nostrum, et una mensura cervisie et una mensura bladi . . . et una latitudo pannorum . . . ; de ponderibus autem sit ut de mensuris." So ran our first Act of Uniformity—a uniformity which, however, has never prevailed in "weights and measures" any more than in religion. But a dawn of hope is rising. The colonial premiers are going to do what they can for oppressed schoolmasters and children, for merchants at home and abroad. May things mensural be ordered and settled upon the best and surest foundations!

THE Imperial Parliament is also drawing attention to "the present state of the navigation laws in the Empire . . . with a view of seeing whether any steps should be taken to promote Imperial trade in British vessels," and to oust the foreigner from our "coasting" trade. Whither are we tending? We have lately been congratulating ourselves on the completion of an "all-British" cable across the Atlantic and Pacific Oceans and the land that lies between them. Is the Empire to become self-sufficing? Are we going back to the days of "protection"? We read in our histories of times long past when every borough regarded all others as foreigners and "upland men," when burgesses gained charters with privileges exclusive of other inhabitants of the same kingdom. As the unity of England dawned on the men of Tudor times, these borough privileges broke down, but only in favour of a "self-sufficing" England whose jealousies are recorded in the controversies over the unions with Scotland and Ireland. And now that we are realising the unity of the Empire, the new union displays its convexity as well as its concavity. It is a larger circle than of old, but it is still exclusive.

WE have long been familiar with the opinions of that section of Russian society which is at the same time discontented with the present constitution of that country and able to voice its complaints. And while sympathising, as most Englishmen do, with some at least of their feelings, those who know most about Russia have understood that the Czar's autocracy, though possibly bearing hardly in the political sense on the more educated classes, is the necessary protection and maintenance of the mass of the peasantry. As it might well be expressed, Russia is now where England was in the sixteenth century. Parliament might then complain of Tudor despotism and arbitrary taxation, nobles might lose their heads for the least suspicion of treason, but in the royal service there was a "career open to talents" (witness the rise of Wolsey, Cromwell or Cecil), and the poor were untaxed and protected by Courts of Star Chamber, Requests, &c. But our latest news

from Russia is of a different complexion. Local committees have been asked to report on the condition of agriculture, and they have been unable to avoid constitutional questions. As in England, 1815-32, social misery is attributed to an evil constitution. Governmental machinery must be changed if the poor are to live well. What will happen? Is there a beginning in Russia of a popular share in government, beginning from the bottom? If English precedents are a guide, that is the way to begin. First the village, then the shire, then the Parliament, in face of a continuously autocratic Prince.

"THE three estates of the realm" is a phrase often on our lips, but, like so many popular phrases, it has been repeated so frequently that we have lost the meaning thereof, and many of us would be puzzled to define it. Certainly there would be much variety in the answers if the Editors were to offer a prize for the best definition of the expression. In the fourteenth century we know what they meant by an "estate." There was the estate of the clergy, that of the lay lords, those of the burgesses, the lawyers, the merchants and of many others at least possible if not actual. Each class was, or might conceivably be, represented in the national assemblies which were meeting more and more frequently as the years went on, and wars were waged, and consequently royal expenses increased. But with the growing equality of men before the law, and the breakdown of local and personal privileges, the old meaning passed away, and curious mis-meanings were given to the phrase, till even the king came to be regarded as an estate. Now, the universities are the only "estate" represented in our House of Commons; the other members represent districts, not estates. However, a revival of the old idea seems probable in Victoria, for the Civil Service there may soon be allowed to have representatives of their own in Parliament, and it is hoped that thus their influence may be defined and regularised. Compare the outcry against Walpole's excise scheme and the influence of government employees in the U.S.A.

RECENT SCHOOL BOOKS AND APPARATUS.

Modern Languages.

Bechstein, Ausgewählte Märchen. Edited by P. Shaw Jeffrey. x + 83 pp. (Whitaker.) 1s. 6d.—This book starts with an "Introduction about Folk and Fairy Tales," which is badly put together and does not sufficiently emphasise the distinction between popular and literary fairy-tales. Then comes the text of seven tales, printed in old-fashioned type. At the end of *Die verwandelte Maus* we actually find part of another story, which is altogether unintelligible, as the first part has not been included in this book; there is no explanation of this fact in the Notes, which are altogether inadequate. The vocabulary is incomplete.

German Irregular Nouns in Rhyme. By N. E. Toke, B.A. 20 pp. (Gibbs, Canterbury.)—This production is calculated (in its petty way) to bring modern-language teaching into contempt. We are not referring to such obviously absurd statements as this: "Umlaut consists of giving an 'e' sound to the vowels *a, o, u*, and the diphthong *au*"; or this: "The omission of the *e* in the dative renders the inflections of the singular of all masculine and neuter nouns practically alike." But we do object very strongly, for more than one reason, to the foolish doggerel intended as a help to learning the

"irregular nouns." The idea is intrinsically bad. It originated of course in the Latin Primer rules for words with "exceptional" gender; but surely we have made some advance since the days when this was regarded as a legitimate aid to the memory. Further, the learning of these verses is fatal to the pronunciation; English and German are jumbled together; *Herr* and *Bär*, *Lump* and "pump," "afar" and *Narr*, "calm" and *Halm* are coupled as rimes! When we add that words are used in a wrong sense, and that there are misprints (*e.g.*, *Mench*, *Schwulft*, *Gemut*), we have probably said enough to warn our readers against this book.

Heinrich Seidel, Leberecht Hühnchen. Edited by A. Werner-Spanhoofd. iv. + 120 pp. (Heath.) 1s. 3d.—Hühnchen, with his delightful opinions, never so extravagant as to become ludicrous, will bring many a smile into the schoolroom; he is Seidel's best creation. The style is good; the range of words considerable. The book is equally suitable for private and for class reading. The notes seem to have been written in a hurry, but the vocabulary is complete.

Körner, Zriny. Edited by F. G. Holzwarth, Ph.D. viii. + 126 pp. (Heath.) 1s. 6d.—The one great play which Theodor Körner wrote is little known in England, and it is to be hoped that this convenient edition will induce our teachers to read it with their boys. The spirit of Schiller pervades it, and the patriotic fervour of the poet whose life was sacrificed in the great struggle for freedom. The editor has supplied an indifferently written introduction, and notes which are barely adequate. Some of the English renderings are very poor. It is an instance of gross carelessness to print the author's name as *Krüner* twice on the cover.

A Complete French Verb Drill. By J. Lazare and H. Marshall. 68 pp. (Hachette). 9d.—This is a very dull and worthy booklet. There is nothing novel about it; it consists of tables of the regular verbs, an alphabetical list of the irregular verbs, and short sentences for translation into French, the chief practical objection to which is that they are not numbered.

A Skeleton French Grammar. By H. G. Atkins. 51 pp. (Blackie.) 1s. 6d.—A neat and well-arranged little book, printed in red and black. It is remarkable how much Mr. Atkins has been able to condense into these fifty pages by a judicious selection of what it is really important for the beginner to know. It seems a pity that the book was not written in French; at least, that is what the teacher on reform lines will think. Others will welcome it unreservedly.

Classics.

A Latin Grammar for Schools. (Twentieth Century Text Books.) By A. F. West. xi. + 262 pp. (Hirschfeld.) 4s. net.—This is a simple grammar, clearly printed, and with quantities marked; a distinct advantage is that internal long vowels in position, as in *mēnsa*, are marked as well as those which are not in position. *Nesciō quis* (p. 49), by the way, is wrongly marked as *nesciō quis*. The book is on the whole satisfactory, but hardly stands out from the other grammars; it is not so good, for example, as Postgate's "New Latin Primer." Too much is made of the Greek nouns, which are better relegated to an appendix. The tables are useful, *e.g.*, that of active and passive forms side by side (p. 58). On p. 7, *whēy*, in which the vowel sound is a diphthong, ought not to be given to explain the value of Latin *ē*. "I may love," &c. (p. 63), is the typical translation of the Latin subjunctive; we had hoped that this most misleading error would not reappear in newer grammars.

The introductory paragraphs on *Language* are quite out of place in such a book as this; and the appendix (p. 240), explaining in detail the futile "English pronunciation of Latin," which we devoutly hope is doomed, is sheer waste of labour.

Latin Elegiacs and Prosody Rhymes for Beginners, by C. H. St. L. Russell, vi. + 134 pp. (Macmillan), 1s. 6d., gives 120 copies of Latin lines for rearrangement in elegiacs. It will be useful for those who believe that so long a drill in rearrangement is necessary. For our own part, we do not believe it to be necessary, unless verses are begun at an age which we think too young. Mr. Russell's knowledge is superficial, or he would not say that "an elegy included originally all lighter poems on love or ordinary topics"; Solon's elegiacs are hardly light, nor is the lyric necessarily "lighter still." All this is trivial and should have been omitted. It is equally incorrect to say that the "vowel" in *erro* is long; *ἔρρω* disproves it. Mr. Russell confuses the vowel with the syllable. His statement that a short vowel at the end of a word cannot remain short before "two consonants" is also wrong; the definition includes such groups as *tr* in *trudo*. If definitions are given at all, let them be accurate.

C. Sallusti Crispi Jugurtha. Edited, with introduction, notes and index, by W. C. Summers, M.A. xxxvi. + 192 pp. (Pitt Press Series.)—This belongs to the small company of books which are wanted. If any authors may fairly be read with the help of a commentary, Sallust is one of them; and Mr. Summers's edition is really good. He knows his author and the literature about his author; and he has some ingenious suggestions of his own for occasions, as when he proposes to read *picem sulphure mixtam et teia ardentia*, in the curious sentence of 575, *saxa volvere, sudas, pila, praeterea picem sulphure et taeda mixtam ardentia mittere*. He uses an independent judgment, and is generally convincing (in 49.6, however, we do not quite follow him in respect to *transvorsis principis*). There are very few notes of the baby's bottle order, such as that on the pluperfect subjunctive in obliqua (p. 90). We could wish Mr. Summers were less fond of marks of exclamation; we are really not so dense as to miss every point. But apart from this venial fault we can give hearty praise to the book. The introduction is specially good. It contains an useful synopsis of the author's peculiarities of style.

Cicero Pro Milone. Edited, with introduction and notes, by A. B. Poynton, M.A. xxiii. + 88 pp. + text unpagged. Second edition. (Clarendon Press.)—Mr. Poynton's edition is, from the schoolmaster's point of view, a good one. His introduction is capital, especially in its clear presentation of the issue, and of Cicero's methods of advocacy. The notes are short and judicious. The only fault we must find is that the editor is too fond of referring to other editions (especially Reid's) for what readers would expect to find in his own.

The Messenian Wars. An Elementary Greek Reader, with Exercises and a full Vocabulary. By H. W. Auden, M.A. xii. + 105 pp. (Blackwood.) 1s. 6d.—We have often wondered why the editors of school books did not try Pausanias; and here is Mr. Auden at last with a simplified version of his story of the Messenian Wars. A few short extracts from Homer are also given. Each exercise has a vocabulary at the end, and there is also a general vocabulary alphabetically arranged. The text is perhaps not easy enough for quite the first stage, but it will suit the next well, and Mr. Auden's book should prove useful. We doubt whether it would be possible, as Mr. Auden thinks, absolutely to begin Greek with this book. His "Suggestions to the Teacher" (pp. 67 ff.) are a collection of scrappy hints for lectures, and are out of place here. They are, in fact, rather stupid, and the excellent suggestion as to "free composition"

(p. 72) may be lost amidst the desert. What is the use of this? "(1) Use a fine pen. (2) Write your letters near together, your words far apart," and so forth, for half a page. The editor does not take to heart his own warning about accents and breathings; his portion of the book contains the most extraordinary blunders: *ἄλοχος, ἀνδρείος* (a favourite accentuation of diphthongs), after which to mention *ἕερος* is flat. Fortunately more care has been taken with the text.

Xenophon's Anabasis, I. Edited by C. E. Brownrigg, M.A. xxiii. + 139 pp. With Map, Illustrations, and Vocabulary. (Blackie.)—This is a reprint. The notes are painfully elementary, and not always to be trusted. In *καὶ στρατηγὸν δέ, καὶ* and not *δὲ* is intensive; *μετέωρος* means literally "balanced, afloat," and is not to be compared with "the high seas;" the explanation here given of *ὅτι τυγχάνοις* is, "in whatever he happened to wish (he might wish)," and no more. Such notes as these ought never to be written. There is an appendix on *Sentence Construction*, which is too elaborate for boys and too elementary for teachers. The introduction is well enough, but for a fearsome split infinitive (p. xi).

We have also before us a *Key to Second Greek Exercises*. By W. G. Rutherford. 78 pp. (Macmillan.) 5s. net.

Edited Books.

Macbeth. By Geo. Smith. (Temple Shakespeare.) xliii. pp. + Text + xxxii. pp. + Glossary. (Dent.) 1s. 4d.—We have drawn attention to the divisions of this book in the above headlines because the unsatisfactory matter of unnumbered pages in text and glossary is one to which we drew attention in the case of a former volume in the series, and indeed the only thing to which exception can be taken. "Macbeth" is as delightful an edition as its predecessor, not perhaps quite so profusely illustrated, but a singularly able and attractive piece of work. The introduction is excellent, though too much is made of Shakespeare's personal history; when the editor turns his attention to the text of the play he is learned yet lucid. The sections on Shakespeare's Prosody are however, we think, too difficult. The notes are capital, and the reproduction of many quaint illustrations of antiquarian interest makes them well worthy of attention. The coloured engraving of the dresses and military costumes of Macbeth's epoch with which the book commences is also beautifully done.

Shakespeare's Macbeth. By L. W. Lyde. xliv. + 110 pp. (Black.) 1s. 4d.—Here is another handy volume of educational matter dealing with a great play in a rudimentary, class-room fashion. Really, the swiftly multiplied books of this class, neither remarkable for scholarship, nor for style, nor for anything save some particular editorial fads in arrangement, are becoming so numerous as to make one wonder how they can all find readers or students. In this particular volume Mr. Lyde attempts to cover a great deal of ground in his introductory matter, and he does it by strict attention to a method of condensation which certainly will enable young students to grasp the idea of the play, but will not be greatly serviceable to older ones. His account of the action, with every leading characteristic put into italic type, simplifies matters exceedingly; the question is whether it does not simplify them too much. Nevertheless, it seems that Mr. Lyde would want almost as much explanation as Shakespeare, when he italicises a sentence like the following:—"A man who so dissipates his strength in turbulent emotions, and whose imagination makes him so susceptible to hallucinations, is destined to be an easy victim of Nemesis." Mr. Lyde's analysis of the characters in Macbeth is distinctly worth study: his account of Macbeth himself is

capital. The section headed "Interpretation" is not at all badly done. The notes are fairly good.

Scott's Lord of the Isles. By J. H. Flather. xxxi. + 245 pp. (Cambridge University Press.)—This particular poem of Scott's has never appealed to the critical or to the general reader in quite the same way as the "Lay" or "Marmion," or "The Lady of the Lake." Yet it has many excellences, though the story can be accounted only second rate, and in the present form as a school book it ought to do good service. Mr. Flather has performed his task with great ability, and in giving a literary estimate of the poem he has been both judicious and happy in disinterring the criticism of Lord Jeffrey in the *Edinburgh Review*. The introduction is brief. The great merit lies in the notes, of which the one upon Bannockburn, illustrated by a map, is certain to give rise to much curiosity, and probably to some discussion.

Tennyson. By Sir Alfred Lyall. English Men of Letters. 200 pp. (Macmillan.) 2s.—Tennyson has already become the subject of a considerable literature, critical, explanatory, and more or less biographical; and he could not fail to command a place in this justly celebrated series. Sir Alfred Lyall has written a very readable monograph upon him, which strikes one as a sincere tribute to his memory without being by any means one of the most remarkable volumes in this collection. The critical force of Sir Alfred Lyall's mind, from the purely literary point of view, is too much concerned with the obvious in Tennyson's work, but for the teacher this account of a consummate literary artist will be found helpful. It follows his career very closely, and is not in the least uninteresting because that career was so unexciting and uneventful; and it analyses his work with great patience, although it seldom reaches any genuine depth of insight. This, however, a teacher rarely stands in need of; and, as Tennyson has a great vogue in schools, and has established an ascendancy not lightly to be disputed, this volume will excellently serve the purpose of enabling teachers to grasp the commonplaces of criticism without losing sight of the essential splendour of Tennyson's achievement. For, as a literary artist, he was unique; as a sketcher of landscapes and a seer of visions, as a verbal musician, and a manipulator of rhythms, he was (and is) a joy to those who are very little concerned with the value of his thought; and this volume will enable teachers still further, and at great ease to themselves, to give Tennyson the honour due unto his name.

Graduated Lessons on the Old Testament. By Rev. U. Z. Rule. Edited by Rev. L. J. M. Webb. Vols. I., II., III., 186, 218, 236 pp. respectively. (Clarendon Press.) 1s. 6d.—These "Graduated Lessons" are evidently the result of a considerable amount of time and care expended upon an attempt to popularise a school subject which is rarely successfully handled. The author's own desire is that these lessons may be used in class-work by the pupils rather than by the teacher, and to this end he has designed a way of teaching the whole Scripture narrative in a connected series of readings. The sequence, which in the ordinary version is often not preserved at all, is here plainly set down; and almost too much trouble is saved to the pupil by using them. The best advantage to be drawn from these pages probably resides in the fact that the author is quite pleasantly undogmatic. His suggested lessons to be drawn from the narrative are very briefly expressed and very much to the point. Whether passages of the Bible "to be learnt by heart" are an advisable addition, or even a profitable exercise, may be doubted. There are some handy uncoloured maps in these volumes, and the notes are excellently done.

Senior School Poetry Book. Edited by W. Peterson, C.M.G. vi. + 276 pp. (Longmans.) 2s. 6d.—We dealt briefly some time ago with the companion volume to this collection, namely, that intended for junior scholars. This latter compilation follows the arrangement of the former. It is wonderful to note the comprehensiveness of Dr. Peterson's selection; he has ranged over a wide field of English verse, and has managed to cull a great many flowers that have escaped notice in some more pretentious volumes. A fair quantity of American verse is included, and the English part of the collection is thoroughly representative. There are no notes; the editor speaks of his desire, instead of including these, to provide a book which will do much to cultivate youthful imaginations. This book appears to be quite one of the best attempts to serve this end.

Geography.

The British Colonies and their Industries. By Rev. W. P. Greswell. 188 pp. (Philip.) 1s. 6d.—A fifth edition of this book has just appeared. The author very wisely advocates the use of lantern slides as a means of illustrating the matter it contains, and a list of slides that may be obtained from the publishers is given in the preface. The book consists of two parts—the former dealing with the geographical and historical data of each colony, the latter with a number of typical colonial industries.

The British Empire. By L. W. Lyde. 216 pp. (Black.) 1s. 4d.—Some remarkably fine illustrations combine with the scientific treatment of the subject to make this volume of the Elementary Geography Reader Series exceptionally valuable.

A Teacher's Manual of Geography. By Charles McMurry. 107 pp. (New York: the Macmillan Company.) 2s. 6d.—Teachers who use the excellent series of geographies written by Messrs. Tarr and McMurry will find this manual of considerable assistance. It is a concise explanation of what has proved to be a highly successful method of studying the science of geography.

Geography of Africa. By W. Hughes. vi. + 100 pp. (Philip.) 1s.—Teachers will be able to use this book with confidence. Especially useful are the sections on railways, the political partition of Africa, international Conventions, and the numerous quotations from up-to-date publications. There are two coloured maps.

Geography of Egypt and the Anglo-Egyptian Sudan. By W. H. Mardon. viii. + 214 pp. + 8 coloured maps (appendix). (Blackie.) 2s.—We have nothing but praise for this little reader. Mr. Mardon writes with the intimate knowledge consequent upon residence, and with the practical experience he has gained as a teacher at Tewfikah Training College. Numerous maps, diagrams, and illustrations, combined with the local knowledge we have referred to, render the book a very valuable one. Though written primarily for Egyptian schools, it deserves a large circulation in this country.

Science and Technology.

Practical Electricity. By J. H. Belcher, B.A., B.Sc. 148 pp. (Allman.) 2s. 6d.—This book is intended as a laboratory course suitable for technical, secondary and science schools. It contains five preliminary exercises in general physical measurements, nine in magnetism, and twenty-seven in voltaic electricity, a short chapter on Units of Measurements, and an appendix containing physical and mathematical tables are also included. All the exercises are of a quantitative nature, and are sufficiently advanced to require considerable manipulative skill

and experience in observation on the part of the student. The omission of all exercises on electrostatic phenomena is noticeable, and it might be possible for the course to be taken by a student who, in the end, would not possess a very clear conception of potential; exercises on magnetic and electromagnetic induction are also absent. On p. 33 the strength of a magnet pole is expressed in *dynes*; surely the physical dimensions of pole strength are not the same as those of force. Also, on p. 35, the "law of inverse squares" and the "law of distances" are quoted as though they were distinct results. The text is illustrated by thirty-nine diagrams.

Practical Exercises in Heat. By E. S. A. Robson, M.Sc. 164 pp. (Macmillan.) 2s. 6d.—As a general rule the experimental study of heat has hitherto only been included in those text-books which cover the whole range of physics, but the subject of heat is of sufficient importance, especially to students of engineering, to justify the publication of a separate laboratory text-book devoted entirely to it. The most experienced teacher of physics will enjoy a perusal of this volume, for, though the stereotyped experiments are present, yet they are discreetly surrounded by numerous experiments of a more advanced nature, which are clearly described, novel, and yet not too elaborate. The book may certainly be recommended both for elementary and advanced classes. The chapters on Properties of Vapours, Conduction of Heat, and Radiation, are particularly good. It would have been useful if information were given as to making or the purchase of some of the apparatus. An appendix includes sections on Plotting Curves, the use of Logarithms, Tables of Logarithms and Antilogarithms, Physical Constants, &c. The illustrations (ninety-three in number) are excellent. The approximate method of correcting for cooling in calorimetric experiments, which is first mentioned on p. 159, might advantageously have been mentioned in the earlier chapter on Specific Heat.

Earth and Sky. A Second and Third-grade Nature Reader. By J. H. Stickney. viii. + 118 pp. (Ginn.) 1s. 6d.—The short reading-lessons contained in this little book are most of them interesting from a child's point of view, but they are not likely to encourage habits of observation and reasoning. The young pupil is told everything and is not taught to question nature for himself. Nature-study of the right kind discourages an implicit reliance upon didactic methods on the part of teachers.

The Mind of Man: a Text-Book of Psychology. By Gustav Spiller. 550 pp. (Swan Sonnenschein.) 7s. 6d.—Some notes of distinction characterise this work. It shows not a little independence of thought. There is neither subservience to authority in matters of opinion nor reliance on tradition in method of exposition. The headings of the chapters, "Systems as Distributed," "Systems as Organised," "Systems as Need-satisfying," and so forth, suggest a freshness of treatment which is in large degree realised in their contents. Constant reference is made to the results of actual experience; the author has worked assiduously in the introspective laboratory of his own mind, and urges his readers to adopt the same course. Again and again, in italics and within brackets, we find such directions as: [*Test this*], [*Repeat this experimentally, recording the results*], [*Observe such instances*]. The statements of leading writers, with references, are collected in special paragraphs and printed in small type. For example, on the subject of "feeling-tone" there are four pages in which brief quotations giving the views of more than five-and-twenty authors are recited with running comment. Psychology is treated as "a science of needs": but what this implies we have not space to indicate. If the reader is led to turn to the book for elucidation, though he may find

much which he cannot accept, he will probably be stimulated to think for himself on many psychological problems. There is a good subject-index, one of authors quoted, and one of publications.

Wood: a Manual of the Natural History and Industrial Applications of the Timbers of Commerce. By G. S. Boulger. viii. + 369 pp. (Arnold.) 7s. 6d. net.—Considering the manifold uses to which wood is put—and, in spite of the many modern substitutes, its industrial application is increasing rather than decreasing—the amount of scientific literature upon the subject has hitherto been surprisingly meagre. Professor Boulger's book thus supplies a real want. In the first chapter the nature and development of wood and its rôle in the life of various trees are clearly described. The great structural differences with which every practical worker in wood is familiar are thus explained at the outset. Subsequent chapters deal with the important subjects of the recognition and classification of woods, selecting, seasoning, storing, defects, methods of testing, &c. Part II., which comprises more than half of the book, gives highly condensed accounts, with physical constants, when these last are known, of the different woods of commerce, and will prove most valuable for purposes of reference. The eighty-two excellent illustrations supplement the text admirably.

Elementary Applied Mechanics. By T. Alexander, C.E., and A. W. Thomson, D.Sc. xii. + 575 pp. (Macmillan.) 21s.—The two separate volumes of the first are combined in their new edition, and the authors have taken the opportunity not only to rearrange the whole, but also to introduce a considerable amount of new and important matter. The result is a well-written and able treatise on the applications of the principles of mechanics to such important questions as the practical and scientific design of earthworks, of linkwork, and of blockwork structures. The work is obviously based on Rankine's treatment of the subject in his "Applied Mechanics and Civil Engineering." It is probably unnecessary to point out the clear and lucid style of the writers or the simplicity of their explanations; those who are familiar with the two volumes referred to know these characteristics already. One of the best features of the book is the insertion in the various sections of systematic and graduated sets of examples and also of graphical methods. Of the former quite a large number are fully worked out, and to the remainder, which may usefully serve as exercises, the answers are given. These cannot fail to be of the greatest value to those using the book. The diagrams are clearly drawn to scale and both the data and the results are printed on them.

Agricultural Industry and Education in Hungary. Compiled by T. S. Dymond. 177 pp. (Chelmsford: John Dutton.) 2s. 6d. net.—This well-illustrated little volume gives an account of the visit of the Essex Farmers' party to Hungary in May and June, 1902. As was explained in our issue for May, 1902, the tour was arranged in connection with the work of the Essex Technical Instruction Committee and was conducted by Mr. Dymond. The collection of papers in the book shows conclusively that such visits to other countries must have an educative influence on English farmers in broadening their outlook and suggesting new methods to them. All the contributors to the account speak in grateful terms of the hearty welcome extended to the party by the statesmen and agriculturists of Hungary.

Mathematics.

Shades and Shadows and Perspective. By O. E. Randall, Ph.D. 64 pp. (Ginn.) 7s.—This is an attractive book based on a definite and intelligible principle. The treatment is based upon the theory of orthogonal projection, with which the reader

is assumed to be familiar. One of the advantages of this method is that the student is led by easy stages to learn how to construct a perspective representation from an ordinary plan and elevation. The book is the sequel of fifteen years' teaching experience, and combines practical and theoretical merits to an unusual degree.

A Short Introduction to Graphical Algebra. By H. S. Hall, M.A. 24 pp. (Macmillan.) 6d.—A supplementary chapter to Hall and Knight's "Elementary Algebra," in future editions of which it will appear. Technical terms such as *function*, *variable*, *abscissa*, are somewhat prematurely introduced, and there is an absence of examples derived from statistics, physical formulæ, and the like. The point of view is, in fact, exclusively that of analytical geometry: with this limitation, the treatment is clear and instructive, and the examples suitable.

A College Algebra. By G. A. Wentworth. Revised edition. vi. + 530 pp. (Ginn.) 7s.—The appearance of a new edition shows that this treatise has been favourably received. It is not very sound on the theoretical side: for instance, there is only a formal discussion of surds, and the existence, *as numbers*, of arithmetical surds is merely assumed; the treatment of the exponential theorem is incomplete; the professed proof that a number can be resolved into prime factors in only one way is quite worthless, and practically begs the whole question. And we too often find the terms "indicated quotient," "indicated square root," and so on, which are now so often used in America in connection with slipshod analysis. But as an ordinary textbook for college students no doubt this work is useful: it is well printed, and the exercises are sensible and very numerous.

Elementary Plane and Solid Mensuration. By R. W. K. Edwards, M.A. xii. + 304 + xviii pp. (Arnold.) 3s. 6d.—A useful and well-written treatise in which the rules are proved as well as enunciated: for example, Simpson's rule is discussed in a way which every intelligent fifth-form boy ought to understand. The only point that calls for criticism is that the results are often worked out to excessive arithmetical "accuracy:" thus we are told that, supposing the earth to be perfectly spherical, the area of its surface visible from the top of a tower 300 m. high is 11999'43 sq. km. The absurdity of this needs no comment.

Miscellaneous.

Eyes Within. By Walter Earle, M.A. 156 pp. (George Allen.) 5s. net.—Chaste and restrained, these poems are part of "the harvest of a quiet eye." "The Secret," "The Vale of Bossiney," and particularly "The Freshet," exhibit the author at his best. In this last there is a melody which we could wish more common to the whole. We quote the first stanza:—

Down to the sea, down to the sea,
And the old wheel runs so merrily,—
On the flowers a brighter hue,
On the stream a deeper blue,—
A whiter star on the dipper's breast,
And a golden sun on the fire-wren's crest;
Oh, the reshet of yesternight
Is dancing in ripples of light
Merrily, merrily.

The poems are fragrant with devoutness and disclose a breezy faith in the trend of things. The author's point of view is expressed in his own pleasing line: "Suns never set except to earthly eyes."

The Nature-Study Drawing Cards. By Isaac J. Williams. In 8 sets. (Merthyr Tydfil: the Welsh Publishing Co.) Sets of 20 cards, all alike, 4s. net.—Drawing takes a prominent part in every satisfactory scheme of nature-study, and Mr. Williams's

excellent idea will provide the teacher with a means of bringing the drawing lesson into close relation with the nature-study demonstration, even during the winter months when natural material is difficult to obtain. The sets include studies of the following plants: lilac, clover, wood sorrel, strawberry, ivy, maple, oak and rhododendron. On each card is to be found an excellently preserved leaf of the plant, a short botanical description, and a well-executed drawing. More particularly for the drawing lesson an analysis of the leaf is shown on the card, its conventional form explained, and graduated exercises of the application of this form in designs of all kinds are provided. These cards will not only make the drawing lesson much more interesting, but they will train the children to be accurate in their nature-study observations and precise in their descriptions of natural objects. The cards, which are beautifully printed, should gain a wide popularity.

The Teacher and the Child. By H. Thiselton Mark. 165 pp. (Fisher Unwin.) 1s. 6d.—Mr. Mark tells us that much of his material "has been prepared in response to the demand, which becomes more pronounced from day to day, for aids and suggestions to Sunday-school teachers in their work"; and the whole book has been written in a decidedly philanthropic strain. It is very probable that many of the devoted amateurs who fail to instruct or keep order in Sunday-schools would profit considerably by a reading of this little work, and to such folk the slightly unctuous treatment of the various topics will not be too tiresome. Having this main avowed purpose in view, the reader will not quarrel with Mr. Mark's constitutional inability to preserve a proper proportion. He will not mind occasional pulpsteering, in which much license of eloquence and expatiation is allowed; and it will not strike him that out of 165 pages it is inordinate to devote three precious pages to the National Cash Register Company's Sunday-school Forms. Of course, Mr. Mark is incapable of writing a book in which there is not much good sense; but he cannot be greatly congratulated on this occasion for putting frequently-cooked teaching into appetising forms, nor for concinnity, nor for completeness. He will not add much to his reputation, outside the Sunday-school, by such wordy work.

The Student's Handbook to the University and Colleges of Cambridge. First edition corrected to June 30th, 1902. 468 pp. (Cambridge University Press.) 3s. net.—This useful publication contains everything a father proposing to send his son to Cambridge wishes to know. Full particulars as to admission to the different colleges, details of the cost of education and of living—arranged for students of varying means, and regulations as to available scholarships, are explained in the clearest manner. The undergraduate, too, will find all the information he needs as to the examinations and other preliminaries to taking a degree set out in plain terms. In addition, chapters are provided on fellowships, civil service and army examinations, the training of teachers, the education of women, and other matters. The book should be on the shelves of every headmaster and headmistress.

The Golden Rule for Boys and Girls. By the Rev. A. Hampden Lee. 126 pp. (Walsall: T. Kirby.) 1s. net.—Since, as Matthew Arnold taught, conduct makes up three-quarters of life, we cannot begin the work of character-building, too early. Mr. Lee, in his simply-written yet interesting addresses, supplies just the guidance in good behaviour which is likely to have a beneficial effect on children. Some of the stories are old, it is true, but they have not yet lost their influence nor their interest for young people. We can recommend the book to parents and teachers.

Bright Evening Thoughts for Little Children. Selected and arranged for a month by Adelaide L. J. Gosset. With 32 illustrations by Emily J. Harding. (George Allen.) 2s.—We have here, arranged in a form for hanging on the wall of the nursery, an evening hymn for each day of the month, printed boldly on a super-royal octavo sheet, with a nicely reproduced picture on the top of the page. The selection of hymns has been well made and the language in nearly every case is such that a child can understand it.

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 Botany.

In the hope that my experience may help other teachers of Botany, and that my letter may induce others to suggest methods which they have found of value, I should like to give an account here of those plans for the teaching of Botany which we are at present carrying out. I may add that our classes are large (20-30 girls) and the work is tested by public examinations.

I. DIAGRAM BOOKS.—These are large, blank books, like map books, which contain drawings from nature done only by the girls themselves. The drawings are arranged under the following headings, which are copied on the first page of the book :—

- | | |
|--------------------------|------------------------------------|
| A. Seeds. | N. Conveyance of Pollen : by wind. |
| B. Germination. | O. Conveyance of Pollen : by wind. |
| C. Stems : above ground. | P. Fertilisation—Self. [insects. |
| D. Stems : below ground. | Q. Ditto —Cross. |
| E. Foliage leaves. | R. Fruits—True. |
| F. Bracts. | S. Ditto —False. |
| G. Scale leaves. | T. Dispersal of Seeds. |
| H. Stipules. | U. Climbing Plants. |
| I. Inflorescences. | V. Parasites. |
| J. The Flower—Calyx. | W. Saprophytes. |
| K. Ditto —Corolla. | X. Carnivorous Plants. |
| L. Ditto —Stamens. | Y. and Z. |
| M. Ditto —Pistil. | |

Letters Y and Z are used by the elder girls for microscopical work and drawings of the lower plants. We count out the pages for each heading, giving the greatest number to the largest subject, and then "letter" the books like ordinary address books.

II. HOME-MADE APPARATUS.—Each year we add to our store of dried specimens. One day strolling past a geranium, the "cocculus" is noticed in the act of sending off its fruits—the springs are already coiled. It is the work of a moment to slip a noose of cotton over the top of the "beak," and the fruit is secured.

So that we may handle it and still preserve it, we put it in a "case," consisting of a cigar box fitted with a piece of glass at the top. A piece of cardboard which exactly fits the bottom of the box is cut, and to it the fruit is fastened with wire. The card is put into the box as a false bottom, and a glass slip is kept in place by strips of paper pasted over its edges and the sides of the box.

Other specimens have to be kept in position by gum. For instance, the dandelion pappus may be preserved for years if a few drops of gum are allowed to fall gently on to the disc ; the gum gradually spreads and the fruits are kept firm.

Lids of cigar boxes are also utilised. Foliage leaves may be kept firm between such a lid and a piece of glass to fit it ; the edges of the two are bound together by paper.

In the same way the "parts" of flowers are preserved. It is a most fascinating occupation, after dissecting your flower and writing a description of it, to press the separate parts, and then to arrange them in the form of a "floral diagram" on the back of a gummed luggage-label. This label may then be sandwiched between a lid and a piece of glass in the same way as foliage leaves.

III. BOTANICAL GARDENS.—A long narrow strip of ground is divided into about twenty gardens and each is kept for one particular natural order and clearly labelled with that order. The orders are grouped in their respective series ; and, as we have many roots which do not come into any of our twenty orders, we keep one large garden labelled "Miscellaneous." Each garden is undertaken by a mistress or one of the elder girls, who has several under-gardeners. As the girls have most time to get roots on Saturday, we have a gardeners' meeting on Monday morning, and any girl in the school who has found a plant which is new to our gardens brings it, and it is planted in its proper place.

In the upper forms the girls keep catalogues in which they enter each flower as it comes out in the gardens. Each Order has its own page, and each flower is entered with the date of flowering, its genus and species, and any special note of interest about it. Occasionally for home work, questions are set, which have to be answered by a study of the gardens, such as, general descriptions of certain plants, methods of pollination, protection of pollen from rain, kinds of fruits found in certain Order, &c. We have now almost all the common local plants, and are collecting those found only in special districts which we can obtain from time to time in holidays. I may add that personally I have found these gardens a great convenience in getting specimens for a class in Botany after a wet day when an expedition has been impossible.

IV. CLASS-WORK.—First, as to the "cases." Imagine the subject of the lesson is the "dispersal of seeds." Each girl has the fruit of a plant specially adapted for dispersal and she draws it roughly in her diagram book under the proper heading. Then each case is passed on to the next girl, and so on all round the class until all the fruits are drawn. For home work a written description of a few of the fruits may be done. In the next lesson the teacher goes over the fruits, explaining and asking questions, and the pupils name all the parts of their drawings. For home work some general questions on dispersal are given to be answered, and probably the greater number of pupils will have painted all their drawings by this time, of their own accord. After such a lesson, I have often been asked by as many as a dozen girls if they may come back in the afternoon to colour their drawings from the real specimens.

Then, too, these cases may be used as tests. The cases are put round the room and each pupil is provided with a sheet of paper on which she is to write *the point* which the specimen is to illustrate, and no more. Every minute, the word is given to "move on" and each pupil moves to the next case. This plan will remind any Natural Science student of "spotting sections."

The flat cases of leaves and parts of flowers may be used in the same way.

To help pupils to learn and remember the classification of plants I proceed thus:—Suppose the form has been for an expedition, and one or two specimens of every kind of flower found have been kept and brought to school, say some forty species. Each species separately is put in water in a beaker or flask and placed round the room. Then each girl takes a specimen and moves about with it, classifying it step by step until flowers of like orders are together. Then each order is supplied with a

sheet of paper on which the common names of the flowers are entered. We repeat the whole process until all the specimens are classified. Then the girls move round and learn the name of any flower with which they are not familiar.

V. OTHER PLANS AND COST.—We also arrange botanical expeditions, carry on physiological experiments, offer prizes for the best collections of pressed flowers, and have a few specimens in spirit.

It may be urged that all these plans are easy for a country school, but that they are impossible in a town. I think that almost all town schools have some arrangements for having specimens sent to them from the country, and there are always "train girls" who are invaluable in such cases; so that, I think, the "gardens" would be the only impossibility.

There is very little originality in these ideas. Three years ago we had a number of dried specimens in cases lent to us, and since then we have made our own on the same model but in a cheaper style. We get our cigar boxes for 1d. each, and any glazier will cut the glass to fit for 1d. a piece.

The diagram books are only an adaptation of the morphological note-books of the Cambridge University. We have used them for several years, starting with blank books and gradually filling them in, but in a very short time we hope to have them printed, leaving spaces for the drawings to be done.

As for the gardens, many schools have had them for years, but I am quite sure that other schools would start them if the subject teachers realised the additional interest they gave to the subject. If schools in different districts would co-operate in the exchange of plants, the value of the gardens would be much increased.

IDA H. JACKSON.

Queen Elizabeth's Grammar School for Girls,
Mansfield, Notts.

The Art of Reading.

WITH reference to the interesting letter from Miss Wrightson in the December number of THE SCHOOL WORLD, may I point out that the following books, attributed by her to the Norland Press, are published by us: "The Junior Temple Reader," "The Adventures of Ulysses," and "Stories from the Northern Sagas." The mistake is a natural one, as Mr. E. E. Speight and I have each published books through both firms.

C. L. THOMSON,
(For Messrs. H. Marshall & Son).

December 3rd, 1902.

The Graphic Mark Book.

YOUR Reviewer, in dealing with "The Graphic Mark Book" in the November number of THE SCHOOL WORLD, asserts that the method of recording marks in it is objectionably slow. Will you allow us to point out that when the tens and units are recorded, as they should be usually, on separate lines, any two-figure number can, with a little practice, be marked off in the time required for reading out the next name. If, however, his view is correct, he should, in justice, have laid equal stress on the fact that the time occupied in adding and reducing marks, and other necessary operations, is diminished by at least 90 per cent.

THE INVENTORS.

"THE Inventors" find that it takes as long to read out a name as to record lengths along two lines, probably at different distances along the page.

Personal experience has shown that without reading out

names a class of twenty-five boys can give up their marks in order in thirty to forty seconds on the old system.

Finally, "the time occupied in adding" is in a sense, "diminished" by 100 per cent. (since the addition is performed in *teaching hours*). The method of reduction was favourably mentioned in the review.

YOUR REVIEWER.

PRIZE COMPETITION.

No. 16.—Most Popular School-books in English Grammar and Composition.

IN another part of the present issue (p. 20) experienced teachers have drawn up lists of the best books in a number of subjects of the school curriculum published during 1902. We offer two prizes of books, one of the published value of a guinea, the other of half-a-guinea, to be chosen from the catalogue of Messrs. Macmillan & Co., Ltd., for the two lists of six text-books of English grammar and composition now in use in schools, which are by those taking part in this competition considered to be the most popular.

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

In naming a book, its title, author, publisher and price should be given, and books named may deal with both English grammar and composition or with only one of these subjects.

Each list of books sent in must be accompanied by a coupon printed on p. vi., though a reader may send in more than one list. Replies must reach the Editors of THE SCHOOL WORLD, St. Martin's Street, London, W.C., on or before January 31st, 1903.

The result will be announced in the March number, when the successful lists will be published.

The School World.

A Monthly Magazine of Educational Work and Progress.

EDITORIAL AND PUBLISHING OFFICES,
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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. 50.

FEBRUARY, 1903.

SIXPENCE.

THE PLACE OF DRAWING IN EDUCATION.

BY EDWARD R. TAYLOR.

Headmaster of the Municipal School of Art, Birmingham.

THE three questions submitted to me by the Editors are:—

(1) The place of art in a rational system of education.

(2) To what extent should instruction in drawing form part of the education of every boy and girl?

(3) What advantages are likely to spring from this instruction which cannot be obtained in any other way?

THE PLACE OF ART IN A RATIONAL SYSTEM OF EDUCATION.

The three questions rightly imply that all real teaching of drawing is art training. This training is primarily the development of a power of seeing, which is generally dormant under modern western civilisation, and, speaking generally, is not only outside school life but, also, is not possessed by most headmasters, headmistresses, educationists, and politicians, with whom rests the final decision as to the place of art training in education.

Art is therefore at a disadvantage as compared with other subjects claiming a place in education, for the classical master has some knowledge of mathematics — mathematics lead naturally to science, hand and eye training is an old subject if only in the playing fields, and even music is fairly general; but skill in, and love for, art is not a common possession. This difficulty is doubtless the reason why some of the advocates of art training have shown it as a pretence of the charlatan, or as a merely mechanical training.

Greek life developed and trained a sense of beauty, and we have the expression of it in literature and art. Modern civilisation has created, for the first time in history, a life in which ugliness and not beauty is the dominant characteristic. To some scholars both Greek art and literature are expressions of beauty; but

there are others who claim to have a love of the beauty of Greek literature, and yet are blind to Greek, and indeed to all other art, and this often after humble and earnest efforts to cultivate an appreciation of art. Is it possible that in the latter instances their appreciation for literature is like the admiration of an engineer for any mechanism which accomplishes its purpose, whether it be ugly or beautiful? Or that of the surgeon who sees in some ugly disease "a beautiful case?" and is not really a love of those qualities which constitute beauty.

Therefore, except perhaps to a few educationists, we can do little more than *plead* that art teaching may be placed as an essential side by side with literature and science. A justification for this plea may appear in the answer to the third question.

TO WHAT EXTENT SHOULD INSTRUCTION IN DRAWING FORM PART OF THE EDUCATION OF EVERY BOY AND GIRL?

The time given to this subject in the infant school or kindergarten should be as much as is possible without wearying the child. This amount will depend upon the teacher. Above the infant school two hours a week at least, with a short time weekly for home work, should be allotted to this subject throughout the whole school-course. Drawing cannot be considered as an essential by the headmistresses and headmasters of those High and Public Schools in which it is merely a voluntary subject for the higher forms, to be taken only out of school hours.

If once regarded as an essential subject it should be possible to teach every boy and girl:—

(a) To see the beauty of a small spray of leaves, of flowers, or of fruits; and to make line drawings of them with pencil, pen, or brush—drawings which shall be fairly accurate expressions of their beauty of form; also to emphasise these forms, as distinct from lines, by a flat wash of colour of the general hue of the leaves, flowers, or fruits.

(b) To develop the power to remember forms and colour. The earliest exercises for this might be rapidly-drawn forms, repeated in orderly arrangements, which can serve as colour exercises by the superimposition of colours.

(c) Solid geometry, to enable all to read plans, elevations, and sections.

There is another very desirable subject which should be taught if there is time, viz., the History of Art, more especially of Architecture, but it is unwise to begin this until fair progress has been made in the subjects already named, and no alternative drawing subject should be accepted if these are neglected. Fortunately, it is now generally admitted by experienced teachers of the subject that drawing can be taught as widely as any other subject.

WHAT ADVANTAGES, WHICH CANNOT BE OBTAINED IN ANY OTHER WAY, ARE LIKELY TO SPRING FROM THIS INSTRUCTION ?

Art instruction develops faculties which cannot be left dormant without loss, mental powers which cannot be fully developed except by drawing, using the word in its widest sense, as including every kind of graphic expression. Without irreverence one may say that a knowledge of art opens a new heaven and a new earth. Drawing is, moreover, the means of rousing interest in ordinary school-studies where all else fails to do this; it is of use in teaching most other subjects; and it takes precedence—at least in order of time—of commercial training in developing our industries.

What are some of the consequences of the neglect of the study of art in our schools? The carpet of flowers at our feet in an English meadow in summer time is passed by unnoticed; carpet bedding excites attention and wonder proportionate to its ugliness and its success as an imitation; our cathedrals may excite a faint wonder by their size, but this even is eclipsed by that of the Tower Bridge, the Eiffel Tower, or the Great Wheel; and all the beauty of our cathedrals—their grandeur and tenderness—are unfelt; the National Gallery and the objects of art in the British Museum are as sealed books, even to educated people; a love of shams prevails and a belief seems spreading that beauty or even comeliness is not worth an effort, for a well-known Kyrle Society in its last appeal for subscriptions is most anxious “effectively to dispel any idea which may still exist that it has anything whatever to do with art or taste in any form whatever,” “or anything of that kind.” The present ugly and sordid influences are accepted as necessities of civilisation. Drawing properly taught would open the eyes of the next generation to the beauty in nature and in art, and would thus help to cleanse our lives.

Educationists value the unconscious training by a good teacher more than the amount of his teaching. This training is only partially effectual because at present the teaching is almost entirely introspective, and leaves faculties undeveloped which are of the greatest use to every boy and girl, but of which the school takes no account.

In every school there are also boys who seem little influenced by its training, who seem to live a life outside that of the school—the dreamer, the boy with hobbies, he who keeps white mice, or the

like, and the boy who, on hearing a fairy tale, asks “Is it true?” Drawing generally interests these pupils, and if it is made an essential of their education the influence of school training will reach them.

Drawing not infrequently awakens a boy's powers of learning the ordinary school subjects, where failure has resulted when the commencement has been made with the usual and more abstract subjects. This is partly caused by the interest in drawing, but it is chiefly due to the fact that the order of work in the teaching of drawing is reversed; the pupil is first taught to do, this induces thinking, and on these two activities the learning is based. The faculties being once aroused, it is not difficult to bring them to bear on other subjects.

Recently I had the pleasure of hearing Sir Oliver Lodge explain that two jets of water rebound on coming in contact, that there is a surrounding body which keeps them apart, but that electricity destroys this power and the streams become one. May I presume to suggest that art is this third force, which can combine with literature and science in providing a rational education?

The new view of nature opened to the student of drawing, developing as it does both exactness and imagination, cannot but be helpful in the study of literature and science. It is an exploded notion that a man of science does not need imagination, and all recognise the use of drawing in the teaching of such subjects as require pictorial or diagrammatic illustration.

I will give but one example of the use of drawing in school-lessons, and that of the lowest type. Ordinary map-making is generally dry and unsatisfactory work—untruthful wriggle and wanting in proportion. The boy who can draw, in beginning a map of England, would note first its general triangular shape, then draw the straight line from Berwick to the Wash, next the strong convex curve to the mouth of the Thames, then the short, strong convex curve and the long concave curve to the Lizard, and with four or five similar lines for the west coast and a slanting line for the Scottish border, he would secure correct proportion impossible to obtain in the old way, and, moreover, his memory of these few lines, and of the subordinate details easily added, will be quite another thing from that of the boy who begins wriggling at the top and continues his dreary, monotonous and impossible-to-be-remembered course.

I have left until the last a plea for the teaching of drawing on the ground of its usefulness in after life and especially its worth in our industries, because there is a tendency to value subjects mainly as preparing bread-winners, and not as developing the powers of men and women who have to live their own lives, and because this subject will not enrich our industries unless it is pursued for the love of it. We are constantly being reminded of German competition, but I do not think that fear of this has brought us one worthy

student. We are an industrious nation, and rejoice in "something attempted, something done," and are not merely money-makers. For this reason we are good colonists. As a nation we also possess strong art instincts, and the production of ugliness is not natural to us. As early as the ninth century our art had a strong influence on that of Europe, and until the nineteenth century, when for the first time in the world's history ugliness became dominant, the British race gave happy expression to this instinct, not only in many glorious buildings, but in the commonest articles of daily use.

This instinct is not destroyed but smothered, or perverted, by modern conditions, including introspective education. It is at least singular that, side by side with wider education and our modern system of manufacture, ugliness and hooliganism have grown, and our lives have been divorced from our work. We are said to be entering upon a war for commercial supremacy, which largely means the cheapening of production and distribution, and educationists are wisely asking for better commercial education; but, if this is to be our only weapon, it will increase, under present conditions, the ugliness and other evils which make so many lives sordid, and may, moreover, of itself not prove effectual. Persistent and spasmodic efforts, attended with a certain amount of success, have been made to alter these conditions into right seeing and right doing. Great men have here and there turned to the light, but their work has often been tinged with the great effort necessary to do in modern days that which our forefathers apparently did without effort—unconsciously, or by tradition, doing right. And yet the question is rarely, if ever, asked, What can the schools do towards bringing about similar conditions to those which not only made our cathedrals beautiful but made beautiful and pleasant the articles of commonest use? If headmasters recognise art training as an essential of school work, and not as technical teaching or as an accomplishment, the rising generation of makers, merchants and users will be started on the right road, and will know good from evil, instead of being blind slaves to commercialism.

The Student's Herbart. By F. H. Hayward, D.Lit., &c. 103 pp. (Swan Sonnenschein.) 1s. 6d. — This little book should be widely read. A clear and short account of what people mean when they speak of Herbartianism has long been wanted, and a "brief educational monograph" may clear up, even for some Herbartians, many misty ideas. The work consists of a prefatory note and three chapters: "the Makers of Herbartianism," "the Essentials of Herbartianism" and "the Supposed Weaknesses of Herbartianism." We may say at once that if the writer had begun with the "Essentials of Herbartianism," the book would have been even clearer than it is. The writer is an enthusiast for "many-sided interest" and "the activity which can only spring from the circle of thought;" and throughout the little volume he speaks with the clerk of Oxenforde's golden motto before him. So fair is the book that it will scarcely make proselytes. It will, however, confirm the wavering and strengthen the strong, and the ordinary man who "believes in common sense" will find that he can agree with nearly the whole.

GEOMETRICAL AND MECHANICAL DRAWING FOR LONDON MATRICULATION.

By ALFRED LODGE, M.A.

Professor of Pure Mathematics, Royal Indian Engineering College, Coopers Hill, and

C. B. McELWEE,

Instructor in Geometrical and Freehand Drawing, Royal Indian Engineering College, Coopers Hill.

THE regulations for Geometrical and Mechanical Drawing in the Matriculation Examination of the University of London are as under:—

Plane Geometry.—Construction of scales, triangles, quadrilaterals and polygons. Problems on circles and tangents and on areas of plane figures. Simple problems on loci, including paths of points in elementary linkwork. Construction of Archimedean spiral, ellipse, cycloid, and involute of circle, with their tangents and normals.

Solid Geometry.—Elementary projections of points, lines, planes, inclined surfaces, and solids, including the cylinder, cone and sphere. Simple sections. Projection of additional plans and elevations.

Isometric or oblique projection, without using "isometric scale," of simple plane surfaces and solids.

Developments of the surfaces of simple solids; elementary problems in interpenetration of prisms, cylinders and cones, and developments of penetrated surfaces.

Projection of simple helix and square-threaded screw.

Machine Drawing.—Making scale drawings, two or more views, with simple sections of elementary machine parts, from rough partly-dimensioned sketches.

The subject is an optional one, but in its simple parts the ordinary school-course of geometry should, under the revised requirements of the majority of examining bodies, be directed along lines similar to those laid down above.

The new departure in geometry inaugurated by the action of the British Association, and generally accepted, separates the work into two parallel courses: (1) theoretical; (2) practical; the ideal scheme being somewhat as follows:—

In the earliest stages the pupil is familiarised with the concepts of geometry, with the measurement of straight lines and of angles, with simple geometrical properties of parallel lines, triangles, and other plane figures, and learns how to calculate areas of plane figures and volumes of simple solids. Then he commences his systematic deductive course of theorems, learning how to prove crisply and neatly such properties as he already knows, and to deduce others, till the whole course of theorems, at any rate as far as the end of Euclid, Book VI., is assimilated, together with a number of collateral theorems or riders. At the same time, in a parallel but distinct course, he learns how to perform, accurately and intelligently, in the best possible way, various geometrical constructions, rising by degrees from the simplest, such as bisecting a straight line or an angle, to more and more complex constructions, basing the reasons for such constructions on the theorems he has been learning in the theoretical course. This is the kind of teaching contemplated by those who have drawn up the recent revised courses on geometry.

For the deductive course guidance has been given in the syllabus issued by the Mathematical Association (Bell and Sons, 6d. net), which has been drawn up in consonance with the general principles laid down by the British Association, and broadly in accordance with the new requirements of the Oxford and Cambridge Local Examinations and the Board of Responsions at Oxford. Books are being written embodying the principles of these modifications, and among those already issued may be mentioned W. C. Fletcher's "Elementary Geometry" (Edward Arnold), and Baker and Bourne's "Elementary Geometry" (Bell and Sons). Of these, the former covers the whole of the six books of Euclid, but rather aims at giving outlines and suggestions of proofs than the full proofs of the various propositions. It is intended to encourage the pupils to fill out the complete proofs for themselves, with of course such help as the teacher finds necessary. The proofs given in the second of these books aim at being more complete, but the range extends only to the end of Book IV., with a chapter on graphs. Book VI. is, we believe, shortly to be published.

The best mode of conducting the early or preliminary course has been discussed in these columns at various times during the last year. The concurrence of opinion seems to be that the young pupils should work without text-books, and that the teacher should lead them gradually to discover facts for themselves, and to devise methods of construction. Many books have been written for the guidance of the teacher in this primary work, and others are in course of preparation. It is not within the scope of this article to endeavour to enter into their respective merits.

For the practical course, which should be worked concurrently with the systematic course of theorems, the ideal book has probably yet to be written. Perhaps the best available books are Spooner's "Geometrical Drawing" (Longmans), and Morris's "Practical Plane and Solid Geometry" (Longmans). Both are excellent text-books, and perhaps of the two Spooner's is the best and most complete. Whatever book is chosen, we feel strongly that the teacher should in the first instance use it strictly as a *text-book*, *i.e.*, a book of texts, and should give out the various problems to be worked by the pupils, if possible, before either working them himself or letting them read the book.

The teacher's object is, of course, to lead on the pupils to solve the problems for themselves, with only such assistance as he finds necessary, and which should be less and less as they progress. His motto should be "*festina lente*."

Revision, for examination purposes, can be rapidly made by help of the text-book, but the pioneer work of tackling fresh problems is more happily undertaken if the pupil feels that he has to depend on his own initiative and resources. Nothing is more irritating to a keen pupil than to be told something which he feels he could have found out for himself, and perhaps this is more specially the case in geometry than in any other subject.

We all know the pleasure in obtaining a neat geometrical solution ourselves, and what comparatively dull work it is to wade through some one else's proof unless you have obtained your own first.

Problems in simple loci, which can be traced by finding series of points on them, such as the ellipse, hyperbola, equiangular spiral, and others, will be a welcome occasional change from the rest of the practical problem course.

To prevent the construction work from becoming too mechanical, and to cultivate manual dexterity, the pupil should often be required to execute it *frechand* as accurately as possible, using his knowledge of theory to help him. It is a mistake to depend too absolutely on instruments: in fact, the pupil's eyes and hands are his primary instruments, and the others are merely supplementary aids to more accurate finish. If he cannot produce a fairly accurate drawing without the use of instruments, his instrumental work is almost certain to degenerate into mechanical drudgery, and real and rapid lasting progress will be impossible.

In *Solid Geometry* probably the best book for the theoretical course is Mr. R. B. Hayward's "Elements of Solid Geometry" (Macmillan). It is a little book, but well and carefully written, and will be easily assimilated, particularly if the pupils occasionally make paper or cardboard illustrative models to assist the imagination.

The corresponding practical course could not be better than that laid down by the University of London in their first paragraph dealing with this part of the subject. Orthogonal, or orthographic, projection is so important that no excuse is needed for introducing it into secondary schools as part of the ordinary curriculum. With the help of models (models cut in paper are quite sufficient, and can be made by the pupils themselves, quickly and readily) the first principles of plan and elevation are readily learnt, and then fairly rapid progress may be expected. Probably the best text-book for this work is Harrison and Baxandall's "Practical Plane and Solid Geometry for Elementary Students" (Macmillan), though some teachers may prefer to continue using Spooner's or Morris's books, which are both good, though perhaps not so carefully graduated as Harrison and Baxandall's.

Isometric projection is not of much practical use. It is applicable only to rectangular solids whose faces are all equally inclined to the plane of projection. It is, moreover, only a particular simple case of orthographic projection, and a very few examples should suffice for its illustration.

The projection of a simple helix and square-threaded screw can readily be undertaken by a pupil who has been through the above course and who has a model to work from.

Developments of the surfaces of simple solids are also not difficult if the pupils cut out their own developments and construct the solids with them. It is, however, useful work and is worth the expenditure of some time. A good example of

such work is the construction of the three pyramids into which a given triangular prism can be cut. If, in the case of a skew prism, the pupil can successfully draw out the developments of the component pyramids and construct them, showing that they can be built into the prism, a good and interesting piece of work will have been done. It requires a considerable amount of careful thought. The cone and its frustum, and oblique frusta of a cylinder, probably complete the more important elementary part of this work, with perhaps the developments of the five regular solids;¹ but more advanced work could be undertaken with the best pupils in connection with the surfaces formed by the interpenetration of solids.

Interpenetration of solids is the most difficult part of the schedule, and probably only the simplest cases could be undertaken at school, and then only by the better pupils. Harrison and Baxandall's "Practical Plane and Solid Geometry for Advanced Students" (Macmillan), or Angel's "Advanced Plane Geometry and Projection" (Wm. Collins), would be the best for the teacher to consult if he works from a book, but probably the better plan would be to work from a collection of good models such as those supplied by G. Cussons, the Technical Works, Lower Broughton, Manchester.

This brings us to the last part of the schedule, viz., *Machine Drawing*. It is a question whether it is wise to require such a subject in a school curriculum, as it is entirely a technical subject. Unless the intention of the University Board is merely to suggest the use of the simplest machine parts, as being practical illustrations of combinations or interpenetrations of solids, the work will be too special for the majority of secondary-school boys. This would be a pity, as the previous part of the work constitutes an excellent course for boys who show mathematical aptitude. The danger is that this early, foundation, part of the course will be hurried unduly to find time for the "machine" course, and so the whole spoilt.

To teach machine drawing intelligently and beneficially, models of the machine parts required should be at hand, the pupil should know the use of the part or detail illustrated, and he should make careful sketches showing two or more views or projections from the model prior to his drawing the same to scale. (All attempts at "rough" sketches should be rigidly discouraged, and "rough" sketches should, in our opinion, not be exhibited to the pupil to copy. The rough sketch is the cause of much unintelligent and careless work.)

Now, the models are expensive, and the work takes time, and requires unusual knowledge on the part of the teacher: it would be much better to let this work wait for the Technical School or Engineering College. If the pupil has been well grounded at school in the principles of projection, he will be able easily to assimilate the further

work required for machine drawing when he leaves school. The danger is, to repeat what we have already stated, that, if this later work is attempted to be crowded into a school course, the foundation work will be hurried and scamped, which would be disastrous.

This part of the syllabus is vague, and it is to be hoped that the University authorities will require little or none of it in their Matriculation examination.

INDUSTRIAL OPENINGS FOR ART STUDENTS.

By HENRY CADNESS.

The Municipal School of Art, Manchester.

IN the following article the writer makes no pretence to have solved the problem, "What to do with our boys and girls." So much depends on the ability, capacity, and inclination of the individual concerned, that it is impossible to lay down a course suitable for all. Yet it is possible to point out certain directions which may be taken under present conditions by those who have discovered a taste for drawing and designing, or some special aptitude for a craft in which art plays an important part. It will be taken for granted that the student has received a sound general education which will serve as a foundation for later studies, one in which the drawing lessons have been thorough, in which precise and accurate observation in the rendering of nature has been exercised, and the student's aim has been to understand as well as to reproduce faithfully, and not to be satisfied with superficial treatment.

To some persons the pursuit of art in its broadest sense is pleasant and full of delights. The power to represent the beauties of nature is only gained by careful observation and practice, and this training includes much that is looked upon by some as dry, yet that is necessary in acquiring a knowledge of the principles which underlie all forms. When sufficient power is gained to enable a fair idea of objects to be given the joy begins, and it increases when such power is employed to create, or to embody original ideas, or thoughts, as in pictorial work, book illustrations, or sculpture; or in decorative work for the beautifying of an object. The enthusiastic exercise of this power indicates genius. Its possession, if not exercised fully, results in mediocrity; activity and energy, without care in working, will also produce inferior results; unfortunately, the happy combination of these qualities is not common.

In our connection these considerations are of the deepest importance, and should be borne in mind by those responsible for the guidance of the youth; for, of all subjects, that of art is one in which parents and others are most easily deluded by the early attempts of the young. Often the merest daubs are looked upon as signs of genius, as also are trick effects produced sometimes under a teacher's direction, and drawings in the nature of "elementary designs" which lack the most primary necessities.

¹ The icosahedron and dodecahedron are not usually included in an elementary course, but they could be developed with the assistance of models.

Such displays in music would easily be estimated at their true value. This early work may be useful for many purposes, but it should not be allowed to mislead. Such students have not always the perseverance to carry it beyond a certain stage. The pupil who plods, who delights in careful work, who even requires restraining, is most likely to throw enough soul into the work to make it successful, and only such effort will raise the student to the highest position.

In many trades drawing plays an important part. The scheming and planning is done on paper previous to execution in the material, thus enabling the craftsman to proceed directly with his work without waste of time or material; so that a class of artists known as designers is employed to invent and originate. Now, this might give rise to a happy state of things if all that was demanded from them had to be of the most refined kind. Unfortunately, the majority are required to create novelties and objects that will attract or "take" with a public desiring frequent change; or things that will be saleable in certain markets. Under such conditions the occupation often ceases to be congenial. A man with ideals has frequently to abandon them and to produce instead that which precedent proves to be successful, viz., to adapt previous patterns to "follow on" those that sold well in the preceding season.

Again, a large body classed as designers do not originate, they only finish, or work out, the ideas of others, converting and adapting them to technical requirements, simplifying the colouring—as in textile printing and weaving—in the latter draughting on point paper, not at all an entertaining process. In lithographic drawing, where tones and mixtures of colour are produced by fine points calculated by their size and closeness together to give varied effects, the perfection of finish acquired by many such workers is wonderful—stippling, spotting, binding, &c., in a most practical and often mechanical form suited for reproduction.

It will be seen from this that designing can be separated into two groups, inventing and originating and practical application. These may be and often are, combined in the same individual, especially in the handicrafts, and in many cases the designer is also the craftsman. In the first group many artists work at home or in private studios, either to commissions given, or on designs to be submitted for sale. Manufacturers buy these ideas and adapt them with the aid of their own finishers. Frequently this originating takes the form of scissors and paste, and portions cut from other patterns are combined to get new effects.

It must not be inferred from this that there is an unlimited demand for designers; that is not so, for any one of the carefully-planned designs provides opportunity for many variations in sampling the colours and tones. This necessity brings into play the services of an art adviser, or colourist, for the best classes of work.

All this implies experience, and knowledge of markets and other matters such as cannot be gained without direct contact with the trade, and a charge

sometimes made against what are termed "school-of-art" patterns is that they are not "practical." In most cases this means they are unlikely to sell in sufficient quantities to make them profitable, and not that they lack beauty and interest, or could not be reproduced.

Some trades are distinctly local and others universal. To the former belong the manufactures such as weaving and cotton printing in Manchester, Glasgow, Bradford, and Leeds; pottery and metal, as at Hanley and Birmingham. The designers and workers in these materials are to a great extent tied to these centres; away from them there is but small demand, though merchants in towns far away call for the services of an originator, whose designs are forwarded to the manufacturers for execution. Hence designs are sold in London for this purpose.

The localising of the industries has naturally an important bearing on the character of the designing and the trend of art instruction in a district; and, although these are grouped together for economical reasons, it is very remarkable how varied the styles are. The work is sub-divided in such a way that the designer trained in one place of business has often a difficulty to adapt himself to the style of another. Thus, in cotton printing, there are "Home Trades," "Fancies," "China," "Indian," "South American," &c., markets, and so it will be found with other manufactures.

Much of this work cannot be classed as artistic; nevertheless, it forms a large part of the trade, and any student engaged in it will do well to supplement his work with practice of the most refined kind.

I have dwelt on this, as it is calamitous for a youth to find that his occupation is uncongenial; a state of unrest sets in, and what he thought at first would be a delightful art pursuit turns out to be something more commonplace. This occurs often, and it is the experience of many teachers, especially in the evening classes of art schools, to find students anxious to change their occupation—the printer wanting to take up weaving, the weaver printing, and so on; each thinking the other's calling offers a larger field.

In the handicrafts there is much greater scope and opportunity. In the first place, they are not so localised; some are carried on in almost every town; for instance, decorative painting, sculpture, wood-carving, stained glass, book-binding, and so on, giving chances of more varied experience. Further, the student can get into direct touch with the material, either as designer, or craftsman, or both; there is more encouragement to greater effort and pride in the work, a greater chance for the development of the better side of the individual, greater possibility for the craftsman to work independently and for the individual character to be asserted, whilst in most cases the outlay for tools and materials is usually not great.

It is advisable to follow one of two courses: (1) To devote a period of, say, three or four years, to study broadly in a good art-school, and afterwards a short service in some craft, the choice

of which will be determined by the inclinations of the individual. The provision of scholarships will be found of service in many cases in assisting worthy students to take this course. (2) To enter the workshop of an employer after a suitable course of training in the subjects of a general education. This is suitable in some respects, though it is generally believed that a student might with advantage for any career prolong his general education until the age of sixteen or seventeen, but under present conditions he is more likely to obtain employment in some craft at fourteen. In the evenings the pupil should then follow a systematic course of study in an art school in order to acquire a broader knowledge than that required immediately for his craft. Too much stress cannot be laid on this fact. Every effort should be made to gain instruction in all the branches of the work, and generally this is best attained by employment with a small firm, and although the class of work may not be so high, opportunities for actual practice are more likely to present themselves than in many large establishments.

I am not now thinking of great firms whose apprentices pay large premiums, for which consideration the employer undertakes to give them full instruction in all the branches, but of the ordinary places of business. The opportunities for development in any craft are greater than they ever were; for, although there are the disadvantages of the sub-divisions, the aspiring youth can attend special classes, and the multitude of books opens out a wide field, and further, many employers offer to send their apprentices to the schools in the evenings, some even giving time during the day. This is not always taken advantage of, with the result that many grow up with a narrow training, and so give no encouragement to the employer to entrust them with better work.

It must be borne in mind that there are limitations in all the crafts. Usually in this country the supply of workers is greater than the demand. Beside this, there are certain restrictions imposed in some trades which must be considered in arranging a course.

My remarks are inspired by much experience of employers as well as employed. The former complain that the modern youth is often too "clever;" he has done too little of too many things; he sometimes comes to teach the employer what he should do, and he has to be disillusioned. The employer who keeps a large staff, and is dependent on certain sales, says he cannot afford to risk them for the sake of budding genius. On the other hand, many of the employed complain of the want of opportunity to exercise their individual taste; and the smallness, comparatively, of the demand for the most refined things is to a certain extent responsible for this. The reconciling of art and commerce, it would seem, depends much on the inculcation of artistic perception in every-day life, and particularly in every-day schools.

In conclusion, as there will always be a large class of workers who lack original ideas, or lack

courage to develop those they have, such should strive to become excellent craftsmen, and so to master their material that their work will command attention.

In the list below, crafts of a kindred nature are grouped together, and those printed in italics are the most likely to provide an outlet for skilled girls. In some places there is a distinct prejudice against their employment, although the work is just suitable, so that it has given rise to many working successfully on their own account, as the numerous exhibitions of arts and crafts show.

Decorative Painting, both in designing schemes and details and in their execution.

Stained Glass, Enamels, Mosaics, designing Cartoons, and actual work in painting and colouring.

Pottery, Tiles—in designing and painting.

Textiles, Cotton, Silk, Wool, Carpets, Furnitures, Dress goods—*designing and draughting.*

Printing Wall-papers and Textiles—*designing and colouring.*

Metal Work: wrought iron, cast iron, bronze—*designing and modelling.*

Repoussé Engraving, Jewellery—*designing and working.*

Furniture—*designing and decorating with stained wood.*

Inlay and Gesso panels.

Wood Carving, Sculpture, for decoration, *designing and modelling and working in studio.*

Embroidery, designing and working, for banners, portières, and dress decorations.

Lithography, *Book Illustrations, Poster designing, Book binding.*

There are also branches of Architectural work, drawing, details, perspective views, &c.

Teaching Art, after passing through Certificate Courses and specialising in certain subjects.

This list does not exhaust all, as so many branches are likely to be developed in the near future.

THE VALUE OF DRAWING IN THE SCIENCE AND MANUAL INSTRUCTION LESSONS.¹

By WM. A. KNIGHT.

Headmaster of Sexey's Trade School, Bruton.

IT is difficult to realise how large a part is taken by drawing in the curriculum of the modern school. The lessons in art are usually under the charge of an enthusiast who is not satisfied until all his pupils can appreciate the beauty of line, light and shade, form, and even colour. The art lessons are correlated to the rest of the curriculum and are thus lifted from the inferior position occupied by the old-fashioned "extra" subjects. Experts are dealing in the present issue with the art teaching, and the purpose of this article is to show the value and importance of drawing in other subjects of the curriculum.

¹ The illustrations in this article are specimens selected almost at random from the actual work of boys at school. It is hoped that even with their imperfections they will be more useful for the purpose than drawings specially prepared.

NATURE-STUDY.—Practical experience shows that the most useful arrangement of the instruction in this subject is to confine the lowest forms, aged nine to twelve, to observational work¹ and gradually to add written descriptions, working up to reasoning and generalisation in the upper forms, aged fifteen to seventeen or eighteen.

The Nature-study, then, of Forms I. and II. will consist almost wholly of directed observation of common plants and animals. A sketch of the object under consideration is built up by each pupil either in his note-book or preferably on separate slips to be afterwards pasted in. At first, the sketches are crude in the extreme, but before long the best pupils will be able to produce even an artistic representation of the object, and the clumsy ones will be able to set down the characteristic features, which are thus fixed more surely and more rapidly than by pages of notes. At the end of the school year, the pupil can look

form will be able rapidly to represent these in a sketch, and the best pupils will be able to make a crude attempt at the colour. The very difficulties encountered serve to impress the true appearance indelibly on the mind.

But perhaps the most powerful argument for drawing is that *it forces the pupil to observe what would otherwise be quite invisible.* Try to form a mental picture of, say, a twig of the ash in winter, then draw from the object, and structures previously hidden come to view, and are reproduced.

. . . if eyes were made for seeing,
Then beauty is its own excuse for being.

EMERSON.

A careful choice of subjects for lessons must be made, for the field is wide. The old-fashioned type of object-lessons on, *e.g.*, "Balloons," or "the Manufacture of Glass," must be replaced by a series on an oak-leaf, a lilac shoot, or a bird's wing. The life-histories of the bean, the frog, and the insect will be worked out and the stages recorded by drawings. Some teachers will wish to add the study of inanimate nature, rocks, and stones, and the simpler phenomena of mechanics and physics.

Labelling is a great help to the memory: it should be done sparingly and neatly by means of arrows drawn outward from the object to the name, or, where more convenient, by capital letters referring to a key.

The mere copying of a drawing from the black-board or a book is of small value. No objection, however, can be taken to the pupils comparing their own unaided drawings with finished drawings made by the teacher or with those in trustworthy text-books.

In the upper forms the nature-study will probably take the form of botany or zoology. Here the need for constant drawing is already well recognised. The note-books in morphology should consist almost entirely of drawings, and the results of many physiological experiments can be shown best by a series of sketches. The difficulty often found by students in microscopic work in correctly drawing what they see will be greatly lessened in the case of those who have had the advantage of constant practice in drawing in their earlier years.

PHYSICS AND CHEMISTRY.—The value of drawing in the teaching of Physics and Chemistry cannot be over-estimated, but here artistic effect is not aimed at, except so far as neatness of execution constitutes art. This instruction will probably begin in Form III. (age twelve to fourteen). Considerable facility with the pencil will have been gained in the nature-study work of Forms I. and II., but it will be found economical to devote a little time to preliminary practice in drawing such things as a flask, a Wolff's bottle, glass tubing, the surface of a liquid in a glass vessel, a Bunsen burner, a cork with glass tubing passing through it, the conventional form of a battery and of an electroscope. Most of the drawings will be merely combinations of these. At this point a definite decision should be made about the form of the drawing to be adopted. Some teachers prefer to draw a per-

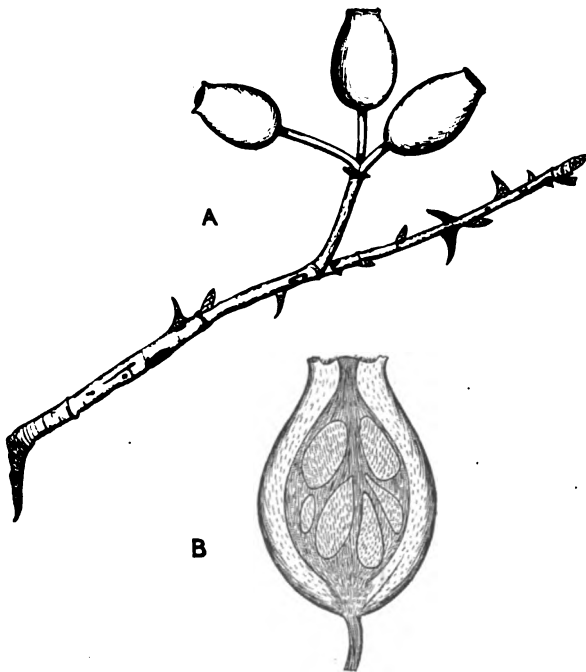


Fig. 1.—Fruit of Dog-rose.
A, A Natural Sprig. B, Vertical Section of Fruit.

back through his book and survey the whole of his lessons, with a maximum of pleasure and a minimum of fatigue.

Another advantage of a drawing is that many natural objects almost defy written description, except that of a Richard Jefferies. Take a butterfly's wing, for instance. The difficulty of describing accurately its shape and markings is enormous, even for advanced pupils, yet the majority of the

¹ "The beginning of all true work is accurate observation, the end and crown of all true work is an accuracy which observes everything, and lets nothing escape, a power of observation animated by a true love for what it undertakes to investigate, and able through love to discover subtler truth than other people. Observation and accuracy comprise all that it is possible for a teacher to do, whatever may be the subject with which he has to deal."—THRING.

spective view, the eye being supposed to be slightly above the apparatus. In this case all circles appear, of course, as elongated ellipses, corks are not transparent, and tubes must first be drawn continuously through the corks, and the hidden parts afterwards rubbed out. Any rectangular objects can be drawn in perspective or isometrically. (Fig. 2.)

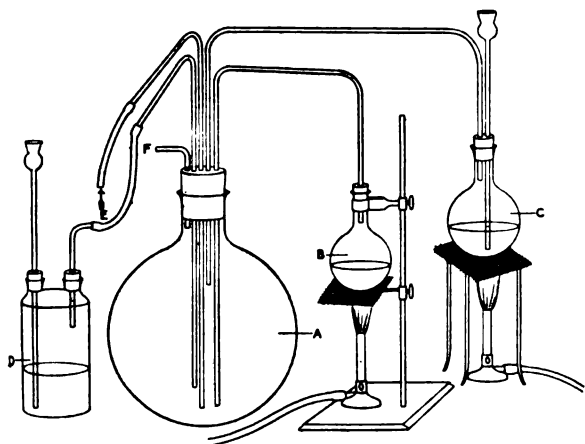


Fig. 2.—Apparatus for Preparation of Sulphuric Acid.

An alternative method is to draw a vertical section of everything, showing tubes passing right through the corks, and representing all circles by horizontal straight lines.

It does not greatly matter which form is adopted, and sometimes one is better fitted for a particular piece of apparatus than the other, but a boy should not be allowed to flounder for perhaps several terms before he decides for himself which he prefers.

Discourage the drawing of irrelevant surroundings, such as the bench top or the master's hand. This takes much time and often distracts attention from really important details. In burettes, a curve drawn to represent the meniscus shows at once whether mercury or water is being used. In preparing gases, a large round glass-basin and a "beehive" are preferable to the usual pneumatic trough, both because the drawing is rendered easy and because it is essential for beginners thoroughly to understand the collection of the gas. The average pupil is liable to think that some mystery lurks inside the trough. In the case of a soluble gas it is helpful to a pupil to see the water oscillating up and down the delivery tube.

MANUAL INSTRUCTION.—The drawing done in connection with Manual Instruction is not an incidental aid but should be considered as an important part of the work. It is impossible for the hand to fashion a more or less geometrical form "in the solid," until some conception is formed in the mind of the nature, boundaries and relations of its surfaces. Plans and elevations are tests of the accuracy of such a conception and serve also as an economical record of the dimensions. The advantage to a boy in after life of a familiarity with working drawings is very real.

Manual Instruction should be taken throughout the school because of its educational value, the material used varying according to the age of the pupils. Cardboard work can be cheaply and conveniently taught in the lowest forms without a workshop, pads being used to cover the desks, and it is not too laborious for boys between nine and twelve. The drawing consists almost entirely of geometrically-constructed plans of the cardboard used previous to gluing. A boy in his first year learns all the simpler geometrical constructions, to use a ruler, set-square, protractor and compasses, and gains familiarity with the French and English units of length. Frankly, this preliminary teaching must be mainly empirical, and the discovery of the reasons for the constructions must be made in the geometry lessons, but the boy acquires a skill which is of immense use to him all through his school career and afterwards, and the time spent is quite recouped by time thereby saved in the upper forms. He has learnt not merely how to make the geometrical constructions, but has used them practically, and sees their importance in the manipulation of his material. The necessity for accuracy is rendered visible by the "fit" of the complete model.

In Woodwork, which will probably be taken in Forms III. and IV. in the workshop, a plan and elevation of each piece of wood and an isometric sketch of the complete joint, or model, should appear on one page, with a correctly-figured scale in every case at the head (Fig. 3).

A word about the isometric sketch, which is, of course, not drawn from an isometric scale; the dimensions are taken from the plain scale, the parallel edges of the object being all drawn at an angle of 30° with the lower edge of the page, any curved or oblique edges being inserted last.

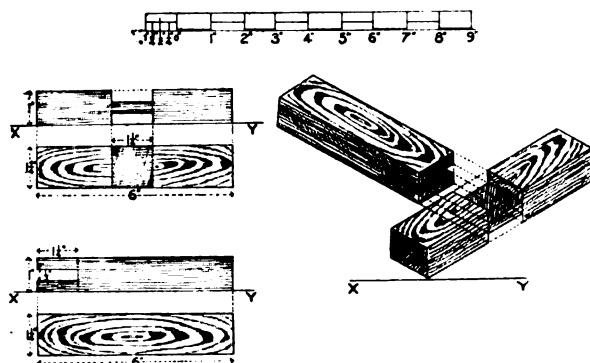


Fig. 3.—Woodwork : Bridle Joint in Pine.

It is very useful to show a section through the completed joint; a boy who can do this correctly obtains valuable exercise of his imagination, and incidentally gains concrete practice in solid geometry, in a way which he seldom gets in the geometry lesson, where he is dealing with abstract form.

The same plan should be followed in the metal-work drawings of the top forms.

If sheet-metal is used, the "developing" of the

instruction occurs in the order of the steps taken. In many cases the boys work from a printed book of drawings, in others they merely copy drawings

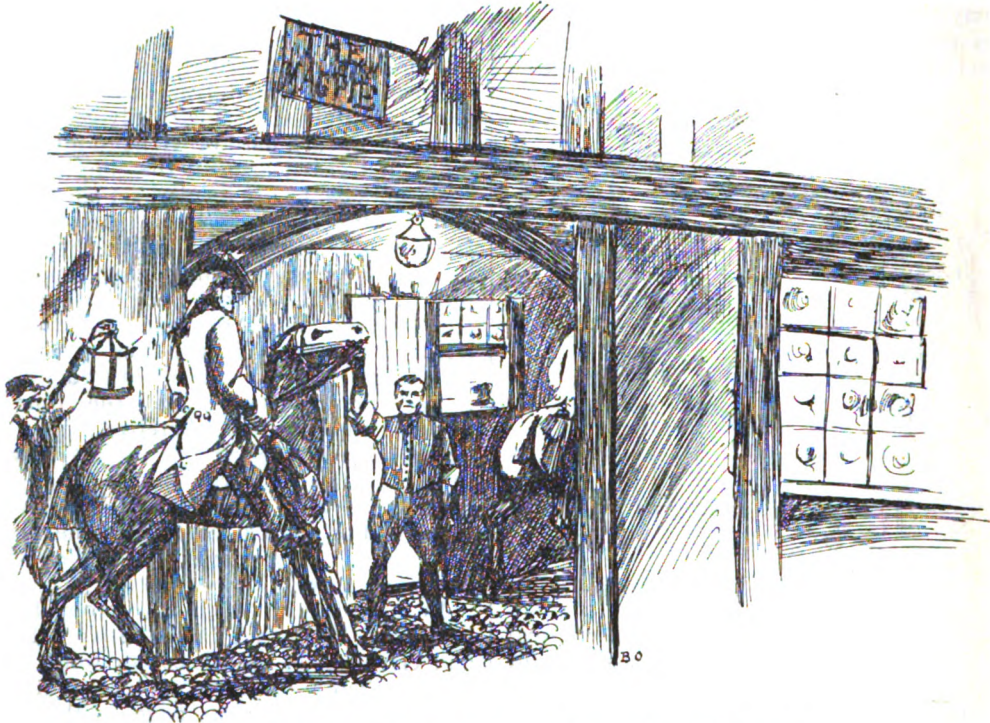


Fig. 4.—Original Illustration to "Adventures of Capt. Falconer of Bruton."

model is a splendid help to the mensuration work. The boy who has made an ordinary tin-plate funnel from his own drawing can almost work out unaided the area of the surface of a cone.

One of the most frequent errors in manual

from the blackboard into their own drawing-books, while in some cases there is no attempt to draw at all. The work should be done in the following steps:—

(1) A lesson is given by the teacher upon the particular joint, or model, which should often be made wholly, or in part, before the boys.

(2) The boys make rough sketches, correctly dimensioned.

(3) A finished drawing is made from the sketch, showing plan, elevation, section, and isometric sketch.

(4) The drawing is translated into a material form.

In MATHEMATICS the teacher should insist on a drawing to scale wherever possible. The usual rough sketch is sometimes misleading rather than helpful. Algebraical problems involving distances, rates of travelling, and time taken, should have a diagram; every question in mensuration involving area or volume will be worked more satisfactorily with a fairly accurate diagram. This may appear trite, but examiners

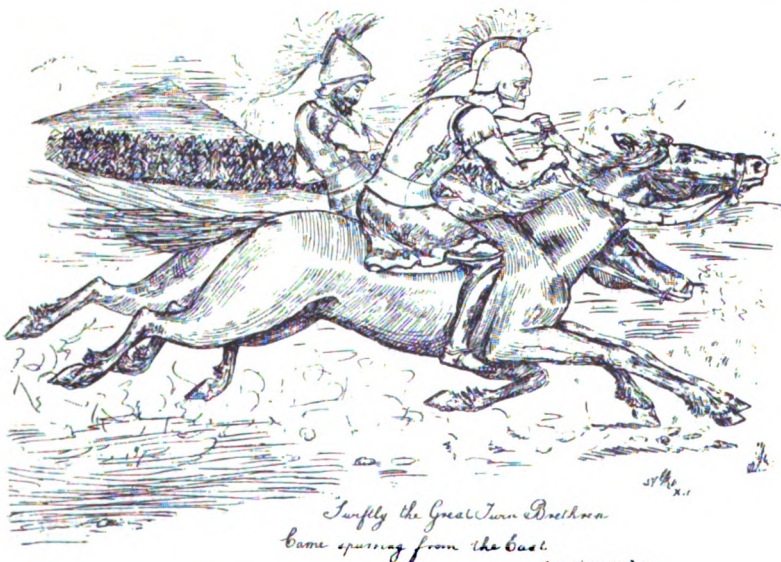


Fig. 5.—Original Illustration to Macaulay's "Lays of Ancient Rome."

know how often incorrect results are arrived at because of a faulty sketch or the absence of one altogether. There is no need to touch on the question of graphs and diagrams in algebra and trigonometry, for the admirable paper by Mr. Godfrey in *THE SCHOOL WORLD* for August, 1902, contains just what a teacher requires to guide him.

In a school the curriculum and other conditions of which allow of the prominent position here advocated for drawing, and where it is insisted on

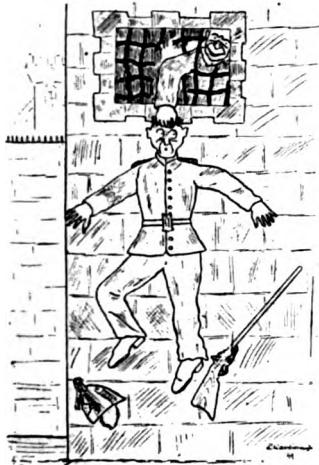


Fig. 6.—Original Illustration to "Twenty Years After." Dumas.

in all forms and not merely in the art lessons, there should be expected among the elder boys an unusual power of expression by pen or pencil, and the general neatness of all written work should be very marked. The pages of the school magazine may be available for budding artists with literary tastes (Figs 4-6). In any case, a powerful instrument is placed at the disposal of a youth who leaves such a school for a workshop, laboratory or drawing office, or for higher instruction in a university or technical college; he will be in a better position to appreciate or criticise the illustrations which take so large a place in nearly all modern books; and he will be the better man because of the firmer grip and truer conception which he has gained of the truth and beauty of the natural world around him. Things rather than words will appeal to him, and will not his reasoning power be clearer and stronger for the solid foundation of fact upon which he is able to build?

ONE result of the transference to the University of London of the University Extension work in the metropolitan area has been the arrangement for the current term of a central course of lectures in the University building, South Kensington. The course will be given by Dr. Emil Reich on "The Foundations of Modern Europe, 1760-1871," dealing with the principal events and persons that have shaped the political and intellectual history of modern times since George III. The course will treat of the War of American Independence, the French Revolution, Napoleon, the Great Reaction of 1815-1848, the Revolutions of 1848-1849, and the Unity of Italy and Germany. Dr. Reich's reputation as an expert in modern history, and as a lucid and attractive lecturer, should draw a large audience. The chair will be taken at the first lecture, on Tuesday afternoon, January 27th, by the Vice-Chancellor. It has been arranged that, to meet the convenience of those able to attend only in the evening, the same course will be delivered on Wednesday evenings, at eight o'clock, beginning January 28th.

EQUIPMENT OF THE ART SIDE OF SECONDARY SCHOOLS.

By J. W. TOPHAM VINALL, A.R.C.A. (Lond.)

Member of the Society of Art Masters, Author of "Art and How to Study it."

DRAWING is a subject which necessarily finds a place in the curricula of both elementary and secondary schools, having long since been recognised as a subject of the greatest educational value: and this, be it understood, from a strictly educational point of view.

The ability to draw, or even a bare knowledge of drawing, has been found indispensable to pupils preparing to become craftsmen, designers, architects, surveyors, artisans, and in a lesser degree to those who in after days may become men of science, physicians, surgeons, oculists, engineers, and even lawyers, solicitors and men of commerce. In fact, drawing is a medium of communication at times more graphic and concise than any verbal or written description can be. To impart this power of communication should therefore be the aim of the systems of drawing in vogue in our schools. To teach the children to become "artists" will, of course, be farthest from the intention of the day schools, primary or secondary; the art schools proper will do that.

Assuming that children can begin to draw at the age of six or seven, they are, nevertheless, in our public elementary schools, taken in hand before that age, and as soon as they enter school at all, are led to express their ideas and illustrate their lessons by manual expression in clay, sand or chalk. Their efforts may be crude, but they are valuable, so much so that in infant schools nearly half the time is spent in depicting objects and forms related to the object lessons. You may not be able to call it "drawing" in the strictest sense, but it is a useful preparation.

The work is carried out in this way. The children are supplied with large brown or dark mill-boards (impervious to water), which are placed in, or on the desks, in an almost vertical position. The children themselves may stand or sit as convenient, and a stooping posture of course becomes impossible for them. On these mill-boards, or on brown or white paper attached to them, they sketch in boldly with coloured chalks or crayons. These forms are reduced to the simplest lines and masses, and are never allowed to deteriorate to caricatures of elaborate and impossible shapes. The simpler the shapes the better, but they have to be true.

As a preparation for pure "outline," the younger children pass through a course of "massing," that is, they learn to rub the chalk on in masses, and thus *build up* forms. To such simplicity does this method lead that it is possible to commence in the "babies' class." These little mites start with a dot, and enlarge it to any given size, such as a bead, a penny, an apple, and so on. The round or elliptical form is taken first, because simplest, the

motion in producing it being similar to the child's natural action of scribbling, only brought *within control*. These round shapes of various sizes are added to, and placed in juxtaposition, in such a manner as to form strings of beads or patterns. This is the commencement, and by careful grading, "masses" are made to grow into many shapes without any thought of outline. Later, outlines are firmly added to these shapes, in order more carefully to define them. Lastly, in Standard I., the preparatory "massing" as an aid to "outline" is dropped, and pure "outline" takes its place. This brings the child to the real commencement of drawing.

The results of this free-arm method are most gratifying, and the children themselves thoroughly enjoy the work. It does away at one sweep with all minute eye-straining pencilling on squares, and supplies a more truly Froebelian substitute, bringing into play boldness and freedom. In the case of infants, straight lines are only introduced by degrees. Actual straight-lined work is done separately as *ruler-practice*, worked from the beginning on plain white paper. Young children should not be expected to draw straight lines by hand very perfectly. In Standards I., II., and III., the brown-paper free-arm practice is continued. As many natural forms and common objects are selected for examples as possible. Geometrical shapes are reserved for ruler-work. In Standard I., broadly, the year's work is based on long straight lines *combined with arc curves* to form shapes and patterns. In Standard II., the O or *elliptical curve* (done in one sweep) is introduced, and is combined with straight lines to form shapes and patterns. Standard III. deals with the *compound or double-curve* applied to natural and ornamental forms, and the children are initiated into the laws of growth, exhaustion, repetition, and radiation. In many schools the free-arm practices are repeated to a smaller scale on white paper as freehand practices. In others, suitable mass forms are represented in clay or with the brush, which are really only other ways of "massing."

Above Standard III., free-arm, freehand, and model are practised, and pen and brush work introduced by degrees. All ordinary lessons, such as geography, composition, and science subjects, are whenever possible, illustrated by little pen or pencil sketches in the margins of the paper or exercise. Geometry and scalework, pattern designing, the tinting of patterns and scale drawings, are also included in all the complete elementary courses: although in girls' schools of all grades the drawing course is necessarily less exacting, with a minimum of mechanical work. In many schools short blackboard practices are undertaken in addition to all other drawing, even in the infants' departments. Such practice is generally on the lines suggested by Professor Liberty Tadd, and is useful for gaining facility. As "gymnastics" may aid "dancing," so this big work imparts certainty of touch, versatility, and leads to fertility of invention, but does not on this account constitute

a "drawing scheme." "Memory drawing" is periodically practised in all classes. In the top classes only, as a rule, are clay-work and painting taken up, as time and opportunity will allow. The same remark applies to the drawing and shading of casts, designing, stencilling, and other more advanced subjects. Never less than two hours per week are given to these exercises, and four are found to be ample. It must be borne in mind, however, that above all things, the pencil work of these classes has to be good (done either by the free-arm or freehand method at option), and it is advisable that pen-drawing as encouraged in the new Government syllabus should be taken up more generally than it is.

Several excellent sets of drawing charts are to be had from well-known publishers at about 2s. or 3s. net per set for each class above Standard III., say for children of nine and ten upwards. Perhaps the four that are most famous and useful just now are:—Bacon's "Grey Line Series" (extremely practical), Waddington and Jackman's "Grey Line Series" (Wilkinson), Nelson's "New Drawing Course" by J. Vaughan (Director of Drawing, Glasgow School Board), and the admirable "Leicester School Board Course" (C. R. Robins, Leicester).

Is it surprising that, from amongst elementary pupils so trained, art masters all over the country are anxious to recruit their school-of-art students, with the promise of full support from the Board of Education in such efforts at co-ordination? "But where," it may be asked, "do the secondary schools come in, if this be the case?"

The secondary schools come in and occupy a most important place in the training of pupils between the ages of fourteen and eighteen. The higher elementary-schools are, after all, but few in number, and but touch the fringe of the work. The field, and it is a broad one, is in possession of the secondary schools.

Therefore, with proper previous training, pupils in secondary schools should be able to produce very passable advanced drawing, and be able to qualify in the Society of Arts examinations, School of Commerce examinations, Oxford and Cambridge Locals, and South Kensington examinations. The art schools and technical schools ought also to be able to count on a large number of qualified candidates from these schools.

Hence the subjects to be taught (according to circumstances and requirements) might be enumerated as follows:—Advanced freehand with pencil, pen, or brush; advanced model, lightly shaded; shading of casts and objects with chalks, stumps, pen, or sepia; simple sketches of the human features or figure, of trees and landscapes from good examples; simple designing and colouring; a little still-life; modelling in clay or wax; pen-and-ink drawing for illustration; a little wood-carving; some stencilling; geometrical drawing and perspective; mechanical drawing for machine or building construction; blackboard drawing; a slight knowledge of architecture and architectural mouldings, and of the general history of art.

Technical, grammar, and high schools, generally have art-class rooms (smaller or larger as the case may be), where a part, at least, of the above syllabus could be carried out. Smaller schools might attempt the same subjects, but with smaller classes according to space at disposal. The services of specialists might be required.

Now for the equipment of a drawing class-room, to accommodate say twenty-five secondary school pupils, working on these lines. This is a maximum number for one teacher. We will suppose the syllabus is as varied and comprehensive as possible, for the sake of detailing a full equipment.

ART CLASS-ROOM STOCK.

Furniture.

Cupboards, desks, racks, can be obtained from either:—The London School Furniture Co., Messrs. Chapman and Hall, or Messrs. Geo. Hammer and Co. Obtain estimates.

Blackboard (42 in. long), and *Easel*, about 17s. 6d. Chapman and Hall.

Chairs, 3s. 9d. to 6s. each. Chapman and Hall.

Desks, London School Furniture Co., or Chapman and Hall. (Mr. Fisher's Combination Art Table, 30s. each; very good.)

An art room is far better without desks at all; they encumber the floor space and are heavy for moving about. The small light "*Englefield Easel*" (plain deal, 5s. each) is to be recommended instead. Twenty-five required with chairs, and drawing boards.

Other Easels, say 3 deal, 6 ft. high, 9s. each, and 3 School of Art easels, 10s. 6d. each. Reeves and Sons. Or the "Hatherly," 8s., Messrs. Winsor and Newton, is very steady.

Two Stools for Models, with adjustable top and background, about 18s. each. London School Furniture Co.

Picture Frames with movable backs, imperial, about 5s. 6d.; half imperial, about 3s. 6d. Chapman and Hall, or from C. Jacobs.

Twelve Stands for Casts (upright). H. Boneau.

Complete set of S.K. Models in box, £4. Chapman and Hall. Additional various models can be obtained from same firm, and from The Educational Supply Association, at from 3s. to 5s. each.

Drawing Boards, 25 half imperial, at about 2s. each; 12 imperial, at about 4s. each. Reeves and Sons.

Materials for General Purposes.

Millboards, brown paper (several sizes), cartridge paper, blotting paper, Canson paper, Michallet paper, Saunders and Whatman's paper. Apply to Strong and Hanbury, or Reeves and Sons.

For Colour Work, &c.

Pencils, crayons, chalks, stumps, indiarubbers, &c., from Messrs. Lechertier, Barbe & Co., Reeves and Sons, or Rowney's.

Water-colour tin boxes (at 2s. 6d. each), refills, palettes, bottles and wire trays for same, indian-ink, ebony-stain, &c. Messrs. Reeves and Sons. Send for Reeves' booklet on Brush Drawing.

Compasses and mathematical instruments. (Chapman and Hall). T-squares and set squares. Reeves and Sons (for geometry).

Teachers' large T-squares, set squares and compasses. Set, 21s. 6d. Chapman and Hall (for geometry).

Teachers' coloured chalks. Messrs. Rowney and Co.

For Clay Modelling (Class of 10).

Two Bins for Clay. From local builder or contractor. Can be zinc-lined boxes or fixed slate-sided receptacles, having sloping

lid, sloping forward. Can be made for about £2 each (large size).

Large Pails can be used instead, cost 7d. or 8d. each.

White Clay, about 5s. per cwt., from any local potters', or from Messrs. Doulton and Co., of London.

Plasticine. For 1s. 3d. per pound in bulk. Chapman and Hall.

Adjustable Modelling Stands, 18s. to £1 15s. Messrs. Lechertier, Barbe and Co. (one or two only ever required).

Table with oak top, very strong, 2 ft. high, for beating clay. About £1 10s.

American Cloth, piece 12 yards for £1 2s. *Thick flannel* at 5½d. a yard.

Sponges at 4d. a dozen. *Trowel*, 1s. 8d. *Spade*, about 2s. 6d.

From Reeves and Sons the following:—

A pair of hard-wood Callipers, 10 in. long, at 1s. 6d.

Modelling Tools: best boxwood, 7 in., at 4s. per dozen. Nos. 1, 2^T, and 3 most serviceable. Wire, 6½ in., at 6s. per dozen. Nos. 1, 2, and 3 most serviceable.

For Wood-Carving.

Patterns and Miss Rowe's books on Wood and Chip-carving, from the Manager, School of Art Wood-Carving, South Kensington, S.W.

Set of wood-carving plaster casts, Nos. 408-419, Chapman and Hall's catalogue, at £2 10s (set).

Tools from J. B. Addis, Tottenham Court Road; or R. Melhuish, 84, Fetter Lane, Holborn Circus.

Wood and Boards from Mr. Newson, 61, Pimlico Road, London, or from local dealer.

Photographs for Drawing Purposes.

From NATURE (plants, &c.). Set at 2s. 6d. "The Arts Co.," Derby. Or from the Welsh Educational Publishing Co., Merthyr-Tydvil, an excellent set of nature-study drawing cards, at 4s. net (box of 20); these are actual pressed specimens. From ORNAMENT. Selections from Kerry's admirable sets, at 6d. each photograph. Also "The Arts Co." set at 2s. 6d.

Cast (not including human figure).

Elementaries. From Brucciani's catalogue:—

Studies of ornament, 2315.—Set of 10 at 2s. 6d. each. Set for £1: Nos. 1 and 9 good. *Studies of ornament*, 2584.—Set of 15 at 2s. 6d. each. Set for £1 10s.: Nos. 3, 5, 10, 11, 15, good.

An egg, 2811, at 2s. Very useful. Group of eggs, 2813, at 5s. Very useful. 5 balls, 2814, at 3s. Very useful.

Elementaries (from Chapman and Hall's illustrated catalogue, price 2s. net. (This catalogue is most useful):—

New Century Casts, Nos. 12, 13, 17, 18 (5s. each). Could be used instead of one of Brucciani's elementary set quoted above.

For Advanced Shading. Nos. 448 (2s. 6d.), 449 (2s.), 451 (2s.), and from the New Century Casts, Nos. 1, 3 and 5 (12s. 6d. each); and 333A (5s.).

For Acanthus Ornament. Steven's spandril, 331 (4s. 6d.).

For Shading and Clay Modelling. Nos. 14 (5s. 6d.), 17 (4s.), 56-59 (3s. or 3s. 6d. each), 382 (3s. 6d.), 384 (3s. 6d.), 393, 394, 397 (4s. 6d.), 398 (4s. 6d.), 426 (9s.), 427 (2s. 6d.), 436, 437, 438, 439 (2s. 6d. each), 454 (4s. 6d.), 455 (2s.). These can all be recommended, and selections can be made from them by help of the illustrated catalogue.

Some Books of Reference.

Packet of Card-copies for Elementary Chalk Drawing. (Charles and Dible.) 2s. net.

"Chalk Drawing on Brown Paper," in book form. (Charles and Dible.) 3s. net.

"Free-Arm and Ambidextrous Drawing-Book," by Frank Steeley. (G. W. Bacon and Co.) Just out.

"Brush-Work Drawing Copies," by Frank Steeley. (G. W. Bacon and Co.) Just out.

"Elementary Art Teaching," by E. R. Taylor. (Chapman and Hall.) 10s. 6d.

"Plane Geometry," by J. Carroll. (Burns and Oates.) 1s. 6d.

"New Art Geometry," by Steeley and Trotman. (Bacon and Co.) 2s.

"Perspective," by J. Carroll. (G. W. Bacon and Co.) 2s. 6d.

"Perspective," by Petty. (G. J. Arnold and Son.) 4s.

J. Humphrey Spanton's "Geometry and Perspective" are very useful for advanced scholars. (Macmillan.)

"Building Construction," by Mitchell (Adv). (Batsford.) 5s. 6d.

"Machine Construction," by D. A. Low. (Longmans, Green and Co.) 7s. 6d.

"History of Architecture," by Banister Fletcher. (Batsford.) 1s.

"Manual of Historic Ornament," by Richard Glazier. (Batsford.) 5s.

"Midgley and Lilley. Studies in Plant Form and Design." (Chapman and Hall.) 6s.

"Wood-Carving and Chip-Carving," by Eleanor Rowe. (Batsford.) 1s. each.

"Landscape Painting," by J. McWhirter, R.A. (Cassell and Co.) 5s.

"Marine Painting," by W. L. Wyllie, A.R.A. (Cassell and Co.) 5s.

BLACKBOARD DRAWING FOR THE ILLUSTRATION OF LESSONS.

By F. F. LYDON.

Art Master at Parmiter's School, Victoria Park, and the People's Palace School of Art.

THERE has been a constantly increasing tendency of late years to add to the interest and consequent effectiveness of almost all the lessons of the school course by the introduction, wherever possible, of some form of illustration, which, by appealing to the eye, makes it an auxiliary of the ear in the reception of the facts sought to be laid down or deduced by the teacher. The illustration of lessons may be provided for in any one of four different ways. The most effective illustration is, of course, the production of the actual object under discussion in the lesson, and, where this is possible, it should in all cases be resorted to. But a very good substitute for the actual object is frequently supplied in the beautifully-reproduced wall charts that are so much used in kindergarten and lower-school departments. These effectively illustrate objects that are not accessible to the schoolroom, such as the larger animals, forest trees, tropical plants, manufacturing processes, and sections of coal mines, or of rock strata.

A third kind of illustration is the carefully prepared sketch on a blackboard, not reproduced in the presence of the class, but drawn out by the teacher before the lesson commences. There is very little justification for this form of illustration, as, though considerable pains may have been taken

with this sketch, it is not likely to be so effective as the coloured wall-sheets, while it lacks the interest of the fourth kind of illustration, the blackboard sketch proper, executed during the course of the lesson in the presence of the pupils. In this latter case even a very crude sketch, if rapidly drawn, will stimulate the interest of the children, who like to see the drawing developed before their eyes. There is little doubt that this last method of illustration is not more resorted to because of the distrust of the teacher in his own artistic capabilities. This diffidence arises from a lack of appreciation of what a blackboard sketch should be, and of the standard of artistic judgment that will be brought to bear on the sketch by the on-looking class.

To deal with this latter point first. An examination of the sketches made by children for their own amusement reveals the fact that they give first importance to an exaggerated expression of the most obvious features of the object illustrated, and though this becomes to a certain extent modified in the work of older pupils, its continued presence affords a clue to the best means of fixing their attention to the point it is desirable to emphasise. In a blackboard sketch, then, all unnecessary detail should be left out, a simplicity of outline should be aimed at, and the important points may be with advantage exaggerated. The main object to be kept in view should be that, as the sketch is to illustrate some point in a lesson, and is to be drawn when this point arises, only a very simple drawing, that will not delay the course of the lesson, can possibly be allowed, and the sketch becomes a mere note on the blackboard, taking its place with the verbal notes, and forming a part of the summary of the lesson that should appear on the board when the lesson is concluded.

The first stage in a course of practice towards becoming efficient in this subject should take the form of "free-arm" exercises. The student should stand in front of the board, so that, when the arm is extended straight from the shoulder, the chalk just rests on the middle of the board opposite. Now if the wrist and elbow be kept comparatively rigid, by means of two sweeps, one from the top to the left downwards, and the other from the same starting point to the right downwards, an almost perfect circle will be struck, even by a novice, the arm acting almost as the arm of a compass, and the shoulder joint being the pivot. By approaching nearer, a larger circle will be struck, and by receding the area of the circle will be diminished. When the circle has been placed in as suggested, even though it is not perfectly round at first, commence from the top and let the hand rotate the complete circumference several times in each direction. The series of overlapping lines will approximate to a perfect circle, the defect of one revolution rarely falling in the same place as that of the second revolution, so that a thick line will have finally covered in the several defects in the complete sketch.

The chalk to be used for this and subsequent exercises should not exceed an inch-and-a-half in

length, as it will be found in practice that the shorter the chalk the greater command one has over it, and the firmer the line it will produce. And here we may note the difference between drawing on paper and on the blackboard. In making a sketch on paper the difficulty of erasing mistakes leads us at first to make our sketch very lightly, but with the chalk and blackboard we shall find it just as easy to clean out a firmly drawn line as one that is lightly sketched in. And as firm lines are necessary for sketches to be seen by all the class, and no time is available for lining in, it is as well at the beginning to draw everything in with a firm line. The exceptions to this rule will arise in the more advanced work, as, for instance, in the drawing of a flower or leaf, where the general shape being faintly indicated the petals or leaflets may be firmly inserted, and then it is not necessary to rub out the construction lines. Just as in ordinary drawing the constant reliance on the indiarubber militates against accuracy in our first attempts, so in blackboard drawing, if we wish to get confidence, which is the essence of good work, the duster must be almost entirely discarded. This may be more readily done because a slight thickening of the outline in various places will generally obliterate slight inaccuracies without detracting from the value of the sketch.

Having practised the circle both singly and in combinations, such as several concentric circles, three circles in a larger one, or an interlacing series forming rope or *guilloche* ornament, next proceed to the ellipse. The difficulty is in this case increased because the diameters are not equal, but the same sweeping swing of the arm should be retained, though at first it may be necessary to set out lightly the two diameters at right angles. Repeat the exercise of running the chalk rapidly round the complete circumference several times, until the swing of the arm becomes quite easy and automatic.

The oval naturally succeeds the ellipse as an exercise, and then such familiar objects as egg and egg-cup, acorn, cherry, apple, and plum, which are based on these forms, may be attempted. In all cases stand in front of the board, not to one side, as the latter position induces an irregularity in the sketch, due to the difficulties of the perspective. The enlargement of freehand copies from printed examples will follow, but too much importance should not be given to absolute symmetry, as this latter quality is rarely present in objects other than purely conventional forms.

Our next exercises should be devoted to practice in proportion and the drawing of straight lines. Draw a square without measuring, and when completed test its accuracy by measuring not only the sides but also the diagonals. A square placed with its diagonals vertical and horizontal on the board will be found more difficult; and then proceed to an oblong with length twice breadth, to an equilateral triangle, and to a regular pentagon. This latter is important as the basis of many floral forms.

Text-books dealing with this branch of the work

are "New Methods in Education," by Liberty Tadd; and "Ambidextrous and Free-arm Black-board Drawing," by F. F. Lydon; both published by Sampson Low, Marston and Co.

So far our practice will have been mainly devoted to the cultivation of confidence and freedom in the use of the chalk. We now approach the second and more interesting branch of our work, the illustration of plant and animal forms as required in the teaching of nature-study. Here the chief feature of our work will be the memorising of natural forms and the observation of the construction. Let any student who has not previously attempted it try to draw from memory a butterfly, a cowslip, or even a leaf, such as the horse chestnut. It will be found in most cases that, though all these objects are perfectly familiar, an exact impression of their form has not been noted with sufficient care to enable one to make even a passable representation. But a very little practice in sketching from the actual object, especially if those of allied form be classified, will soon develop the power to seize on the characteristics of the object it is desired to represent.

A start should be made with leaf-forms, the ivy, the virginia creeper, and the horse chestnut being grouped, as all falling in the general outline of a pentagon with ribs radiating to the corners from above the middle of one side. In this case first lightly indicate the pentagon.

Next put in the ribs of the stalk, and mark the eyelets between the leaflets or the deep serrations between the lobes. A firmly drawn outline will then obviate the necessity of rubbing out the construction lines. The tiny serrations at the edges of some leaves should be only slightly indicated here and there, as a repetition of all that would appear in the natural leaf will give a hard and mechanical effect, besides necessitating too long a time in the execution.

The shape of flowers is most generally a circle with radiating petals, though we get a square form in the wallflower and the clematis, and pentagonal in a number of cases.

The relative thickness of the stalk must be noted, as the character of the stalk—delicate and twisted as in the poppy, or lush and firm-growing as in the Christmas rose—will affect the apparent texture of the petals, in the one case making them appear to be light and silky, and in the other firm and fleshy, though the general outline may in both cases be the same. In order to facilitate the memorising of natural forms a note-book should be kept, and details dotted down as opportunity arises, classification of similar forms, and notifications of variations from type, being a great help to memory drawing.

It may be noted in regard to natural forms that in no case is a strict regularity observed, the two sides of a leaf, or the two leaves of a plant, never being identically alike. Where this variation is overlooked we get a conventional form which always lacks some of the interest of nature, though it is frequently preferable as an illustration of a type.

There are a number of works dealing with this branch of the subject, combining the nature lessons with blackboard illustrations, and these are useful to the student as showing how much may be left out without destroying the value of the sketch.

The third section of this subject deals with the representation of artificial forms based on the geometric models—the cylinder, cone, pyramid and prism. In depicting these forms a knowledge of the principles of model drawing is necessary. Thus, before we can correctly portray a bottle, a cup and saucer, or a vase form, it is necessary to have mastered the principles that in a cylinder the long diameter of the ellipse will be at right angles to the axis, and the more remote end will be represented as smaller but rounder than the nearer end.

The most effective way to study this branch of the subject, which will be applicable to all mechanical, architectural, and in fact all artificial forms, is first to study carefully the geometric models, and then to sketch out objects based on them. Thus the cube should be set up and sketched in various positions, the convergence of the receding lines and the relative foreshortening being noted, and then boxes, chairs, and other cubical objects may be first drawn from the objects, and afterwards from memory. Objects of simple form, with their outline not obliterated by ornamental detail, should be chosen, and in making the blackboard sketch the object should be to express the model with the fewest possible number of lines. The triangular prism will give us the basis for a hen-coop, a tent, or a pair of steps, and so on through all the geometric forms. This section is more difficult than the preceding because a structural accuracy is necessary, or the representation looks weak even to the untrained eye.

Another point in connection with this part of the subject is that, if correct memory sketches of common objects are to be made, it is necessary to note the material and function of the object depicted.

Let us take, for example, the teapot. The spout of a silver teapot will be much thinner than that of one made of delft. The bore or pouring capacity of both being the same, the comparative thinness of the metal, as compared with the thickness of the crockery, will give the difference in the outside appearance of the two objects. Again, the spout of a teapot, coffee-pot, or watering-can, made of tin, will of necessity be straight because of the difficulty of bending tin in more than one direction at once. The spout of each of these objects must also come up to the level of the top of the vessel, or it would be obviously impossible to fill the vessel with water. Such considerations as these will go to the representation of the object in such a manner that it appears to be in proportion and fitted to fulfil its functions.

From these remarks it will be seen that, in order to depict even simple objects successfully from memory, not only is it necessary to have obtained a facility in the use of the chalk, which everyone has who can write on the blackboard, but a quickness of observation, a retentive memory, and above all, an appreciation of construction and function

must be cultivated and constantly practised. Among books dealing with this branch of the subject are "Model and Blackboard Drawing," by F. F. Lydon, and "How to Draw from Models," by W. E. Sparkes.

Artistic ability has throughout been ignored because, although there will always be some who can draw better than others, just as some can write better than others, still it is possible for everyone by practice and care to acquire the small amount of facility necessary to make a successful sketch in illustration of our lessons. Such a power, thus obtained, adds a new interest to the lesson, and a new bond of sympathy between teacher and pupil.

SCHOOL FURNITURE AND EQUIPMENT IN SECONDARY SCHOOLS FOR GIRLS.

By CAROLINE TURNER.

Joint-Principal of S. Catherine's School for Girls, Hove, Brighton; formerly Headmistress of Exeter High School.

I.

IN the three articles of which the present is the first, it is proposed to deal with School Furniture of secondary schools for girls of the present day, and to write chiefly of furniture of which I have had personal experience.

I assume that the class room is properly lighted, warmed, and ventilated. The walls should be tinted or papered with some pale colour, without pattern of any kind. The shade should be restful and such as will give a satisfactory background for the few good pictures which should be in every class-room. I have found a shade of grey-green one of the most decorative and serviceable. A dado of polished wood is a distinct advantage, unless the desks can be kept quite away from the walls, which is not always possible. The floors of the class rooms should be of close-grained, light, polished, but not too highly polished, wood; or, where a school is established, as is so often the case, in a dwelling house adapted to school purposes, covered with linoleum. The old-fashioned plan of scrubbed boards is not satisfactory. This kind of flooring involves considerable outlay for cleaning, as the rooms should be washed at least once a week, and, from a sanitary point of view, the risk of damp floors is considerable. Polished floors are not often kept in good order in England, but are ideal when well laid and well kept. Linoleum is more easily kept in order, and all dust can be quickly removed with a damp flannel. The initial outlay for this floor covering for a large building is heavy, but this is soon saved by reduced cleaning expenses.

DESKS AND SEATS are of the first importance. The great increase of written work in preparation for examinations, which unfortunately seem so

much on the increase in England, demands from the teacher the exercise of the utmost care and watchfulness about the seating arrangements in the class rooms. Curvature of the spine and defective eyesight are frequently the results of inattention to these points. Very often, the

room. There is no mechanism to get out of order, and yet they are perfectly firm when open for use. Those made for us have been stained a dark bronze-green, and we find them most satisfactory. They can be obtained in any size. My experience is that folding desks of this kind are much more convenient, comfortable, and hygienic, either for school buildings or for houses adapted to school purposes, than desks with seats attached.

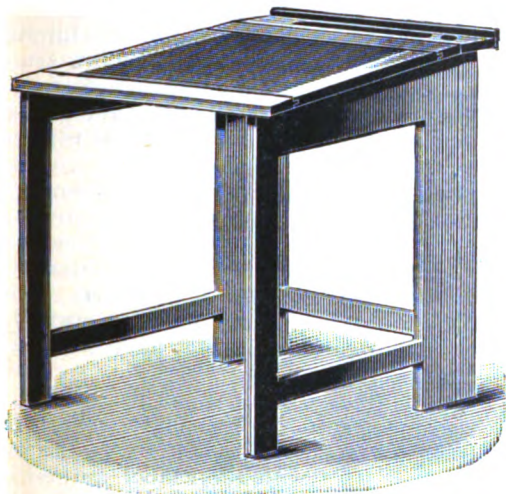
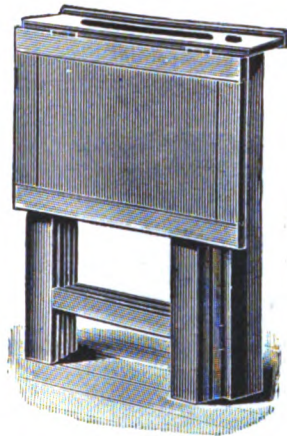


Fig. 1.



teachers who are the most conscientious and most anxious about the intellectual progress of their pupils are careless to a degree about the position assumed by the pupils when listening, reading, drawing, sewing, and—most important of all under the present system of education in England—writing.

With these portable desks, CHAIRS are of course needed. In choosing chairs special attention should be paid to the height of the desk and pupil, to the depth of the seat, and to the slope of the back. The chairs shown in Fig. 2¹ are very comfortable. In ordering others I should, however, ask for seats with square corners, as giving more depth, though perhaps square corners are not so attractive in appearance.



Fig. 2.

I have found a Portable Examination Desk¹ (Fig. 1.) most satisfactory. This desk is light, and allows perfect freedom to the limbs of growing children, without any of the cramping sensation so often produced by the desks made with fixed seats. These desks can be stained to any shade, and look well in any

Whatever the floor covering, and whatever desks are used, all pupils should be supplied with FOOTRESTS. Those shown (Fig. 3.) were made by a local carpenter. They are inexpensive, and can easily be stacked in the corner of even a small class-room if it seems desirable to clear the room.



Fig. 3.

There are two great advantages in the portable school-furniture just described.

(a) A room can easily be cleared in a few minutes, and there are many occasions when it is desirable to have a clear floor-space.

(b) The cleaning can be more thoroughly done than is possible in a room fitted with heavy desks.

Anyone who has watched the ordinary cleaner at work, or who has gone round a school building after the cleaning is supposed to be finished, will appreciate the thorough cleanliness that is made possible by the use of light and portable furniture. Assuming that the cleaner is a conscientious worker, the saving of time and consequently of expense is not to be despised. In most secondary schools for girls the daily cleaning has to be done before 9 a.m. and after 4.30 p.m. The heaviest part of the weekly cleaning is usually done on Saturday, when most of these schools have a holiday. In large buildings the difference in the two methods of furnishing (portable furniture or desks with fixed seats) would probably mean during the winter months a saving of at least five hours¹

¹ Made for me by the Educational Supply Association.

¹ These chairs belong to a set made by Messrs. Liberty & Co., Regent Street, London.

gas per week. I do not think the practical difficulties in connection with the cleaning of school buildings are sufficiently considered in the equipment of schools, and yet these questions should be one of the first considerations in choosing school furniture, as the health and consequently the working capacity of teachers and pupils depend so largely on the arrangements made for thorough and systematic daily and weekly cleaning.

The use of folding desks necessitates some arrangement for the storage of the exercise books and text books of the pupils. The LOCKERS shown in Fig. 4. meet this difficulty, and are more convenient than ordinary cupboards.

These can be made¹ in any number of divisions, and in any size. They should be stained to match the desks and chairs, and fitted with brass flush-catches. These lockers are not unsightly, and, by having them made in small groups of three or six, they occupy very little space. An objection that has been urged against the use of lockers is that the pupils are constantly moving about to get what is needed for the different lessons.



Fig. 4.

This may, I admit, lead to confusion and disorder with a weak disciplinarian, but those who cannot maintain order under these conditions in a class of average size have, in my opinion, missed their vocation in becoming teachers. With a mistress who has her class well in hand, the movement from desk to locker is distinctly good, and provides in a natural way the frequent change of position which is so necessary for growing girls.

In a valuable little book, "A Manual of School Hygiene" (Cambridge University Press), by G. W. Hope, M.D., and Edgar Browne, F.R.C.S., the use of portable furniture is strongly advocated:

All school furniture should be as light and portable as possible, so that it can be moved in order to allow the floors beneath to be thoroughly and frequently scrubbed, and when practicable to be moved completely out of the room.

As I have said, I see objections to the scrubbing if it can be avoided, though it is probably a necessity in elementary schools, but from personal experience I can heartily endorse all that is said in favour of portable school-furniture.

Its chief disadvantage is that, at present, the cost is considerably more than the cost of the average school-desk with locker and fixed seat. The cost of locker, desk, chair, and foot-rest, as described, works out to about two guineas per pupil. With a cheaper chair than that shown, this

cost could be slightly lessened. The cost of the ordinary school-desk, with locker, foot-rest, and chair attached, varies from 20s. to 23s. per pupil. From the hygienic point of view, the advantage is, I think, all on the side of the portable furniture, and a room fitted with it has not the crowded and heavy appearance so often noticed in the ordinary class-room.

Assuming, however, that the cost of this furniture is at present prohibitive for the average school, what remains? There are many varieties of single desks with chair seats, with foot-rests and lockers; some have sliding desks, and seats that tilt automatically. These cost, in pitch pine, 23s. or 22s. each. Most of these require a floor space of from 27 to 31 inches, and they are not easily moved for cleaning or for clearing a room. The hard, straight seats of many of these are often very uncomfortable. An attempt is, however, sometimes made to replace these by cane seats, but these are expensive because they have to be constantly renewed.

Enough attention is not paid to the comfort of seating arrangements in secondary schools for girls. In many cases, the fault lies with the form mistress rather than with the school authorities. I have often been told by elder girls, after they left school, how tired they got of sitting during a long morning in desks with fixed seats, and perhaps with only one short interval in which free movement was permitted. Things are better now, and much is done to break up long hours by drilling and games, but much still remains to be done in this direction. Every wise teacher recognises the signs of physical fatigue in her class, and takes advantage of the opportunity afforded by the needful illustrations of lessons in the shape of maps, pictures, the use of the blackboard, by the children whenever possible, to give the whole or part of her class an entire change of position, but there are still many teachers who treat restlessness as naughtiness and inattention, instead of regarding it, as it so often is, as a sign of physical discomfort.

The old private school of thirty years ago, with its many disadvantages, allowed much more freedom of movement in the class rooms. Less written work was required; a system of tables and chairs necessitated constant change of position in order to fetch books, &c., from lockers and cupboards. Many lessons, such as those in geography, were given with the pupils standing round a map, and I am inclined to think that there were then fewer round shoulders and less tendency to curvature of the spine than now. Of course, defective school-furniture is not the only cause of these evils. Much might be said of the long hours in school, and especially of home preparation, and of the amount of written work required nowadays from growing boys and girls. But if these conditions are to remain as part of the educational system of the country, it is imperative that the equipment of the class rooms should be such as to enable the pupils to work with the least possible amount of discomfort.

For those who require a much cheaper desk than

¹ Those shown in the illustration were made by the Educational Supply Association.

the two described, there is the Charterhouse Dual Desk (Fig. 5)¹. A group of these desks to seat ten children works out at a cost of 10s. 6d. per pupil. These desks do not take up much room, and are useful, especially in a large assembly hall, since they can be placed round the sides of the hall when a clear space is required. The support for the back in these desks is specially comfortable, and where there were only a few in use, I always found there was competition for these seats in preference to the other desks used in the building. Their disadvantages are that they have no foot-rest, and that there is a kind of wooden pocket for books, which is not convenient, and being difficult to clean, serves too often as a dust trap. In ordering these desks teachers should have them without this receptacle; this change, however, by necessitating lockers or cupboards for books, would add to the above estimate of cost. The iron standards used as supports make these desks somewhat heavy to move. Similar desks are made by many firms with

THE INCORPORATED ASSOCIATION OF HEADMASTERS.

IF there be any truth in the definition of genius as the "transcendent capacity for taking trouble," Dr. R. P. Scott, the headmaster of Parmiter's School, Victoria Park, may certainly claim possession of that divine gift. Due not only to his conception, but also to his strenuous effort, is the quite remarkable genesis and growth of the Incorporated Association of Headmasters. There is not one of those who were connected with him in its first beginning who would not cordially assent to this proposition.

In the summer of 1890, a conversation across a tennis net between Dr. Scott and his neighbour, Mr. Hinton, of Hoxton, led to a meeting of headmasters, chiefly metropolitan, at the Holborn Restaurant. Their motive was to establish an Association of Headmasters "for the purpose of

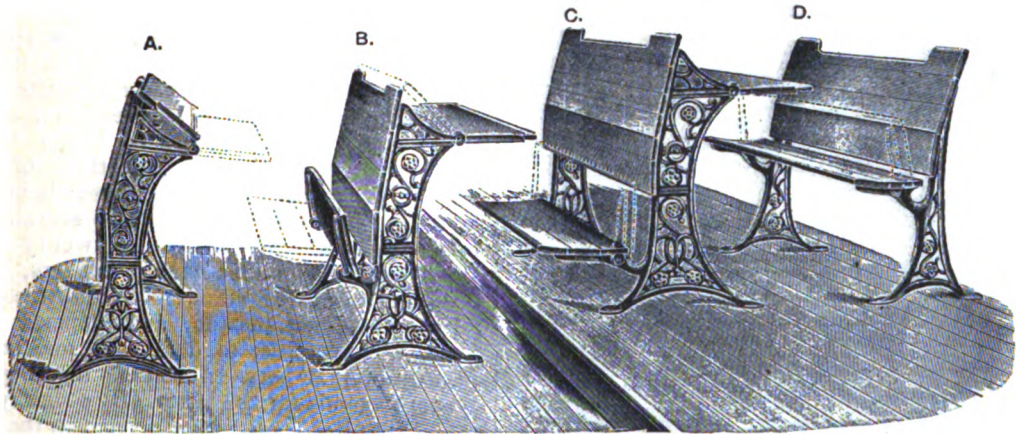


Fig. 5.

lighter standards, but the backs do not appear to be so comfortable.

I would suggest that all school furniture should be dark in colour and highly polished; because (a) dust shows plainly on such furniture, and dust is a deadly enemy to healthy school life; (b) the appearance of the class room is greatly improved, and surroundings play a more important part in education than is generally admitted.

Ruskin's teaching should be carried out in every school:

All the lecturings and teachings, and prizes and principles of art, in the world are of no use so long as you don't surround your men with happy influences and beautiful things. . . . Keep them uncomfortable and in the midst of unbeautiful things, and whatever they do will still be spurious, vulgar, and valueless.

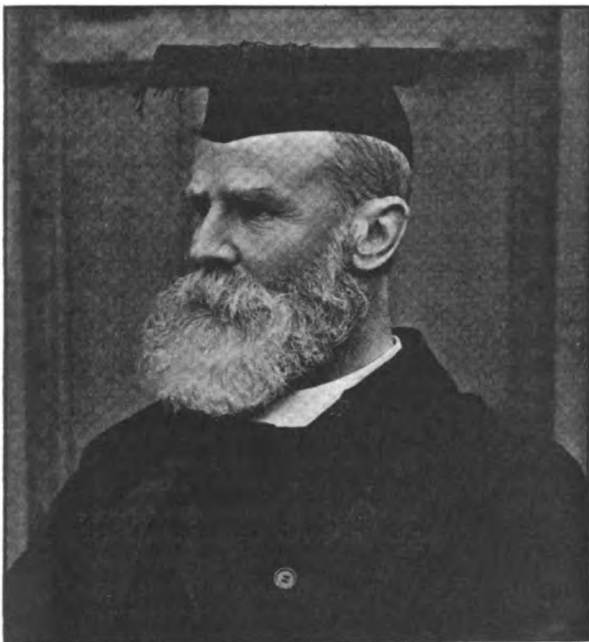
I would have no draperies, tawdry or beautiful, in schoolrooms, but I would have restful and pretty furniture, healthy growing plants, good colouring, a few good pictures, and plenty of light and fresh air.
(To be continued.)

taking combined action, or of making corporate recommendation, in professional or public matters affecting secondary education." Dr. R. B. Poole, of Bedford Modern School, presided over the meeting, and over the committee of nine then appointed to form a constitution and draw up rules for the new society. The basis on which it was formed was democratic. Its membership was "open as a matter of right, and not of courtesy, to headmasters of all secondary schools whose governing bodies are of a public character and undertake the financial responsibility of the school." In this particular is found the essential difference between the Association and its oligarchic elder brother, the Headmasters' Conference, which had attained its majority in the same year.

Then came a period of quiet persistency which secured within twelve months 158 members for the new body. Now the first forty members have grown to 480, who represent every section of the profession. The isolation of schools and schoolmasters was gradually removed, for it is of interest to note how few of the original members were

¹ Made by the Educational Supply Association.

personally acquainted with one another, and men yielded themselves gladly to the idea of coöperation for the attainment of professional ideals. But there were serious hindrances to be overcome. The Conference Committee was unfriendly for a while, or if it may claim to have held out the right hand of fellowship, it smote the young *débutante* with the left by its resolution that no headmaster, save such as had joined the Association at its beginning, should be eligible for membership in both bodies. This aloofness, which arose out of a misconception of the aims of the Association, continued for five years, and then the offending resolution was rescinded: and not only did a considerable number of members of the Conference join the Association, but the committee of the former admitted into its



THE REV. T. C. FRY, D.D.
Headmaster of Berkhamsted School; President of the Incorporated Association of Headmasters.

fold several who had been prominent workers in the latter: and it is interesting to notice to-day that of the Committee of Conference more than half have played a prominent part in the management of the Association, while a similar and even more striking proportion of the Council of the Association are members of the Conference. We believe this was due in part to the wisdom of the late Mr. Vardy, of Birmingham, and the Master of Marlborough: but not less because of a growing conviction of the business methods adopted by Dr. Scott and his colleagues, with confidence therein. There was yet another obstacle, the outcome of ignorance rather than of prejudice. The "man in the street" looked askance at the work of the Association, because the word "secondary" was misunderstood. It was taken by many to mean little more than second-rate.

But the clouds rolled by, and when Dr. Poole, who had occupied the chair for four years, and had been succeeded, for two years' service, by Dr. Wormell, of the Central Foundation Schools in the City of London and a member of the Royal Commission on Secondary Education, the Association had established for itself a foremost position in the educational world. Then followed the year's presidency of Canon Fowler, of Lincoln; and in 1897 Mr. Vardy, of King Edward's School, Birmingham, and a prominent and popular member of the Conference, took the chair for three years. About the same time Dr. Scott sought relief in his secretarial duties by the appointment of Mr. Swallow, of Chigwell, as Joint Honorary Secretary, and of Mr. Bendall, sometime Headmaster of Blackheath Proprietary School, as Assistant Secretary; and before the close of Mr. Vardy's chairmanship, Mr. Hinton, of the Haberdashers' School, had given up the treasurership, which he had held from the beginning, to Mr. Easterbrook, of Owens School, Islington. In 1900, Dr. Gow, of Nottingham High School, who was subsequently elected Headmaster of Westminster, succeeded; giving place this year to Dr. Fry, of Berkhamstead. The Council, which originally consisted of fourteen, and then of eighteen members, elected by the whole society, is now a larger body, and consists of eighteen representatives of the provincial divisions (three of these being metropolitan), with the treasurer, two secretaries, and four members, co-opted by the twenty-one. The Chairman, the above-named officers, and the chairmen of three standing committees for parliamentary, examination, and general purposes, form an executive, to deal with matters arising in the interval between council meetings, and to prepare agenda for the latter. By a rigidly enforced rule, that after three years' service on the Council a member is ineligible for one year, the danger of an oligarchy is avoided; and to this end the method of electoral divisions also tends. Another striking mark of the rules of the Association is that members who give up their headmasterships are not expelled; but within certain limits may become associates and take part in its government.

From the first the Association has met annually in London, during the month of January—lately, by the courtesy of the Court of Common Council, at the Guildhall; and at these meetings it has from time to time accepted hospitality for luncheon or dinner, from two Lord Mayors, and from the Clothworkers', Haberdashers', Grocers', Drapers', Goldsmiths', and Fishmongers' Companies; being in this way brought into touch with the leading politicians in the educational world. For ten years it had midsummer meetings at Bedford, King's College, Trinity, and St. John's, Cambridge; Magdalen and Christ Church, Oxford; Brighton, Leicester, Birmingham, and Manchester; but these were found to interfere with schoolwork at a particularly busy time of year, and they have been superseded by the activities of divisional committees, through which some of the most important work of the Association is done.

A sermon is a characteristic of the general meeting, and it has been preached on different occasions by Archbishop Temple, Bishops Browne and Creighton, by the present Bishops of Rochester, Hereford, and Manchester, the Dean of Christchurch, the Masters of Trinity and St. John's, Canon Henson, Mr. Laffan, some time Principal of Cheltenham College, and Mr. Bernard Wilson, Vicar of Portsea.

It would be impossible to summarise the work which the Association has done during the thirteen years of its existence. There has been hardly a question affecting the internal administration of schools with which it has not dealt from time to time. But it has been more remarkable for the influence which it has exercised on external administration. It has organised a Joint Scholarships' Board for examination of boys who desire to pass into secondary schools from elementary, and of such as are able to mount higher still on the educational ladder; a Joint Committee on the Training of Teachers, which, after several years' laborious investigation, brought about a successful Conference on Training held at Cambridge in the autumn of 1902; an Advisory Committee conjointly with the Head Mistresses' Association; a scheme for pensions, and an annual list of "Public Secondary Schools." In 1897 it met the representatives of higher-grade schools in conference, under the chairmanship of Sir G. W. Kekewich, with Mr. Michael Sadler, and Mr. R. L. Morant, of the Education Office, as assessors, and arrived at a *concordat* as to the mutual relations of such schools towards secondary education; and in the same year it promoted a Bill for the organisation of secondary education, which was introduced into the House of Commons by Colonel Lockwood, with whose patient and unselfish help the Association has pressed its views upon successive Administrations, and by means of question and answer in the House elucidated doubtful points of legislation. The tenure of assistant-masters, assured in one particular by the "Grantham case," much-needed reforms in the Naval system, and in Military education, the organisation of the Education Office, and examinations of almost every sort, have been strengthened by the action of the Association: while the public have been taught "what Secondary Education is" by a series of short Essays, by writers of practical experience on various aspects of the problem, by occasional papers, as well as by the exhaustive annual reports of the Council. For a short while it was associated with other bodies in the publication of a weekly journal called *Education*; but this proved a financial failure, and it is now publishing a quarterly *Review* of a less pretentious character, under the editorship of one of the secretaries and the control of a committee of the Council. Representatives of the Association have played a recognised and prominent part on such bodies as Sir Richard Jebb's Committee, which was summoned by the College of Preceptors in 1897 to promote legislation, on the Consultative Committee of the Board of Education, and the Registration Council, as well as on several county education

authorities, and on every conference held to encourage educational efficiency in any form. Several county councils have already shown a disposition to elect upon their new education committees its nominees; and the Board of Education has officially indicated the desirability of this.

Yet the unique and most effective energies of the Association have been directed towards keeping in touch with, and exercising influence upon, other educational agencies. The personal attachment of its officers to the officials of the old Charity Commission, and the new Board of Education, as well as to the Examiners of the Universities, induced by a common devotion to the same cause, have accomplished this; and it is everywhere regarded as the advisor of the ignorant, and the guide of the helpless in the field of Education.

NAVAL EDUCATION.

By Rev. J. C. P. ALDOUS, M.A.

Late Fellow of Jesus College, Cambridge; Chief Instructor, H.M.S. Britannia, 1875-1898.

THE headmasters had held their Conference and left, all unsuspecting, to celebrate the feast of Peace and Good Will, when the First Lord of the Admiralty handed them a Christmas card of a startling character. Rumours of a readjustment of the system of Naval Training were in the air; but that he should say to them, "Hands off!" and remove practically the whole Wardroom from their sphere of influence, they could never have anticipated.

Viscount Goschen, when First Lord, had thrown himself upon the headmasters and begged them to make the public school an avenue for entering the executive branch of the Navy. He increased the age of entry, which increase many interpreted as an instalment of an advance to that of Sandhurst. The public schools have taken such a strong hold of Sandhurst and Woolwich, and have so well made good their claim to provide officers for our Army, that time alone appeared necessary for them to become the nursery of the Navy.

Eton, Clifton, Radley and many others, had thrown themselves heartily into the scheme; with great self-sacrifice had established naval classes, at the cost of dislocating work and staff; had attained results in spite of obstacles; these were not few—parents reluctant to trust the unknown and risk a failure to pass their boys—preparatory schoolmasters loth to part with their boys and stretching their fourteen-years' limit to pass them direct—the "crammers" who seemed to have acquired a stronger grip of the preparation with the advance of age. Time was, indeed, necessary to make the public schools the main avenue of approach to the executive branch of the Navy.

To this chapter of history the recent memorandum adds *FINIS*—a few kind words of appreciation and of regret that they were no longer possible, and it bows the public schools out of the room. They may think themselves well rid of a troublesome and expensive burden; still they

cannot help feeling that, had the result justified the inconvenience, the country would have been the gainer, and their patriotism makes them regret its removal.

So far, perhaps, the headmasters had only thought with chagrin of the failure of their efforts to supply an ungrateful Admiralty with naval cadets, but on further reflection they saw that the memorandum deals them a harder blow. The young Marine Officers and Naval Engineers who have passed direct into the Service from public schools add no inconsiderable lustre to the honour lists, and the names of those who have fallen in their country's cause live in the memory of their schools. These officers, too, are now removed from public-school influence, and here, without a word of sympathy, the First Lord ends a chapter of school history. The changes are rightly described as "far-reaching and in some respects sweeping."

The *amour propre* of public schools is hard hit by the statement now plainly made that the State can train its young naval officers between the ages of thirteen and seventeen better than the general schools of the country. From the broad aspect of secondary education in the country, and the part which public schools are taking in it, this claim demands serious examination.

The old representatives of public schools in the Navy are few and far between; the youngsters who had been a year or perhaps only a term at Eton, and then went straight on board a line-of-battle ship, with an entry examination which consisted in writing out the Lord's Prayer. These were some of the young cubs "who washed their faces in salt water" and grew into the lions of the Navy, those grand seamen who hand down the traditions of early entry. No wonder the First Lord speaks with appreciation of its success.

But this is not the case for early entry. The entry age of thirteen extends practically to the middle of the Lieuts.' List, with a rise of a year, roughly speaking, in the Lieuts.' and Sub-lieuts.' List, and another still in the Mids.' List. The great fact stands out, among the many things that the Admiralty have learned by experience, that those who joined the *Britannia* at fourteen or fifteen were, so far as the Service is concerned, then about in the same position as the early entries, with the consequent loss to the young officers of so many years of naval training.

To estimate the true bearing of the changes made it is necessary to appreciate the principle, now stated for the first time, that the Executives, the Engineers, and the Marine Officers must all be ranked alike as the combatant officers of the ship. The beautifully worded historical introduction will serve to make shore-going people accept this postulate. But it will take a long time to make the Wardroom appreciate it. The Wardroom Mess consists of these officers, together with the medical and accountant officers, who have, of course, separate duties, as separate and clearly defined as that of the chaplain, if borne.

History and practice alike have led to the Execu-

tive Officers being viewed as the combatant officers of the ship; the Engineers as an intrusion—a late introduction—and there is a tendency for the Marine Officers to be looked on as the fifth wheel of the coach. The position of affairs unquestionably does not make for efficiency, and, in so delicate a piece of machinery as the Wardroom of a fighting ship, any failure in adjusting the bearings leads to friction. No outsider can have spent any time in a Wardroom Mess without feeling that things are a bit awry. It is a master hand which will touch the weak point of an organism and operate with skill to cut off the malignant growth. Lord Selborne's memorandum shows a boldness which, if it had not been framed after a close consultation with naval men of all opinions, would savour of temerity.

The first and absolute requirement for an Executive Officer is that he should be a seaman—one to whom water is a congenial element on which he can rely, and will never fear. It is the watermanship of the old naval officer which gives him his character. Picked up as a youngster and sent straight to sea, he joined the cronies of the old chief boatswain's mate, and learned his ways and his language, to be used with discretion, to cling to a yard in a gale of wind, and keep his head screwed on as they took down the last reef. He knew the look of the sky, was not ashamed to shorten sail on a fair and pleasant afternoon, and had all snug before the snow squall was upon him. All these things, you will say, were the qualities of the past. Not at all! the same is the result of all sea training; the only way to learn to be a seaman is to keep the sea; and a close acquaintance with its moods in early youth, whether it be in sailing cutter, destroyer or submarine, brings power and self-reliance.

It is hardly necessary to labour this point, that the Executive must be a sailor; but it is a fresh and breezy novelty to state the same of the Marine and Engineer officer. It never seems to have struck anyone in authority before that these, too, should be seamen first and specialists afterwards, yet this is clearly the case. These officers must be sailors, and in the end of their course they will be sailors, but it is obviously to everyone's advantage that they should be so first rather than last. Technical training they must and ought to have, and this "will be very carefully determined," but they must be brought up to the sea.

And, what is more to the point, it will make the Engineer himself more efficient. After reaching the rank of sub-lieutenant, between the ages of nineteen and twenty, he will go to Keyham and to engineering shops knowing what he wants and what he does not want. No public-school boy going into an engineering establishment knows what he is looking for; but the sub-lieutenant will have received the preliminary instruction in marine engineering, and will be in a position to profit by everything met with in his special course. A youth spent in contact with that "huge box of engines," a modern man-of-war, will leave an appreciation of what has to be learned, to make it go.

If, however, it be much to the advantage of the Executive and Engineer officers to "wash their faces in salt water" at an early age, the gain is greater in the case of the officer in the Royal Marines. It is now at last appreciated that the combatant naval officer, besides being a seaman, must have a sound fundamental knowledge of physics or natural philosophy, not in a lecture-room form, but as applied to the details of ordinary practice met with every day at sea. Each and all must be familiar with the details and principles of machinery, its construction and adjustment, besides the ordinary problems of navigation.

The memorandum prescribes for the Marine Officer also this naval training; it will fit him to take his part in the general work of the ship; at no time of his career will he be a landlubber, he is to be a seaman first and a soldier afterwards. The knowledge he has acquired of marine engineering, gunnery and general organisation will stand him in good stead in his special training at the headquarters of divisions or the *dépôt*, enabling him to seize on those points which will fit him for his future career. The public-school boy joining the Marine *dépôt* at present begins by imbibing military notions, military tastes, and he takes them to sea to his loss and to the detriment of his usefulness.

Our public schools have had a great interest in this branch of the Service in the past, and it is with great regret that they part company with these officers in the future. Still no public school can train them as seamen; and seamen they must be. It must, in fine, be conceded that, if this sort of education can be classed as "secondary," the State alone possesses the machinery for carrying out such education effectually: hence the scholastic *amour propre* must reconcile itself to yield gracefully.

The general preparatory schools of the country have, however, an unequalled opportunity now of taking the leading part in the provision of the material. They have the boys, and it must not be forgotten that when the system is fully at work something like two thousand candidates will be required annually. Having the boys, it is now their wisdom at once to accept the new Admiralty syllabus of examination as the staple commodity of instruction.

For example, English taught on the *précis* method has an educational value which is practically neglected in preparatory schools: this might be adopted with great advantage to the education of English gentlemen and men of the world. Conversational French, the history and geography of the Empire, should form part of the ordinary curriculum: the gain to the community would be great if our boys all learned these thoroughly. It is by seeing that its ordinary teaching meets the Admiralty requirements that parents will be induced to trust the ordinary school and refuse the offers of the crammer. Also the public schools can help towards this wholesome reform of preparatory-school teaching, if they will include these points in their scholarship tests. The trouble in-

involved in testing French reading and conversation is no valid excuse for allowing the preparatory departments to neglect the real teaching of French.

The scheme is launched: fifteen years hence, if all be well with it, its course and true bearing may be effectively considered: certainly not before that time.

There are no doubt rocks ahead: they can be seen, little is gained by indicating them. When the Admiralty instructions are "full speed ahead," the foul anchor at the fore is always taken to ensure safe pilotage.

THE NEW LEAVING CERTIFICATE OF THE LONDON UNIVERSITY.

By J. LEWIS PATON, M.A.

Headmaster of University College School.

THE old London Matriculation served a double purpose: it was to the University a *terminus a quo*, to the Schools a *terminus ad quem*. It is possible that as a preliminary or entrance examination from the University's point of view it proved satisfactory. It has certainly not proved satisfactory from the point of view of the Schools. True, it provided a definite objective for the second-rate order of intelligences, but to a boy of real power in any special direction the time which he spent in matriculation classes was as a rule a period of marking time, if not of actual deterioration. The sense of scholarship, a somewhat timid and delicate bloom, was nipped by its atmosphere. Its boasted English never bred in anyone a love of literature or fostered literary power. The General Science paper should have been one of its best features: it insisted on a certain modicum of science as an essential part of liberal education. It was a good idea marred in the execution. The papers were ill-assorted and the syllabus took no account of that form of science, recently dubbed "Nature-study," which is the healthiest form science study can take for junior boys. The examination as a whole, awarding its honours on an aggregate of marks, obtained with a comparatively low examination standard, was fatal to excellence.

And yet, though designed as a *terminus a quo*, the examination was more in demand as a *terminus ad quem*. A comparison of the number of candidates proceeding to degrees with the number entering for matriculation proves that the London Matriculation for many years past has been more an examination for the Schools than for the University. The figures for 1901 are: candidates for degrees, total 911; candidates for matriculation, total 4,198. It is as a h'porth of bread to an intolerable deal of sack.

The new University has recognised this state of things, and its new "Regulations for the Inspection of Schools and School-leaving Certificate Examination" are well adapted to meet the new situation. Instead of bringing candidates together by the thousand into great examination centres, the exami-

nation is to be held in the schools themselves and to be adapted, without lowering the standard, to the school curriculum, while it still serves the purpose of admitting the successful candidate as a matriculated student of the University. The elasticity—as some of us would be inclined to say, the excessive elasticity—of the new Matriculation regulations makes this adaptation an easy matter.

Let it be said at the outset that it is a good thing in every way that this Leaving examination should be in the hands of the University rather than the Board of Education. It brings the school into direct touch with the University, it frees the University from what is properly school teaching, and it avoids the awkwardness which arises, for instance, in Scotland, where the Leaving Certificates awarded by the Education Department are only partially accepted by the Universities in lieu of their own preliminary examinations.

It may be well to note some of the special features of the new scheme, as compared with the Matriculation which it is intended to supersede in schools. In the first place, any school desiring to present pupils for the School-leaving Certificate will be required to submit a general statement of the complete course of instruction given in the school, as well as the curriculum of study pursued by the candidates presented. The Leaving Certificate, therefore, will mean in future not merely that the candidate has been successful in one isolated examination, but that he has reached a certain stage in an approved course of educational training fitted to develop soundly the intelligence of its pupils and prepare them for the work of life. It will ensure that proper attention has been paid to those elements of curriculum that do not admit of being fully tested by written papers. For instance, the reading of classes preparing for matriculation in French or German (the latter being a sadly diminished number) has hitherto been almost of necessity disconnected. To take some one masterpiece and read it through would not have given candidates a fair chance on the Unseen paper. The "selection" book was inevitably the book adopted for the matriculation class. Under the new regulations its vogue should be a thing of the past. It is also to be hoped that there will be due insistence in language classes on the training of the ear.

Secondly, the standard of the papers will be that fixed by Matriculation, but provision is made for (1) any additional papers of the same standard that may be found necessary in relation to the school curriculum; (2) for an oral examination, and (3) for special advanced papers, as required by any particular school or group of schools. These advanced papers will be most welcome to all schools which have refused to recognise the London Matriculation as the be-all and the end-all of school education. It is not quite clear what relations these papers will bear to the Intermediate examinations of the University. This point needs to be defined.

Thirdly, a pupil will be able to take up more than five subjects, and yet, if he succeeds in five,

he will secure his matriculation. One is pleased to note that the Board has not adopted the pernicious Scottish system of taking the certificate piecemeal, though a candidate who has already obtained his School-leaving Certificate may stay on at school, take the advanced papers in a subsequent examination, and, if he obtains his distinction, have the fact duly recorded in an appendix to his certificate.

Provision is made for schools which fail to reach matriculation standard by what is called the "school record." "Any pupil who has not entered for all of the subjects required, or has not passed the examination in all of them, shall be entitled to have his attainments set on a document to be called a school record, which will state the subjects in which the pupil has reached the approved standard." This is apparently not to be regarded as a *solatium* to the unsuccessful, but as a regular part of the system. A lower fee of £1 is charged to pupils examined for the school record only. And yet no papers are to be set below matriculation standard. It is difficult to see how the school record is to be what it professes to be, if the papers are beyond the candidate's reach. It will "record" his success in those subjects where he attains matriculation standard, but of the bulk of his work it can give no "record" whatsoever. I confess I do not see how such an arrangement can be satisfactory to the schools which it contemplates, the schools, namely, whose pupils leave at the age of fifteen. If provision is to be made for such second-grade schools, it will have to be made ultimately by a separate Lower Leaving-Certificate with papers testing the education as a whole, only on the lower plane required.

Another novel and experimental feature which will probably provoke much ridicule, but which seems to me to be of real value, is the proposal contained in the eleventh section: "Any pupil who distinguishes himself in (a) any form of manual, artistic or technical skill, or (b) any form of general or special capacity not tested by the examination, may, if desired by the authorities of the school, have a note to this effect added to his Certificate or Record." It is refreshing to find that the Board recognises the educational value of the hobby. The phrasing is delightfully vague, probably it is intended to be so. The Certificate will state that Tommy is an excellent carpenter, can enlarge photographs successfully, or carve a panel, that he has made an excellent model of a twopenny-tube engine, has rifled over a hundred birds' nests, or collected some fifty species of butterflies. Even games are not excluded. The "special capacity" of the pupil in question may be skill on the piano, at chess, spirit-rapping, turning cartwheels, hitting sixes, or dropping goals. Let the Board provide an ample area of parchment: the "general and special capacity" of the schoolboy is not infrequently in inverse proportion to his scholastic attainment. The age limit remains the same, viz., sixteen, and this is good. It acts as a check to early leaving. It removes also the temptations to overpressure.

Such are some of the main features of the new Regulations, which will, I have no doubt, be welcomed by all those schools who hitherto have suffered from the London Matriculation. They leave plenty of freedom, I had almost said too much, for they admit of a Leaving Certificate without any other language than English. They give the teacher a say in the examination, and yet avoid the special danger of the *Abiturienten Prüfung*, where the personal bias of a teacher may ruin unjustly the whole future career of a pupil. And they will be carried out, I do not doubt, with the same first-rate administrative efficiency which has always characterised the London Matriculation.

Personally, I welcome the new examination, because I believe that it will eliminate the necessity of other external examinations, thereby simplifying the business of organisation and giving us what Thring always stood for—"liberty to teach." Of two points Dr. Roberts must assure himself for the complete success of his new venture. In the first place, he must adjust the date of this examination to the convenience of the schools. The last week of July is clearly better than the second week of June. Secondly, he must get the School Leaving Certificate accepted not only by all professions in lieu of their own preliminary examinations, but also by the august Greek-bound Universities of Oxford and Cambridge.

PROF. H. L. WITHERS.

THE death of Prof. Withers, of Owens College, in December last, in his 39th year, has left a gap in the educational world which it will not be easy to fill. That such is the conviction of a wide circle of friends has been made abundantly clear by the tributes paid to him since his death. It is not sought to add to the number of those tributes here, but rather, with the help of some of his recorded utterances, to define the impression which a life devoted to the advancement of education in England and a personality of singular strength and charm left upon one who knew him well.

His contributions to educational literature are interesting, but too slight and fragmentary to give any adequate idea of his intellectual qualities or to justify the hopes which his friends were led to form of the great career that might be in store for him. They were confined to a small volume of English ballads for schools which he edited for Messrs. Rivington; a school edition of the "Merchant of Venice," in the Warwick Shakespeare; a paper on "The Teaching of Ancient History" in Mr. P. A. Barnett's volume on "Teaching and Organisation;" a paper on the relations of the primary to the secondary school in Dr. Scott's "What is Secondary Education?"; and an article in the *Contemporary Review* for June, 1900, entitled "New Authorities on English Education."

The last-named essay is most valuable for the light it throws on the convictions at which the writer had arrived after an educational experience

more varied probably than any Englishman of the same age had enjoyed. After taking his degree at Oxford he had taught for a time in an Oxford board-school; he had been an assistant-master at the City of London School, at Manchester Grammar School, and at Clifton College; he had been Principal of the Isleworth Training College for Elementary Teachers for six years; and then, as Professor of Education at Owens College, he was responsible not only for the training of teachers for both primary and secondary schools, but also for the inspection of such secondary schools as voluntarily offered themselves for his criticism. And the conviction which is deepest in his mind—a remarkably open and observant mind—after all this wide experience, is evidently *the need of science in English education*.

Not, first and chiefly, the need of natural science. In no spirit of antagonism to one important branch of study he protested against such a limitation of the use of the word. Science meant to him "the whole body of systematic knowledge whether in the humanities or in nature-studies." All departments of knowledge and indeed of human life call for the scientific habit of mind; and a man may almost be said to be educated in proportion to the degree in which he has acquired it. "One can tell in five minutes whether a man has this habit of mind or not by the way in which he will address himself to a new book or a strange fact." He had an intense admiration for the type of character, "strong, serious and quiet," as he expressed it in a letter from Clifton, produced in the best boys by English public-school life, but he held that the public schools had "not succeeded in communicating to the general body of their pupils a trained intellectual habit, an idea of scientific method, a power of severe and concentrated thinking, a many-sided capability." Nor would he have considered that any other of our secondary schools, still less that our technical schools, had succeeded where our public schools had failed. Just because scientific method varies he regarded it as essential that a man of science should have "an all-round liberal training" before he devotes himself to his specialist study. "Otherwise he is likely to be unscientific in every province but his own."

Of the means by which he thought it would be possible to secure the reform in English education that seemed to him so urgent, only the merest hint can be given here. He desired, first, "an adequately manned and equipped Central Department of Secondary Education," and, secondly, the systematic study of Education at the Universities by men with sufficient leisure and opportunity to get at the facts and reflect upon them. "The country has no one to collect the information and do the thinking in matters of Education, as it has had in matters of Law or Medicine." His last official act was to get the Victoria University to recognise "Education" as one of the subjects in its degree-examinations. From the first he attached immense importance to the *teaching of history* in primary schools as well as secondary. "Without it," he says, in his "Ancient History" paper, "a mo-

mentous aspect of human life is blank to the imagination, and dark to the reason." He had, personally, the same sort of vivid historical imagination as Dr. Arnold: he could have told of himself the story he prefers to tell of Dr. Arnold—that historical sieges and battles entered into his dreams. This essay contains some valuable hints, and at least one characteristic saying: "No time is more grievously and fruitlessly lost in teaching than that which is bestowed upon elaborately explaining to a boy at twelve what, without explanation, will be to him at sixteen as plain as way to parish church." A favourite counsel in his lectures on teaching was, "Begin at the boy's end."

There is a melancholy pleasure in thus gathering up some of the crumbs of wisdom, now that we can no longer enjoy the feast as of old. But when one tries to justify to oneself one's strong conviction of his greatness and value to English education, one feels more and more that both the greatness and the value lay in his deep and strong personality—in the life that was fed by inner springs hidden from the eyes of the world.

A REGISTER OF TEACHERS.¹

THE appearance of this work is an indication of the great strides which secondary schoolmasters are making towards professional recognition; and the ignorant layman who on all occasions, public and private, girds at our schoolmasters as culpably effete may find plenty of food for reflection if he peruses the particulars given in this volume of the various bodies—organisations within an organisation—all of which are living witnesses to the interest with which pedagogues follow the various branches of their strenuous calling. Indeed, the work itself will, we feel convinced, contribute in no small degree towards that federation and furtherance of the common interests of secondary teachers which is so much to be desired for the welfare of our national education.

To judge the first appearance of what promises to be an annual book of reference requires a certain amount of leniency. Before passing on, however, to make one or two criticisms and suggestions, we should like to congratulate the editor of the work and its publisher on the handsome volume they have produced. It is at once the "Who's Who," the "Crockford," and the "Year-book" of Pedagogy.

Turning to detail, we should in the first place suggest a division into two and not three parts. There seems no valid reason why Part III., "Articles and Reviews," should not follow Part I., dealing with "Societies, Universities, Training, Events of the Year, &c., &c." The articles and reviews in Part III. are practically a criticism of the educational work of the year, and might well follow Part I. as a necessary corollary. The re-

maining portion of the volume would then contain a directory of individual teachers and schools.

The matter contained in Part I. is excellent; in no other volume is it possible to obtain such valuable information on so many important aspects of organisation and higher education. We have noticed only one error of importance. On page 135, University College, Sheffield, is described as belonging to Victoria University. Sheffield, we know, had aspirations for promotion, but hitherto they have not been gratified. We believe, further, that the Principal of the College is Dr. Hicks, not "Hincks."

In Part III. there is some good reading-matter, but we detect one article at least which has been entrusted to a gentleman who—to our certain knowledge—has absolutely no first-hand grasp of the subject upon which he discourses: we forbear to mention his name. Again, Mr. Bridge's article on "Tenure," though good in the main, contains a very stupid statement: "He (the headmaster) can dismiss an old and tried master with as little fear of criticism or inquiry as if he were a boot-boy." Such a sentence is a wanton travesty of facts, and is calculated to perpetuate a feeling of mistrust between headmasters and assistants which we would fain see removed.

Part II. is necessarily at present incomplete, and there are a good many omissions. If professors are to be included, we could furnish a list of half-a-dozen who have done far more work, from the schoolmaster's point of view, than some of those who now receive their quarter-column. Again, where are the names of the headmaster of Highgate; of Mr. Kitchener, formerly of Newcastle; of Mr. Kennedy, formerly of Aldenham; of Mr. Marchant, formerly of St. Paul's, &c.?

These are omissions which no doubt will be rectified next year. We would also suggest a more extensive use of abbreviations: *e.g.*, G.A. = Member Geographical Association; A.S.M. = Member Association of Science Masters; M.L.A. = Member Modern Language Association; T.G. = Member Teachers' Guild. In a few years' time space will become a serious consideration, and it would be well to make use of simple expedients such as those we have indicated.

PEDAGOGICS AT RECENT CONFERENCES.

So many Conferences are held each year during the Christmas vacation that it is impossible, with the space at our disposal, to attempt to report each of them in detail. Bearing in mind that our chief object is to be of practical assistance to teachers in their teaching, it is proposed only to refer briefly to the papers and discussions concerning methods of teaching and kindred subjects which have been given attention at the numerous meetings of schoolmasters and schoolmistresses during the past month.

The Headmasters, neither at the Conference at Tonbridge nor at the meeting of the Incorporated Association in London, gave much attention to methodology. They were more particularly concerned with administrative matters, the training of teachers, the new scheme of naval education, and military education in

¹ *The Schoolmaster's Year-book and Directory for 1903.* About 800 pp. (Swan Sonnenschein.) 5s. net.

general. The discussion at Tonbridge on compulsory Greek, however, calls for a remark. After a lengthy debate and considerable voting, the Headmasters resolved that the Vice-chancellors of Oxford and Cambridge should be requested to take representatives of the Conference and the Incorporated Association of Headmasters into consultation as to the compulsory subjects for entrance into the Universities. A general approval was given by the Conference to the recent report of the Mathematical Association on the teaching of mathematics.

At their meeting the Headmasters' Association resolved that in their opinion the establishment of Leaving Certificates by the Universities is desirable and practicable, and that the Consultative Committee should promote the inter-recognition of such certificates by Universities and their acceptance by professional bodies, and for obligatory subjects in Civil Service examinations. The Association also agreed that the teaching of science in the secondary school should aim not so much at imparting useful knowledge as at developing an accurate and receptive mind.

At the meeting of the Modern Language Association, a reference to which is made in another part of this issue (p. 70), Miss Brebner read a paper on the Training of the Modern-language Teacher, and Mr. F. B. Kirkman dealt with the Use and Abuse of Translation in Modern-language Teaching. A resolution was adopted, that in the opinion of the Association, wherever in a university entrance-examination two foreign languages are required, a modern language should be allowed as one of them.

The Winter Meeting for Teachers conducted by the College of Preceptors extended over five days, and the programme included lectures on the principles and practice of education and on the methods of teaching various school subjects. Dr. Findlay gave two lectures on the Teacher in his Class-room, and Mr. Adamson one on the Criticism Lesson. Miss Burstall and Mr. Malden dealt with the teaching of history in lower and higher forms respectively. Prof. A. Lodge lectured on the Teaching of Algebra and Euclid, and Mr. Langley on the Teaching of Arithmetic. Prof. Rippmann discoursed on the Teaching of Modern Languages, Dr. Moody on Physics, Mr. Lyde on Geography, and Mr. Hedger Wallace on Nature-studies. On the whole, the meetings were well attended, and proved of real assistance to teachers who have not had the advantage of a course of training.

But the teachers of science throughout the country seem to have been most energetic. Three successful conferences have been held. The largest was that held at Manchester for teachers in the North of England, which was attended by more than three thousand persons. The other two meetings were held in London, one at the Chelsea Polytechnic, the other for science masters in public schools, at the University of London. In Manchester enthusiastic discussions followed each of the papers, which were numerous and dealt with a great variety of subjects. Papers were read by Miss Burstall on the Curriculum in different Types of Schools; Mr. Hoyle on the Value of Natural History Collections for Teaching Purposes; Dr. Kimmins on the Co-ordination and Delimitation of Science Teaching in various grades of schools; Canon Rawnsley on the National Import of Co-education; Mr. French on the Teaching of Experimental Physics in its earliest stages; Mr. R. L. Taylor on the Teaching of Experimental Chemistry in its earliest stages; Mr. Lomas on the Fitting-up of School Laboratories; Mr. Wager on the Methods of Nature-study; and Mr. W. C. Fletcher on the Teaching of Geometry. In addition to the papers and discussions, a variety of exhibitions were arranged in different rooms of the palatial School of Technology which was opened in Manchester last year.

At the Chelsea Conference the whole of the first day was devoted to the Teaching of Elementary Mathematics, more

especially that of geometry. The debates on this occasion showed clearly that the recommendations of the British Association and the Mathematical Association have been received by practical teachers with the greatest satisfaction, and that they have already had inspiring influences upon mathematical teaching. In the morning, addresses were given by Mr. Usherwood on the Experimental Method in Geometry, and by Mr. Frank Castle on the Teaching of Workshop Mathematics; in the afternoon, Messrs. Andrews, Eggar, and Siddons took up the Teaching of Geometry, and Mr. Eggar's address in particular was greatly appreciated. The Teaching of Botany was the subject of the third session, when Miss Lilian Clarke and Mr. H. B. Lacey read papers. At the concluding meeting, Mr. Newth gave a splendid series of experimental demonstrations in exemplification of his subject, which was the Experimental Illustration in the Teaching of Chemistry. Mr. Busbridge explained inexpensive methods of making lantern slides, and clearly showed how scientific lectures can be illustrated at a minimum of expenditure.

The Public-school Science Masters, at their meeting, under the presidency of Sir Arthur Rücker, discussed three papers, viz., Mr. Talbot (Harrow), on the Tyranny of Greek for the Ordinary Boy; Mr. Sherwood (Westminster), on How to make Practical Work of any use to a big low form; and Dr. Baker (Birmingham), on the New Syllabus in the Matriculation of the University of London.

The meeting of the Incorporated Association of Assistant-masters was chiefly concerned with matters of administration, but papers on subjects of use to the practical teacher in his work were also read. Mr. Morshead, of Winchester College, explained some Parallels between the Greek Drama and Shakespeare; Mr. P. J. Hartog described the System in French Schools, and Dr. Wimberley, of Abingdon School, took up the question of Preparatory Departments in Secondary Schools.

THE EDUCATIONAL VALUE OF CLASSICS.¹

WE are most of us workers in the teaching of Latin and of Greek; we are all of us, I take it, believers in the supreme value to the intellectual life of the nation of the preservation of classical study, as a means of the highest mental discipline, for all such as have the natural aptitude, and can afford the time needed, to turn those studies to account. But we recognise the fact that those studies, with their severe demands, are not, and by their very nature cannot be made, available for all; we recognise that, with the advance of knowledge in all departments, there are other subjects which must form part of any general scheme of higher education, however high; and that there are other directions in which, if only right methods be employed, and right aims held in view, a liberal education of a really high kind can be secured.

We do not appeal to classical men alone. We look for co-operation to all who desire to see a high standard of education maintained and sound methods of education followed, whether in ancient or modern languages, in English, history, or literature; in mathematics, or in science. The danger of the moment is that, under a sudden and ill-considered demand for various new subjects, and a mistaken idea that it is possible to gather the practical fruits of education without giving those fruits time to mature, the true educational idea should be lost. We appeal

¹ Extracted from the inaugural address delivered by Prof. G. G. Ramsay, M.A., LL.D., Litt.D., at the first annual meeting of the Scottish Classical Association, November 29th, 1902.

to our especial allies, the teachers of English, whose subject is bound up with our own; to those who would have French and German taught as thoroughly and thoughtfully as we desire to teach the classics; to all who regard it as the highest function of education to develop the man, and to turn him out into the world with an instructed, and yet an open mind.

Furthermore, although the teaching of classics—as of mathematics—has this immense advantage, that its methods have been developed and systematised by the experience of many generations, it is also true that this subject, like all other subjects, has made great strides in recent years, and that the old methods of teaching it require to be reconsidered in view of modern conditions. It is not merely that new subjects have been introduced, for which a place must be found; but also that the demand for higher education of some sort, and of the best sort available, is being made on behalf of a much wider and larger class than formerly. It is no longer a select class, consisting of those destined for professions and the higher walks of life, whose needs demand attention: the nation has at last been roused to the necessity, which many of us have been preaching all our lives as a matter of national concern, of training to the utmost the brain-power of the community, and of bringing within the reach of every capable mind, in every class, the benefits of a liberal education.

But there are questions which we have to ask ourselves as educators. Is classical study essential for everyone who would equip himself with a liberal education for the ordinary purposes of life? No scholar would venture nowadays to answer that question in the affirmative. That being so, for whom must it be retained? and what is the precise point in the study short of which it is not worth while to make our youth enter upon it at all? We cannot but feel—we hear it on every side—that there is a waste in beginning a difficult study which is never to be carried to any real end; and we cannot doubt that many a mind has been sacrificed to the fetish of a classical education by pursuing it after it has become evident that no real fruit was to come of it. In the interesting debate that recently took place in Oxford upon the question of compulsory Greek for pass degrees at Oxford, two foremost authorities on classical education, Mr. P. E. Matheson, of New College, and Professor Pelham, President of Trinity College, agreed in the opinion that, in view of the growth of other studies, and of their proportion to each other, no great university, and no sane man, would maintain that there could not be a liberal education which did not include Greek.

In Scotland, we have been beforehand on this particular question. Greek is now made an alternative subject with Latin; yet the study of Greek is not dead, and can be trusted not to die. There has been a falling off in the number of learners of Greek who would never have prosecuted the study to any advantage; but the number of those prosecuting it to real purpose, with a view to an Honours standard, has increased; the standard for Honours work, both in Greek and Latin, is steadily rising; and the figures in the universities for the present session are hopeful in that respect for the future.

I do not, therefore, share in any gloomy vaticinations as to the prospects of classical education in this country, if only its advocates make up their minds to accept the following positions:—

(1) First, that however firmly they are convinced that the highest kind of literary and mental training is to be obtained through the classics, there are multitudes capable of a higher training to whom the long and severe methods of classical study are not appropriate, or can only be attempted at the loss of a genuine mental discipline in subjects more within their reach.

(2) Secondly, that the highest literary and classical education appeals only to one side—though that be the most universal and

indispensable side—of human culture; while science has opened up to us not only a new world of future practical possibilities, but also a new mental discipline, requiring powers of observation and methods of reasoning which are in the highest degree stimulating to a certain order of minds, and on which a true mental training can be based, fulfilling the great end we should aim at in all liberal culture.

(3) Thirdly, that the teachers of the classics themselves should be ready to revise their methods in view of the altered condition of the times; do more to bring out the great ideas which are the educating and inspiring force of ancient life and literature; dwell less exclusively on the dry and dreary technicalities of the subject, and more on its larger human spirit; care less to enable scholars to answer examination questions than to touch their imagination, and lead them gradually on to appreciate the literary beauty, the logical power, the direct, simple language of the great classical writers; above all, as the most useful of all the lessons which the classics have to teach, so to handle them as to lead their scholars to use their own tongue with the purity and directness which they see exemplified in every great classical work which is put before them. Conducted in this fashion, the utility of classical teaching would never be called in question by the most utilitarian of reformers: it is thus that out of the so-called dead languages may be produced the most living of all forces to prepare the young mind to grapple with the varied human problems which may be put before it in future life.

(4) And fourthly, while freely admitting the high educational value which may be obtained from the study of modern subjects—whether science or modern languages—it must be insisted that the method of any study is of greater value for educational purposes than the matter of it. The essential aim of education is to develop and train the natural powers of the mind; to make it quick, observing, apprehensive, accurate, logical; able to understand argument; able to search out facts for itself, and draw from them the proper conclusions; to reason, and to understand reasoning: in one word, to think.

It is for these ends that the classics have proved so potent an intellectual instrument. It is not merely that their study gives a knowledge of so much language, literature, and history: it is that the processes by which that knowledge has to be acquired are in the highest degree intellectual, formative, inspiring; it is that the methods of classical study are severe, long, and thorough; that it demands patient work and scientific exactness, and stimulates inventiveness and self-confidence by putting difficulties before the learner, together with the means of overcoming them for himself. It supplies also a sure test of honest work, since nothing can be slurred over, or taken for granted, or repeated parrot-like at second-hand without detection; false knowledge cannot pass muster for true knowledge; it is discovered almost as infallibly as a spurious method in mathematics.

This is what has given to the classics their supreme educational value; and now that the field of education is being enlarged, it is the business of educationists to insist that, whatever subjects be included in the curriculum of the future, they shall be studied with the same thoroughness and completeness, with the same rigid regard for accuracy, the same suggestive vitality, the same continuity, which have been the strength of the older subjects.

Keeping these points in view as indispensable for all real discipline of the mind, we have to apply them to two of the principal demands which are being pressed upon us at the present moment.

In the first place, the demand continually being made for the inclusion of additional subjects into the already over-crowded curriculum of our schools must steadily be resisted. Not on the

ground that the subjects to be added are necessarily inferior or unsuitable for educational purposes, but that no time at all should be allotted to any subject unless it can be taught with thoroughness. Time and continuity of instruction are essential to all real progress; and if new subjects are to be introduced, it must be in substitution for others that are to be laid aside. Nothing is so fatal to mental development as patched and scamped instruction in a number of subjects not one of which is to be carried to its legitimate conclusion. It is for this reason that the Scotch Education Department has wisely withdrawn what used to be known under the Code as Specific Subjects; and has urgently called upon school managers, with a view to the needs of their own districts, to make choice between different courses of study, rather than try vainly to comprehend them all.

And the second enemy which has to be faced is the demand for an immediate and premature utility in the subjects to be studied. The business of all education, of the highest or lowest sort, is to prepare for the work of life: but nothing is more contrary to all educational experience than the idea that the best mode of preparing the young mind for its future work is to direct it, at a too early age, before a basis of really sound knowledge has been laid, towards the special studies which are to occupy it in after life. The very converse is more near to the truth: the more special the occupation of the man, the more large and liberal should be the studies on which the boy is trained. For wherein does true utility consist? Is it in introducing the boy prematurely to the tricks of trade, to the application of knowledge to special walks of life, to the narrow grooves in which necessity too often compels the professional or business man to move: or is it in laying a solid foundation of sound general knowledge, and in giving to the mind such a command of principles as may enable it to apply the powers with grasp and freedom to whatever problems the future calling or profession may present to it?

The demand for mere utility, apart from solid mental training, is one which should be resisted at all hazards. It is most commonly heard in connection with the cry for Commercial Education raised by many who have never studied the processes by which young minds are developed. If commercial education means an exact training in modern languages similar to that given in classics, and not merely such a courier knowledge of French or German as a child learns from its nurse; if it means thorough arithmetic and elementary mathematics; good English, study of English authors, and intelligent physical geography, it is excellent: but these should be given to all scholars in all schools. But if it means that a scholar intended for commerce is to learn these subjects by some short-cut, snipetty method, learning just so much, and no more, as it is thought will be needed in actual commerce—then the mind so trained will be of little use either in commerce or in any other calling.

Take geography. What subject can be more interesting to the young mind, more educative, if treated in a large and simple scientific way, with reference to the great determining features of our planet and its conditions? But what is commercial geography? I found an admirable specimen of it not long ago. I was shown an elaborate series of maps, the latest thing out for teaching commercial geography. From one of these maps, a class was being instructed in all the railway lines, main and branch, which intersect the fens of Lincolnshire; while from another, a class was to learn that cakes are made at Banbury, rock at Forfar, bicycles at Coventry, pins and bobbins at places otherwise unknown to fame. Could anything be more dull and senseless? It would be more useful, and quite as educative, to use Bradshaw's Railway Guide as a text-book; or to instruct children, by way of geography, where to find the sweetie-shops in their own locality.

Methods equally poor and uneducative may be found used in languages, when they are taught with the sole object of passing examinations. I have examined a class in the fourth year of French, preparing for the Higher Grade Leaving Certificate, which had never read any complete part of any French author. During all that time the class had never used but one text-book—a collection of scraps from various authors.

No; such methods, such aims, are not those of true utility. The only true utility in education is to turn out minds well trained, well furnished, well balanced; minds that have been made to understand what sound knowledge is, and what are the only methods, in any class of subject, by which it can be acquired.

And now to go back to another of our contested points; up to what point must the classical languages be studied with a view to bring out their usefulness for the scholar's future life? All acknowledge their immense intellectual value if pursued far enough to enable the student to read readily the ancient texts, to appreciate the qualities of their style, and to gain a first-hand knowledge of the literature, the history, the philosophy of the ancient world. But many point to the fact that only a few can go so far as this; and are apt to think that for those who stop short of that point, and carry away from school no abiding knowledge of the two languages, their time has been largely wasted, and should have been spent on other subjects.

I do not share that opinion. I believe that a sound knowledge of Latin grammar, the capacity to translate, with dictionary, an easy passage of Latin or Greek, and still more, the power to translate, with fair accuracy, simple sentences into Latin, implies an amount of logical training, of mastery over language in general, and over our own language in particular, which will serve the scholar throughout his life. And if he can go further than this; if he can turn a piece of idiomatic literary English into a piece of idiomatically correct Latin prose, he can be sent into any calling with the certainty that, if he have the will and energy, he will be able to do well in it.

Varied evidence from other countries and our own seems to me to lead to the conclusion that, in ordering its system of higher education, the nation should aim at equipping and maintaining two main types of school, and two only, each appropriate to a particular class of mind and a special range of occupations. In the one type, the backbone of the teaching and the training should be on the linguistic, literary and classical side; in the other, on the scientific side; modern languages being taught in both.

The course in the science school should be mainly scientific and mathematical; the principal hours of the day being reserved for those subjects. The indispensable literary subjects would hold a subordinate place, being taught subject to the fundamental condition that the minds of the pupils were to receive their formative training through science and scientific methods. Similarly, the training in the classical schools should essentially be a training through language, history, and literature; such an amount of elementary science and mathematics being added as are indispensable for any man of education.

All secondary schools should be encouraged to differentiate into one or other of these two types; the attempt to include both sets of subjects in one school will fail to secure the results of either. It results in shallow work, and will turn out minds that have been truly instructed in nothing.

If it were once recognised that there were these two main types of education, with two types of school to match, offering different courses, but each equally thorough and systematic, much of the confusion and inefficiency of our secondary education would disappear. Each type is of equal importance to the nation at large; and each ought equally to be supported out of national and local funds.

NATURE NOTES FOR FEBRUARY.

By the REV. CANON STEWARD, M.A.(Oxon.)
Principal of Salisbury Training College.

Animal Life.—The close season for pheasants and partridges begins on the 1st.

Many birds commence pairing, and therefore begin to exercise their vocal powers. Note difference in song of Missel Thrush, Blackbird, and Song Thrush. As the month advances Blue Tit, Yellow Hammer, and Golden Crested Wren may be heard. The Woodlark commences song, and Woodpigeon coos. Stock Doves reappear in flocks, Ring Ousels pass through, Rooks may be seen making their nests, Partridges pair, and Ravens, who mate for life, build in inaccessible parts of trees.

Snails, Houseflies, Toads, Frogs, and Vipers reappear. Moles begin to work and Efts are seen in ponds.

During this month may be found Pale Brindled Beauty M., Winter M., Chestnut M., Dotted Border M., Dark Beauty M., and Hebrew Character M.

There are eight kinds of butterflies whose routine of existence includes living through the winter: The Red Admiral, Tortoiseshell, large and small, Peacock, Brimstone, Camberwell Beauty, Painted Lady, and the Comma. Observe how their colouring adapts itself to their different hiding-places.

Plant Life.—Look for the Barren Strawberry (Potentilla), Wych Elm in flower, Spurge Laurel, Small Celandine, Box, Daffodil, Anemone, Moschatel, Dog's Mercury, Dogwood, Violet, Butter Bur (Petasites), Cardamine hirsuta, Coltsfoot, Scilla verna, Lesser Periwinkle, Hairy Violet, and Butcher's Broom.

Folk-lore.—

February fill dyke, be it black or be it white,
But if it be white it's the better to like.
All the months of the year curse a fair Februeer.

A February Spring is not worth a pin.

If February brings no rain,
'Tis neither good for grass nor grain.

If Candlemas Day (*Feb. 2*) be fair and bright,
Winter will have another flight;
But if Candlemas Day be clouds and rain,
Winter is gone and will not come again.

The Barometer.—Rain now with a west wind and rising barometer turns to snow, snow with an east wind and a rising barometer turns to rain.

When the wind veers against the sun,
Trust it not, for back 'twill run.

The backing of wind against the sun indicates rain, or wind, or both.

A First Book of Forestry. By Filibert Roth. x. + 291 pp. (Ginn.) 3s. 6d.—This is another of the handy, non-technical, and well-illustrated books which we have learnt to expect from Messrs. Ginn. Mr. Roth is an authority upon his subject, and his little volume should do much to popularise a science which is not only of great economic importance, but also one which incidentally lends itself to the soundest methods of Nature-Study. The natural history of forest trees is dealt with in an interesting manner, and afterwards applied to the principles underlying the practice of forestry. The trees described are American, but the subject matter of the book may easily be adapted by intelligent teachers to the conditions of our own country.

ITEMS OF INTEREST.

GENERAL.

SIR WILLIAM ABNEY, K.C.B., F.R.S., Adviser to the Board of Education, has been elected president of the Educational Science Section of the British Association for the meeting to be held at Southport next September.

SIR MICHAEL FOSTER, Member for the University of London, has decided not to resign his seat in the House of Commons.

At the Headmasters' Conference there was an amusing episode in the debate on Canon Lyttelton's motion in favour of a system of student-teacherships in secondary schools. When such doctors as Dr. Gow and Mr. Lyttelton disagree on such a point, it is obvious that the working-out of some of the details of the training of teachers demands more consideration. The Master of Haileybury drew his picture of a student-teacher, and imagined him an eligible young man with a degree whom he had asked to come to his school. Here the tyro was provided with light teaching work, pedagogically supervised by a master of method at a university through the post, but looked in upon by the headmaster to see that the discipline and general teaching were sound. Dr. Gow's student-teacher would be constructed on very different lines. Having seen his promising young man, Dr. Gow would induce him, by payment, to come to his school, and spend time over his training and discuss matters with him in the headmaster's study. "For," said Dr. Gow, "at my years and after my experience of teaching, I claim to be a master of method myself, and intend to be treated as such." This little contention goes to the root of the matter. Some think the Board of Education is making an excessive demand when it asks graduates to spend a whole year in preliminary professional training, whether as student-teachers, or attendants at a training college, or both in turn.

At the recent annual general meeting of the Modern Language Association Prof. Napier was unable through illness to deliver his presidential address; but two papers were read in the morning on the Training of Modern-language Teachers, by Miss M. Brebner and Dr. W. J. Clark, which were followed by an interesting discussion in which Dr. Breul, Prof. Herford, Mr. Cloudesley Brereton and Prof. Fiedler took part. In the afternoon Mr. F. B. Kirkman dealt with the Use and Abuse of Translation in Modern-language Teaching, and advised that translation should be used in all, except the most elementary, stages of modern-language teaching. A resolution, that in the opinion of this Association, wherever, in a university examination, two foreign languages are required, a modern language should be allowed as one of them, was carried unanimously. The Secretary, Mr. W. M. Poole, in his report, gave a valuable epitome of the work of the Association during the previous year. The Treasurer, Mr. de V. Payen-Payne, commented on the first appearance in the balance sheet of the ominous item, "outstanding accounts," due to the great expense involved in the production of the *Modern Language Quarterly*. The President for 1903 is Sir Arthur Rücker, Principal of the University of London.

The eleventh annual general meeting of the Association of Principals and Lecturers in Training Colleges was held at Westminster at the end of December, when the Rev. E. Hammonds, of Bishop Otter College, Chichester, was elected president for the next year. Sir Henry Oakeley read a paper on "Education and the new Education Act." A resolution was adopted that, in the opinion of the conference, some recognised system or systems of physical drill be set forth by the Board of Education, suitable

for men and women teachers respectively, and that certified proficiency in this subject be a qualification for teaching drill in schools.

THE annual meeting of the Private Schools' Association was held at University College, London, on January 10th, under the presidency of Sir George Bartley, M.P. The report of the council of the Association read on that occasion showed that the membership had increased from 700 to 800 during the past year. After a discussion it was resolved that, in view of the claims of private schools to a definite place in any scheme of national education, the Association recommends all principals to have their schools inspected in accordance with the Board of Education Act, 1899. Sir George Bartley, in the course of his inaugural address as president of the Association, said that the keynote the country had sounded by the new Education Act was that the schools must be efficient or they must go, and the public would not regard a school as efficient if there was not an outside and independent inspection. That was the spirit of the age, and he did not quarrel with it. Efficiency would be looked for in every direction—in teaching, curriculum, appliances, buildings, and the adaptability of the conditions to the requirements of the district. The Association should take care to secure efficiency in every way, and so far as possible due representation on the educational bodies that would be formed.

A LARGE audience assembled at the College of Preceptors, on January 9th, to hear Sir John Cockburn, formerly Prime Minister of South Australia, deliver an address on "The Australian Commonwealth." The occasion was the annual meeting of the Geographical Association, under the presidency of Mr. D. W. Freshfield. The greater part of Sir John Cockburn's address was devoted to an interesting description of the life and customs of the Australian aboriginals—a race that will soon have disappeared in presence of the bacteria of civilisation. The limitations of time prevented the speaker's dealing at all fully with his subject, but members of the Geographical Association and others will look forward with interest to the appearance of the next number of *The Geographical Teacher*, wherein Sir John has promised to give more information about this "oldest country and newest nation." At the conclusion of the address, Mr. A. W. Andrews gave a lantern exhibition, dealing with Ordnance Survey Maps and their lessons, taking as his chief illustration a small district west of St. Ives. We are pleased to note that the Geographical Association is in a prosperous condition, both numerically and financially.

THE Board of Education has issued new regulations respecting the science and drawing grants to training colleges; they are intended to meet the difficulties of a transitional period and will be in force for the current session only. Considerable changes will probably be made next year with a view to place the organisation for the training of elementary-school teachers and the Exchequer contributions thereto upon a sound educational and financial basis. Particulars of the provisional regulations are contained in Circular 467, copies of which can be obtained from the Board of Education.

THE Datchelor Training College for Teachers in Secondary Schools has arranged courses of professional training for specialist teachers of needlework and class-singing. The courses in needlework will include: (1) practical instruction in plain needlework and cutting-out; (2) lectures on class management and discipline; and (3) practice in the teaching and control of needlework classes. A candidate must, as a condition of entrance to this course of training, give evidence of good general education; bring a testimonial from the head of the school at

which she has been educated as to her general capacity and character, and her fitness for work in a secondary school; and give evidence that she is already a good needlewoman. The course for students desiring to become teachers of class-singing will include: practical instruction in singing; lectures (as above) on class management and discipline; and practice in the instruction and control of singing classes. The conditions of entrance to this course are similar to those for the needlework course, but a candidate must be also able to prove that she has a sound knowledge of music and natural capacity for singing.

THE London School Board, following the recommendations of its school management committee, have modified their scheme of entrance examination for higher-grade schools.

WITH reference to the recent correspondence in the daily press with respect to the inefficiency of public-school teaching, it is interesting to notice the unique success of Clifton College in the last Sandhurst examination, when the first three places on the list were taken by Clifton boys, while A. E. J. Collins (of cricket fame) was fourth in the Woolwich list. This success is the more remarkable in view of the fact that last summer the first place in the Sandhurst list was also taken by a Clifton boy, A. T. Wilson, son of the late headmaster. This is the fourth time within five years that Clifton has secured the first place in the Sandhurst examination.

REGISTRATION in the Teachers' Register is, as many of our readers already know, effected by the Teachers' Registration Council, and all communications on the subject should be addressed to the Registrar, Teachers' Registration Council, 49 and 50, Parliament Street, London, S.W. Information as to Recognition of Schools by the Board of Education for the purposes of the Teachers' Registration Regulations is contained in Circular No. 893, recently issued by the Board of Education.

A MEMORANDUM originally prepared for the purposes of the Conference held at the Colonial Office in July last, to give such information regarding the University of Oxford as would be of service to Colonial and Indian students desiring admission to the University, has now been published by the direction of the Vice-Chancellor.

THOSE of our readers who wish to form an idea of the immediate results of the new Education Act will do well to study Dr. Macnamara's article in the *Fortnightly Review* for January on "The New Education Act at Work." This able essay summarises what are likely to be some of the effects of the Act, and written, as it is, by one who has a thorough knowledge of English education, its conclusions deserve very careful attention.

AN interesting account of Alexandra College, Dublin, and its Principal, Miss White, is given in *Gossip* for January 9th.

IT has been pointed out to us that the date given for the return of answers in the Prize Competition announced in the January number was awkward because of the holidays. We have extended the time until Monday, February 9th, by the first post on which day all answers must be received. (See p. 80.)

SCOTTISH.

AT the annual general meeting of the Association of Secondary Teachers, the following resolutions were passed regarding the Leaving Certificate examination: (1) that no Honours papers should be set in any subject, but that Honours passes should be given for special excellence in the Higher Grade examination; (2) that a protest be made against the sudden raising of the standard in the Honours examination for Leaving Certificates

in Modern Languages, whereby in 1902, out of 468 candidates in French, only 9 passed as against 103 the previous year, and in German only 16 out of 202 as compared with 56 out of 218 in 1901. If only 9 pupils in the whole of Scotland are able to attain the Honours standard in French, and 16 in German, it is surely absurd to set a special paper for so small a number. These results are the strongest argument in favour of the first resolution. The Senate of London University have agreed to accept the Scotch Leaving Certificate in lieu of the Matriculation examination, provided that the candidate has passed in the Higher or Honours Grade in all the subjects required by the regulations for the Matriculation examination on one and the same occasion.

THE annual Congress under the auspices of the Educational Institute of Scotland was held this year in Glasgow. The opening sederunt was well attended. The president, Mr. A. T. Watson, gave a thoughtful address on Modern Educational Problems, with special reference to Scotland. The central thought of the address was the imperative necessity of extending to secondary schools the methods and ideals which were having such a vivifying influence in the primary schools. Mr. Shaw, M.P., who followed, gave a speech full of dry humour, and not altogether without educational insight. But his views on the nature of the authority to administer education were essentially parochial and narrow, and quite out of harmony with the opinions of the audience. A resolution was unanimously passed to the effect that, "for the purposes of educational administration, the country should be divided into suitably large areas, each under one local authority having control of all kinds of education." Professor Edgar gave an excellent address on Modern Languages, emphasising the importance of the study of phonetics as a preliminary to all language-study.

BUT the most memorable feature of the meeting was the address of Mr. M. E. Sadler, on "Impressions of Educational Work in the United States." The large and representative audience which taxed even the capacity of the great Bute Hall was in itself a notable tribute to the man, and a signal testimony to the value of the Department over which he presides. Mr. Sadler captivated his audience from the outset, and, though the address lasted fully an hour, he retained the rapt attention of his hearers to the close. From Mr. Sadler's address it was very easy to see that America was confronted with the same problems and difficulties that were present with us. There, however, they were more suspicious of old methods and more accessible to new ideas. He showed that many of the American schools were laboratories in which every variety of educational experiment was being conducted, and that the teachers were in many cases scientific experimenters. In reply to a criticism on the absence of any notice of the educational system of Scotland in his reports, Mr. Sadler expressed the hope that some day the debt England owed to Scotland in educational matters would be fully shown.

PROF. KNIGHT, who has just intimated his resignation of the chair of Moral Philosophy in St. Andrews University, has rendered eminent services to the University during his twenty-seven years' connection with it. Largely owing to his efforts, the value of its bursaries and endowments has been greatly increased. The inception and development of the L.L.A. scheme for the higher education of women was carried through by him in the face of considerable opposition. Indeed, it may fairly be said that the high standard of the examination has never received the official recognition to which it was entitled. Neither the Education Department nor the Registration Board have accepted the L.L.A. diploma as evidence of ability to undertake work in an elementary or secondary school, although

the requirements for the examinations and the standard exacted were far higher than in many examinations which have received formal recognition.

IN a circular regarding the papers in English at the Leaving Certificate examination, the Department states that the degree to which the chronological study of English literature should be recognised in the examination is one of great difficulty. It is unquestionable that, as it is not infrequently pursued, this study lends itself to superficial and demoralising cram-work, and my Lords regret to find evidence in the examination that this very largely prevails. They are unwilling either to ignore the subject altogether or to adopt the only remaining course of prescribing a special period or special authors for study. Might it not be suggested that there is still a third course open to "my Lords," if only they would follow it, and that is to make the examination of such a nature that superficial cramming of text-books will be of no use. Junior pupils last year were asked to state what they knew of Hooker and Jeremy Taylor. Now what first-hand knowledge could pupils possibly have of these writers? Such a question is a direct encouragement to text-book cramming and second-hand knowledge. Let the Department conduct their examination on lines which discourage mere parrot-like repetition of facts, and the teaching will soon progress on sensible and healthy lines.

IRISH.

THE important question as to the discontinuance or otherwise of the Technical Instruction Grants has been settled for the time by a letter from Mr. Wyndham to the Roman Catholic Bishop of Waterford. Basing his reply on the merits of the case rather than on a disputed interpretation of the various Acts relevant to the matter, the Chief Secretary has decided: (1) that the existing grants, standing at £3,500, shall go on; but (2) that a provisional limit of £7,000 shall be laid down as a future point of departure for the reconsideration of these grants in correlation with other similar demands. It is obvious that the question will come up again, certainly when the £7,000 limit is reached, and perhaps earlier.

FOR there are various signs that another reformation of Irish education is not far off. Two or three years back an Intermediate Education Act was passed, the chief object of which was to enable the Commissioners to appoint inspectors of Intermediate schools. The time has long since passed for appointing permanent inspectors, and it appears that the Intermediate Board have been anxious to do so, but have been prevented or forbidden by higher authorities. Does this mean further changes in Intermediate education? Certainly the present dual control is not an ideal arrangement, and the recent reforms of the Intermediate Board can hardly be deemed satisfactory. Taken in connection with Dr. Starkie's proposals, which have since been published in pamphlet form, and other papers on Irish education, such as Dr. McKeown's, these things may point to a new Bill with sweeping reforms and one central Board of Education for Ireland.

THE second annual report of the Department of Agriculture and Technical Instruction was laid upon the table of the House of Commons towards the end of the autumn session. It is supposed to deal only with the year ending March 31st last, but really takes in some matters reaching much later. It contains a record of multifarious and valuable work, including agricultural and fishery schemes of every kind, grants to the Glasgow Exhibition (£3,262), and to the Cork Exhibition (£4,566), a sum of £10,404 spent on the Royal Veterinary College, and details of the opening up of technical and scientific instruction throughout

Ireland. As regards science work in schools, it is sufficient evidence of the Department's energy to say that the number of science laboratories in secondary schools rose during the year from six to one hundred and fifty.

THE following are the official figures summarising the results of the Intermediate Examinations of 1902:—

BOYS.					
	Senior Grade.	Middle Grade.	Junior Grade.	Preparatory Grade.	Total.
Number examined ...	329	794	2,744	2,220	6,087
Number who passed—					
With Honours ...	119	181	288		
Without Honours ...	158	358	1,372		
Total	277	539	1,660	1,219	3,698
Proportion per cent. of those examined who passed	84.2	67.9	60.5	54.9	60.8
GIRLS.					
Number examined ...	127	356	1,009	800	2,292
Numbers who passed—					
With Honours ...	55	56	66		
Without Honours ...	42	147	450		
Total	97	203	516	427	1,245
Proportion per cent. of those examined who passed	76.4	57.0	51.1	53.4	54.3

These are the results after the reduction of the standard and the issuing of a new pass-list.

It is hardly surprising that the rapid development of technical instruction has led to a Conference being held of the Principals and Organising Secretaries of Irish Technical Schools. This took place, at the end of December, at the Royal College of Science in Dublin. It was resolved: "That an Association of Principals be formed, the Association to be open to secretaries who are acting as directors of technical schools." Such an association should be helpful both to the schools and to the Department. Papers were also read on "The Best Form of Books to be Kept," "Intermediate Classes," "Technical Schools," "Higher Grade Schools for Ireland," "Art and Technical Instruction," and "Technical Schools and their Pupils."

WELSH.

THE annual Report of the Central Welsh Board has been issued. This Board superintends, and so far as inspection and examinations are concerned, controls (under reference to the Board of Education) the whole of the schools under the Welsh Intermediate Education Act. There are as many as ninety-five schools in Wales in work under this Act. Of these, twenty-one schools are for boys alone, twenty-one for girls alone, forty-five are dual, and eight mixed. By dual is meant that "there are two departments under one responsible Head, one department for boys and one for girls, with separate entrances, class-rooms, and playground for boys and girls respectively; but that the school-managers may, if they think fit, make arrangements for boys and girls being taught together in all or any of the classes." It is worth noticing that under this arrangement, though a mistress may be "chief" mistress, with full responsibility as to

discipline over girls, she is in all cases of dual schools subordinate to and under the direction of the headmaster in the class-working of the school.

As to pupils, it appears that in 1901-2 the total number in the Welsh Intermediate Schools was 8,322, consisting of 4,308 boys and 4,014 girls. The total number of pupils in 1900-1 was 7,668; and in 1899-1900, 7,445. Glamorganshire and Monmouthshire have in the county schools more girls than boys. So, too, in the town of Cardiff there are rather more girls in the girls' school than boys in the boys' school. One point in the chief Inspector's Report is very important: "There are some indications that the average stay of pupils at school is gradually improving."

FOR the 8,322 pupils, there are 74 headmasters, 21 head-mistresses, 193 assistant-masters, and 200 assistant-mistresses, making a total of 488 teachers. This, we take it, does not include the visiting teachers. The staffing shows an increase of 13 assistant-masters and 5 assistant-mistresses as compared with last year. Such a staffing, though none too liberal for the needs of the schools, must sooner or later attract public attention by the contrast of the staffing (after making all due allowances for the differences of the work) to that in the elementary schools. When the authorities for secondary and elementary education in Wales become unified, we hope this will arouse attention and lead to amendment in the elementary schools. Of the total staff of teachers there are, of men-teachers, 60 without a degree, as against 64 last year; of women-teachers, 100 (last year 104) are without a degree.

THIS year, for the first time, is included a return of the training of the teachers in the Welsh County Schools. It is as follows: "There are in the schools 27 trained certificated teachers, 55 certificated teachers, 43 teachers who hold the Diploma of the University of Cambridge (39 in theory and practice, one in theory alone, and three in practice alone); eight teachers who hold the Diploma of the University of London, and 20 teachers who hold teachers' diplomas or certificates from various other sources." Of course the local governing bodies of the schools make the appointments. There are signs in Wales that the importance of the training of teachers will be still further recognised in the early future. A Course of Secondary Training is recognised in the University of Wales, as put forth by the University Colleges of Aberystwyth, Bangor, and Cardiff, and it is understood that the headmasters of the Intermediate schools are considering a system of student-teachers also.

AT the Speech Day of the Blaenau Festiniog Intermediate School it was stated that 37 certificates of the Central Welsh Board had been won by the school. Out of 155 pupils on the books, this is clearly very good. It was further stated that the only respect in which the school had not advanced last year was in the higher or scholarship work. There was not a single pupil who remained in school after matriculating, except one or two half-timers. No doubt this is typical of the tendency that every boy and girl should get to college as early as possible, get over the degree-work and to salary-earning as soon as possible. But, on the other hand, such a tendency will eventually mean closer attention to junior pupils. It is interesting to note that Blaenau Festiniog, with its 155 pupils, has now half as many more pupils as were contemplated by the scheme. This is a warning for the pessimists as to the extent of the demand for secondary teaching.

CARNARVONSHIRE, we believe, was the first county in Wales to draft a scheme under the Welsh Intermediate Education Act, and there is already some searching of heart as to the resolution passed last August to refuse to administer the new Education

Bill, if passed. It is said that in all probability a motion will be brought forward and urgently pressed to rescind that resolution, so that Carnarvonshire "may again be the first to adopt a scheme under the present Act."

CURRENT HISTORY.

WE ask our readers to define for themselves the words "republic," "freedom," "despotism," as they read the two facts of history which follow, the one from last year's events, the other from those of over two hundred years ago. "The Cabinet of the French Republic has resolved on suspending the stipends of the Archbishop of Besançon and the Bishop of Orleans and Séz, the supposed authors of the collective petition in favour of the religious orders." The Archbishop of Canterbury and seven bishops presented a petition to James II., of England, in 1688. For this they were prosecuted as having "published a false, malicious and seditious libel," and were acquitted. The believer in the divine right of kings could proceed against those who had unexpectedly disappointed him in their "passive obedience" only by way of a trial by jury according to the common law of a kingdom. The Cabinet of a modern republic proceeds by way of *droit administratif*, and the only remedy for the deprivation of stipend is, as we learn from the papers, a voluntary contribution from the friends of the petitioning bishops. There is no thought of a "revolution."

SOME of the opponents of the Education Bill of last autumn put forward the argument that the present Parliament "had no mandate" to deal with the question, that the House of Commons had been elected on other issues, and that therefore the very introduction of the measure was "unconstitutional." This is an instance of the controversy which has been fitfully discussed among us, specially since the Reform Acts of 1832 began to make the House of Commons "representative" in the modern sense of the "people" at large. Are the members of Parliament "representatives," or "deputies"? is the form which the question has generally taken. Is an individual member so *entrusted* with the affairs of the nation that he is free to vote according to the best of his judgment, as each question arises, or is he merely a deputy, bound to vote not according to his individual judgment, but according to the wish of his constituents? We must not discuss this question here, but take the opportunity to refer our readers to many statements of leading politicians of the early years of the nineteenth century. Some of these they will find in Jephson's "History of the Platform," published a few years ago, a book which, with much bias and more wordiness, yet gives an interesting sketch of some nineteenth-century movements.

MR. BALFOUR thought last December that "it would be unwise to make it impossible for the Upper House to introduce modifications into financial measures, and that it was desirable that there should be means of circumventing the obstacle of privilege in order that the House of Commons might be given the opportunity of reconsidering important points." Certain amendments "had been introduced in the Upper House to meet the convenience of the Government and of members of the House of Commons," and therefore the House waived its privileges, though the Speaker caused an entry of the fact to be made in the Journals. This is a good sample of the method of the development of our British constitution. We often hear the word "unconstitutional," but no one knows what it means. In the sense in which the word is used in every European country but Great Britain, we have no constitution. In our own sense of the word, the constitution is simply the usage for the time being.

Under the later Stuarts, Charles II., James II., Mary and Anne, there were many conflicts and jealousies between the two Houses of Parliament, then newly become a permanent factor of the constitution. Hence much talk about "money bills" and quarrels between the two Houses. Now there is no such jealousy, and "privilege" is an old technicality which is "noted" but not allowed to interfere with business.

VENEZUELA has been occupying our attention during the Christmas vacation, and we have therefore been learning geography and, perhaps, international law. We have been reminded, by the mention of La Guaira, of our "Westward Ho!" and the fight against Spain, and some of us may perhaps have remembered that it was to secure the independence of Venezuela and her fellow republics of South America that Canning, of Great Britain, and Monroe, of the United States of America, first put forward that claim of America for the Americans which is now so popularly misunderstood under the name of the Monroe doctrine. But how many Powers have been actively proceeding against Venezuela? According to the telegrams, there would appear to be three—England, Great Britain, and Germany. At least, that is what an ignorant but intelligent person might gather from his study of the newspapers. He there has read of a King of England, of an English as well as a British telephone office, of English as well as British residents, warships, authorities, and soldiers. This is the result, in popular language, of forgetting that the kingdom of England came to an end in 1707, and of the English habit of ignoring the partners who are not "predominant" in these isles. Perhaps the most curious form is that which speaks of an alliance between Great Britain and Germany as *Anglo-German*.

RECENT SCHOOL BOOKS AND APPARATUS.

Modern Languages.

First Steps in German. 93 pp. *A First German Grammar.* 60 pp. By Scholle & Smith. (Blackie.) 1s. 6d. each.—These two small volumes are an outcome of the "New Method." The "Grammar" is to be used as a book of reference, the "First Steps" consist of oral teaching and lessons based on the well-known pictures of *Der Frühling* and *Der Winter* in the "Hölzel" series. With regard to the subject matter in the "First Steps," it does not appear to differ much from that contained in Dent's "First German Book"; though it may be that the English directions, instructions, &c., &c., and the German songs it contains, will make it more acceptable to certain teachers. It strikes us on the whole as a good working book, to be followed up, no doubt, by another volume on the same lines. Practically, it is no use separating "Grammar" from "First Steps." The two volumes should have been bound up in one, and if the editors did not know this, any experienced schoolmaster could have given them the hint.

Jules Sandeau, Mademoiselle de la Seiglière. Edited by A. R. Ropes. viii. + 174 pp. (Pitt Press Series.) 2s.—Mr. Ropes introduces the play by a short account of Sandeau and of the popular novel on which the play is based. The text is well printed, and the notes contain all that is wanted. Indeed, they would gain by compression; the notes giving etymologies might well be omitted (especially such statements as "*autrui* comes from *aller* and *huic*"), and such absurdly superfluous literal renderings as "against whom the devil have you some of it?" On the whole the book leaves a very favourable impression.

Victor Hugo, Lyrical Poems. Edited by P. C. Yorke. 40 pp. (Blackie.) 4d.—The greater number of these poems are epic, and not lyrical; they give some idea of Victor Hugo's poetic activity. The editor supplies a short biography, a rather disappointing "critical note," some very brief remarks on metre, and a few notes. There is surely something ludicrous in forcing Victor Hugo into such a booklet, in making him a "little French classic."

Classics.

A History of Rome for Middle and Upper Forms of Schools. By J. L. Myres, M.A. With maps and plans. xiv. + 627 pp. (Rivingtons.) 5s.—This is really an admirable book, and it is one which has been much needed. Mr. Myres is not a schoolmaster, but he has managed to write in a manner suitable to schoolboys or undergraduates. He has several other advantages over his competitors. He is a student of early culture, and a competent geologist; hence his physical geography is better done than in other histories of Rome, and his maps are very far superior, in substituting contours for "caterpillars." Sketch maps variously marked are also used to show the distribution of nationality, political distinctions, and so forth. In the early history, Mr. Myres does what we have always believed to be the only proper thing: he has given the legends because the Romans believed them, and he has told them in somewhat archaic language to suggest a distinction from history proper. Here he follows the example of Arnold. We wish some one would write a Scripture history on the same principle. Perhaps there is more truth in the legends than Mr. Myres admits (*e.g.*, Rape of Sabines, p. 41). Mr. Myres is original in his arrangements and in the proportions of his work. For instance, he tells the story of the Struggle of the Orders by itself, in two chapters, and thus avoids cumbering the history with disconnected phases, to be or not to be combined by the reader. His style is simple and direct, his knowledge wide and accurate. Altogether we are convinced that this is as truly the school history of Rome as Oman's is of Greece.

The Boys' Iliad. By W. C. Perry, author of "The Boys' Odyssey," &c. With illustrations by Jacob Hood. (Macmillan.) 6s.—We do not altogether like Mr. Perry's style, which is in parts stilted. Thus he tells us that Achilles fed on lions' hearts and bears' marrow, adding, "the effect of this diet was remarkable." He is all right, however, as soon as he gets to Homer's story, which is effectively and simply told. His book begins with the preliminaries to the war, the wooing of Thetis and so forth, and ends with the Wooden Horse and the taking of Troy; so that the reader will get a fairly complete idea of the stories which centre around the "Iliad." This makes an admirable gift-book or prize, and we hope it may help to make a self-complacent and ignorant generation a little less ignorant.

The Aeneid of Vergil. Edited, with notes and vocabulary, by A. Sidgwick, M.A. Book X., 117 pp.; Book XI., 114 pp. Cambridge Series for Schools and Training Colleges. (Cambridge University Press.)—Mr. Sidgwick's name is guarantee for tact and sound scholarship, and these little books are nicely edited on the whole. The introductions are admirably clear and succinct, and the paragraphs on similes should prove interesting. There is, however, too little appeal to principle, and the lack of this distinguishes cram from teaching. Thus Mr. Sidgwick notes that Vergil uses *manu* where a modern would omit it (x. p. 16), and suggests that this may be due to a fondness for gesture. But so he used other instrumentals, *oculis* and *pede* for example, where the suggestion of gesture calls up a smile. Something, too, might be said to explain the "old forms," *divom*, &c. (p. 45), and *nam* enclitic

(p. 45); the historic infinitive, the genitive of definition (xi. p. 51, 60). The general sense of *improbos* in usage is rather "persistent, insatiate," whatever its etymological meaning may be; and a few examples, such as *improbos anser*, "greedy goose," might have been given on xi. 512 instead of the vague note which is to be found there. Finally, we protest against the "scheme of the uses of the Latin subjunctive, with references to this book."

Prof. Champ's books, the *Story of the Iliad* and the *Story of the Odyssey*, are too well known to need any commendation of ours. We are glad to welcome them in a sixpenny edition (Seelcy, pp. 123, 120). We hope they may be issued in cloth at a slightly higher price, as they would make ideal readers for schools of the modern and commercial type, to relieve the monotony of bills, invoices, and shorthand.

Edited Books.

Select Translations from Old English Poetry. By A. S. Cook and Chauncey B. Tinker. 195 + viii. pp. (Ginn.) 4s. 6d.—It is difficult to speak too highly of this little book. It is not pretentious, nor even complete, but it is representative, handy, discriminating, and forms a capital introduction to the study of larger works. The preface makes some singularly good reading; the contents are of the most varied description. Especial interest attaches to the Secular Lyrics; the Religious Lyrics and the Biblical Poems are more customarily quoted; but the Saints' Legends included here are much less known; and the "Charms" are hardly known at all. Certainly they are not among the usual subjects of Early English study. The introductions to each section are excellent, and the whole collection is calculated to convey a distinct and vivid idea of the scope and force of early English poetic thought; and no less serviceably, perhaps, to clear away a great many imperfect conceptions which have been sown broadcast by works of a popular rather than a scholarly aim.

The Faery Queene. Book I. By W. K. Leask. 276 pp. (Blackie.) 2s.—This is a modest yet serviceable edition. The self-repression of the editor is vividly observable from the first page to the last, and Mr. Leask has written an introductory account of Spenser which is quite a model in its way. It would be difficult to name any other recent sketch of the poet more careful and complete which should nevertheless make from the purely literary point of view better reading. The text retains the Spenserian spelling, but the notes are little concerned with either grammatical or philological questions. They are for the most part historical, antiquarian, and explanatory, and good throughout.

The Fortunes of Nigel. By E. S. Davies. 200 + xxiii. pp. (Continuous Readers.) (Black.) 1s.—*The Fortunes of Nigel.* By E. S. Davies. 528 + xxx. pp. (School Edition.) (Black.) 1s. 6d.—We are now quite accustomed to the successive volumes of this series. The present two volumes done by one editor differ in no important respect from those that have gone before. The notes to the larger volume are, if anything, somewhat better than those we have been accustomed to look for. A map of Tudor London and a view of Old Charing Cross are excellent additions, and the introductions are very readable without being anything more. If the great merits of any educational series are monotony and uniformity of treatment, a high place has been secured with this edition.

Macbeth. By A. W. Verity. 208 + xxxvi. pp. (Cambridge University Press.) 1s. 6d.—*Macbeth.* (Students' Edition.) By A. W. Verity. 288 + xlvi. pp. (Cambridge University Press.) 2s. 6d.—Having some months ago reviewed an edition of

"Macbeth" in the Pitt Press series to which Mr. Verity's well-known name was attached, we were induced to believe that the last word had been practically said in so far as the production of model educational editions can go. But here are two more volumes dealing with the same subject, the smaller being a deleted version of the previous issue, and the other a considerable amplification of it. The smaller volume is intended to be used exclusively for school purposes, and the larger carries the subject up to the level of university examinations. The latter is indeed a storehouse of learning, marvellously full and well arranged, and appears destined to provide quite a standard edition for the purposes of all higher examinations. We are promised some more plays in this "Students'" edition, which we shall await with great interest.

Essays of Richard Steele. Selected by L. E. Steele. xv. + 350 pp. Golden Treasury Series. (Macmillan.) 2s. 6d.—Having for some years now included a volume of selections from Addison in this justly renowned series, it is only fair to Sir Richard Steele, though perhaps a little late in the day, to make a companion volume from his works. This has now been done with great success. A more representative volume could hardly have been compiled; and the reading of it is not merely a delightful exercise; it is one of those things which perhaps suggest themselves as a task and end by becoming a fascination. The introduction is a careful though an inconsiderable piece of work in bulk. It aims at giving a succinct account of Steele, and it achieves this purpose admirably. The selections themselves range fairly over all the contents of Steele's share in the *Tatler* and the *Spectator*. They commence indeed with the *Spectator* Club papers, and are then succeeded by those personal and domestic essays wherein the genius of Steele was ever most happy; and Mr. Bickerstaff and Jenny Distaff are once more presented to the English public. The *Humours of Town*, and of *Fashion*, and the *Theatrical Essays* which follow, are succeeded by a somewhat lengthy series of "Various" Essays. This, to the lover of the English Essay pure and simple, will be found a singularly interesting collection. Steele deserves more recognition than he usually gets. It is possible that this volume may serve to secure that end.

Chaucer's Prologue, Knight's Tale, &c. 337 pp. (Macmillan.) 1s.—This is a handy pocket edition, edited, however, not for the use of the trifter in literature, but for service in secondary schools. The text is well printed, and when the one hundred and fifty-five pages devoted to it are done with, the "introductory matter" comes in. A very useful division of the explanatory matter is on Reading Aloud when the reading, that is to say, is in Chaucer. Students will derive profit as well as knowledge from its many useful hints. Three other short sections deal with the text, the language, and the personality of Chaucer, and then comes a capital summary of his work as a poet. The notes are excellent, and the glossary is full. Altogether something more than a handy edition.

English.

Cyr's Advanced First Reader. 104 pp. (Ginn.) 1s. 6d.—This book explains itself by a preface, though the main idea would be clear to anyone after a glance at one or two illustrations. Stated briefly, this is an attempt to teach children to talk and think about great and beautiful pictures. It is the plea from the artist's point of view that his work shall find its place in the schoolroom, not merely as a wall decoration, or as an illustration to an interesting story, but as a ground-work for talk, reading, a story or a criticism. This the good teacher has been accustomed to do from time immemorial—in the nursery; but has this good teaching reached the school? The artists who are represented in this modest little book are

Bougereau, Reynolds, Renouf, Roll, Waterlow, Landseer, Millet. The book is a beautiful one.

The Dale Readers. Book I. With new pictures by Walter Crane. i. + 93 pp. (Philip.) 1s.—The book is an application of the principles set forth by the author in foregoing volumes. It is of course excellently illustrated, and in capable, enthusiastic hands a great deal might be made of such a reader. The doubt that will come across the reader, and even the enthusiastic teacher, is this. Where am I to find time for the "red men and the blue and the yellow silent people"? Has Miss Dale consulted an oculist on the wisdom of filling the reading lesson with letters written in staring colours?

An English Grammar on Historical Principles. x. + 299 pp. By J. Lees, B.A. (Allman.) 3s.—This book is suitable for boys who are being prepared for such examinations as the London Matriculation and similar examinations. We have little doubt that it is adequate for this purpose, and, so far as we have been able to judge, it is, without being in any way original, quite accurate and well arranged.

Junior English Examination Papers. By W. Williamson, B.A. 72 pp. (Methuen.) 1s.—A series of graduated test papers of about the "Junior Locals" standard.

History.

The Tweeddale History Readers. Book II. viii. + 277 pp. (Oliver and Boyd.) 1s. 6d.—This book contains selections from the history since the beginning to the present time. It is well printed and illustrated, and has some poetry and a summary. It has fewer small mistakes than the average of such productions, and, as we said about its predecessors, it gives more prominence than usual to Scottish history.

Adventures with the Connaught Rangers, 1809-14. By W. Grattan. Edited by C. Oman. xxii. + 340 pp. (Edward Arnold.) 7s. 6d.—This is the second of the original authorities for Napoleon's period which Mr. Oman has edited. It lacks the purely personal interest of the first, but still makes good reading. It seems that it was from this work that "Charles Lever drew the greater part of the good stories which made the fortune of 'Charles O'Malley.'" There are short notes, and half-a-dozen illustrations which are good, though the map of Spain is not detailed enough to illustrate the military operations herein described.

Nelson and his Captains. By W. H. Fitchett. 322 pp. (Smith, Elder.) 7s. 6d.—This book contains sketches of Nelson and of eleven of the captains of his "school." It is interestingly written, and contains portraits of most of its heroes. The accounts of the captains are biographical, but written mainly with a view to illustrate the spirit and methods of the navy of Nelson's time. It will make a welcome addition to the school library.

History in Biography. Vol. IV., James I. to James II. By H. L. Powell. xiv. + 198 pp. (Black.) 2s.—We have here fifteen biographies, useful summaries of the period as a whole, and of the Parliaments and the Civil War in particular; brief accounts of other statesmen than the fifteen chosen for fuller treatment, and an index. We have not yet seen a small book on this period with which we are better pleased. It is really a masterpiece of its kind in the thoroughly historical spirit in which it is written. The utmost care has been taken to enter sympathetically into the views of the various conflicting parties of the time, and though there are minor matters with which we should not agree, we can very highly commend the volume as the best text-book on the period for our pupils in the middle and

upper forms. There are portraits and other pictorial illustrations, and to each biography is appended a well-chosen example of the words or writings of the subject thereof.

Local Examination Test Papers in English History. By J. S. Lindsey. 143 pp. (Heffer, Cambridge.) 1s. 6d.—This is a collection of all questions on this subject set for the Oxford and Cambridge Local Examinations (Senior and Junior) for the last twenty years. The pages are printed on one side of the paper only, and the questions are arranged according to periods, indexes giving cross references to topics and to years. We should think this would be most useful to teachers preparing for these or other examinations. Besides the edition described above there are two others for pupils' use (8d. each) without the indexes, and covering respectively the years 1066-1603, and 1603-1832. These are intended for distribution to the class.

Matriculation Modern History. By C. S. Fearenside. xx. + 376 pp. (Clive.) 3s. 6d.—This contains English history from 1485-1901 with some reference to the contemporary history of Europe and colonial developments. It is an excellent manual, provided with maps and tables and index. If the matriculation students, for whom it is primarily designed, gain a satisfactory knowledge of its contents, we can ensure them at least a pass in this subject, and there is no reason why they should not head the honours list. The international history, specially in the eighteenth century, where most text-books fail, is very carefully treated.

Complete History Readers. Book IV. 222 pp. (Blackie.) 1s. 4d.—This is a pleasantly-written sketch of some of the important events in English history from the beginning to the present time, generally correct and illustrated with coloured and other pictures. There are a summary, notes, and explanations.

Studies in United States History. By S. M. Riggs. xiii. + 173 pp. (Ginn.) 3s.—This is a guide for the use of students and teachers, apparently exhaustive for United States history. Topics are indicated, either by chapter-headings or suggestive headings, and detailed references are given to the bibliography of each subject, "sources," text-books and maps. It is a most thorough piece of work.

The Complete History Readers. Book V. 232 pp. (Blackie.) 1s. 6d.—This contains an outline of English history from the beginning to the present day, with pictures coloured and otherwise, "summary, notes and explanations." It is fairly correct, but John "signs" the Charter in the text, while sealing it in the picture; the Long Parliament "sat for twenty years," "Strafford was condemned," "the English Parliament promised to help the Dutch," the seven bishops are accused of "treason," William III. is king of "Great Britain," and the South Sea "Bubble" is not distinguished from the "Company."

We have received a copy of the second edition, "revised," of Miss. Rolleston's "English History Note Book" (Davis and Moughton, Birmingham). The minor defects and errors of the early edition have been corrected, and we can heartily recommend it as useful for revision lessons, &c.

English History Illustrated from Original Sources. 1399-1485. By F. H. Durham. xiii. + 141 pp. (Black.) 2s. 6d.—This volume is divided into two parts. Each contains an introduction, selection from contemporary writers, followed by a bibliography, date summary and genealogical tables. There are pictorial illustrations. The whole is very good and we heartily commend the work to our readers.

Lectures on the History of the Nineteenth Century. Edited by F. A. Kirkpatrick. viii. + 384 pp. (Cambridge University

Press.) 4s. 6d. net.—This book contains seventeen of the lectures delivered at the Cambridge University Extension Summer Meeting last August. Those which deal specially with the history of Prussia, Austria-Hungary, France and Russia, were delivered by distinguished natives of those countries respectively. Besides these, there are two introductory lectures, and others on British, Turkish, Chinese and Japanese history. The collection thus made provides a mass of useful information not otherwise easily accessible. But all the lectures imply at least an elementary knowledge of the events with which they treat, and the introductory lectures, specially that of Dr. Ward, will be found very stiff reading. We imagine much of this must have been hard to follow when delivered, but in this permanent form we commend it to our readers as suggestive and thought-inspiring. Unfortunately there is neither bibliography nor index.

Science and Technology.

The Twentieth Century Atlas of Popular Astronomy. By T. Heath. 126 pp. + xxii. plates. (W. & A. K. Johnston.) 7s. 6d.—This is both a text-book and an atlas of astronomy, a guide to observations of the heavens as well as a descriptive and pictorial representation of characteristic scenes and objects. The early chapters deal, among other subjects, with the earth and its movements; time and seasons; and they are followed by chapters on the planets, sun, moon, eclipses, comets and meteors, while the last chapter is concerned with the stars. On the whole, the text and the plates are worthy of praise, but attention may usefully be directed to a few weak points. No mention is made on p. 45 of helium as one of the chief constituents of the sun's chromosphere; the list of elements in the sun, on p. 48, is not up to date, only 460 Fraunhofer lines being ascribed to iron, whereas, according to Rowland, nearly 2,000 lines can be referred to that element; the non-appearance of the Leonid meteor shower during the past two or three years is not mentioned in the account of the thirty-three-year period; nebulae are said to include clusters of stars which have not been resolved into stellar points, whereas spectrum analysis provides a clear means of distinguishing a nebula from a star cluster. The plates are lithographs, and therefore do not in all cases give faithful pictures of the objects represented upon them. For instance, the solar prominences on Plate X. are badly coloured; the view of the Andromeda nebula on Plate XII. does not bring out the ring structure surrounding the nucleus; and the wrong colour is given to the D lines of sodium on Plate XIV. The star maps are good, and the large reproductions of photographs of parts of the lunar surface, given in the chapter on the moon, are decidedly superior to those found in small text-books. Rightly used, the volume should be a useful guide to students of astronomy, and should stimulate interest in the study of celestial science.

Biological Laboratory Methods. By P. H. Mell, Ph.D. xiv. + 321 pp. (The Macmillan Co.) 6s. 6d. net.—Advanced students of biology have long felt the want of such a book as the present, which, in moderate compass, gives trustworthy guidance in modern methods of research. The style is clear, and the instructions are, in general, just sufficiently detailed to ensure success. The book has a wide range; among the subjects considered are the use of the microscope, microtome, and bacteriological apparatus; the preparation, sectioning and mounting of tissues; photo-micrography, &c. The volume contains a large number of useful illustrations. We notice one or two slips, e.g., "chlorate of lime" for "calcium chloride" (p. 43), and "individual bacteria" for "colonies of bacteria" (p. 224).

Miscellaneous.

Aristotle's Psychology: a Treatise on the Principle of Life. (De Anima and Parva Naturalia.) Translated, with Introduction and Notes, by William Alexander Hammond. (Swan Sonnenschein). 10s. 6d. net.—English readers will be grateful to Dr. Hammond for his careful translation of Aristotle's *Parva Naturalia*, hitherto only accessible to them through Taylor's paraphrase. To this he has added a translation of the *De Anima* in order that they may have in a single volume as complete an account as is possible of the psychological theories of the philosopher of Stagira. And to both he has prefixed a brief but adequate introduction in which the leading features of these theories are summarised and contrasted with those of Plato and other Greek thinkers. Perhaps this contrast might with advantage have been carried into somewhat further detail. At the present day, when the foundations of psychology are sought in the biological conditions under which mental states have their being, it is particularly instructive to turn to the writings of one who included the phenomena of mental life among the vital activities, and whose point of view was in this respect one with that of modern science. The study of the *De Anima* and the *Parva Naturalia* form a fitting preparation for that of the better-known philosophical writings. And Dr. Hammond's Introduction may profitably be read as a propaedeutic to the Essays prefixed by Sir Alexander Grant to his masterly edition of the Nichomachean Ethics.

The Encyclopædia Britannica. The Fifth of the New Volumes. Gla. Jut. xx + 763 pp. (Black and *The Times*.)—It is not too much to say that no working library can be regarded as complete if it lack the new volumes of our great Encyclopædia. Each volume is self-contained so far as it goes, and the new volumes by themselves form an independent encyclopædia in which a view is given of the men and matters that have made history during the past quarter of a century. The thread is taken up in each case from the point where it ended in the ninth edition, so that the possessor of that edition as well as the supplementary volumes can turn to the old or the new fabric for details to study. The old pattern may be preferred by some, but the new is essential to the equipment of students who desire to trace the trend of modern thought, and understand the direction of scientific and industrial progress. Mr. Benjamin Kidd's prefatory essay in the volume under notice, on the application of the doctrine of evolution to sociological theory and problems, is an instructive statement of the change of tendency. Among the subjects of articles which must be mentioned here are the Gospels, golf, theory of groups, heredity, hygiene, ichthyology, illustration, insanity, insurance, iron and steel, and irrigation. For school purposes, the geographical contributions should be of extreme value, for the articles on Holland, Hungary, Iceland, India, Italy, Japan and other countries are remarkably rich in detail. The volume provides so much material for inquiring minds that school governors should consider it a duty to add it and its companions to the library of the master's room.

Who's Who. 1903. An Annual Biographical Dictionary. xviii. + 1,532 pp. 5s. net.—*The Englishwoman's Year-Book and Directory.* Edited by Emily Janes. xxxvi. + 340 pp. (A. & C. Black.) 2s. 6d. net.—There is no annual publication to compare with "Who's Who." It contains just those particulars about the careers of persons prominent in every sort of way that one wants to know. The information has in most cases been supplied by the celebrities themselves, and is therefore authoritative. The volume increases in size annually, and we notice that this year, in order to cope with the growing body of notabilities, the editor has been obliged to omit the collection of useful information which formerly preceded the biographies. "Who's Who" certainly deserves a place in the collection of

current reference books to be found in all well-equipped school libraries. The "Englishwoman's Year-Book" summarises, in a correct and convenient manner, everything pertaining to the professions and avocations followed by women. With the help of a representative body of specialists, the editor has been able to collect invaluable advice and guidance for women anxious to do useful work in the world. Education, Employments and Professions, Industrial, Medical Section, Science, Literature, Philanthropy, and Religious Work, are the titles of some of the sections and serve to indicate the wide scope of the book. Altogether an exceptionally useful book for women.

The "Daily Mail" Year-Book for 1903. Edited by Percy L. Parker. 370 pp. (Amalgamated Press, Ltd.) 1s.—This little publication contains a maximum of information in a minimum of space. That 20,000 facts of the day, with bibliographies, tables, diagrams and maps, are included in the restricted limits indicated is evidence enough that no words are wasted.

Report of a Conference on the Training of Teachers in Secondary Schools for Boys. vii. + 140 pp. (Cambridge University Press.) 1s. net.—An article describing the conference on the training of teachers in secondary schools convened by the Vice-Chancellor of the University of Cambridge, and held in the Senate House in November, appeared in THE SCHOOL WORLD for December last, so that it is unnecessary to state the objects which the meetings were held to promote. The little volume contains all the papers which were read on the occasion as well as the speeches delivered by the representatives assembled at Cambridge. A perusal of the arguments advanced for various forms of training convinces us that there is still much work to be done before the most suitable course of preparation for schoolmasters is decided upon. Yet all acting schoolmasters, and undergraduates who propose to enter the profession, will be well advised in studying these expressions of opinion from our highest educational authorities. On one point, at least, there seems to have been complete unanimity, viz., that some form of training is imperative for all teachers in secondary schools for boys.

The Education Act, 1902. Edited, with an introduction and index and short notes, by E. A. Jelf. viii. + 106 pp. (Horace Cox.) 2s. 6d. net.—*The Education Act, 1902*, together with copious notes and the principal explanatory remarks of leading authorities. By M. Roberts-Jones. 80 pp. (Cardiff: Western Mail, Ltd.) 4s.—These are two convenient editions of the new Act. Mr. Jelf first gives a general description of the provisions of the Act, and his remarks, which run to over forty pages, are of a helpful character. The text of the Act with its different schedules follows. Mr. Roberts-Jones provides a short preface and at once proceeds to print the Act, and supplies a running commentary in the way of notes on each section. These notes include various explanations given during the debates in Parliament by different Ministers and others. It is to be hoped that the volumes may have a wide circulation among the members of the local education authorities to be appointed, and also among the teachers in schools. We can recommend both editions.

School Hygiene: the Laws of Health in relation to School Life. By Arthur Newsholme. New edition re-written by Dr. Newsholme and W. C. C. Pakes. viii. + 311 pp. (Swan Sonnenschein.) 3s.—A book which has now reached its ninth edition, and the first edition of which only appeared in February, 1887, needs no commendation. It clearly meets a widespread want. Mr. Pakes is more directly responsible for the contents of Part II., which deals with schools. The earlier chapters are more particularly the work of Dr. Newsholme, and consider the needs of the scholars. The chapter on eyesight is by Dr. James Kerr, the medical officer of the London School Board.

Mr. Boffin's Secretary. A Comedy in four acts. Adapted by Isabelle M. Pagan from Dickens's "Our Mutual Friend." xvi.+134 pp. (Dent.) 1s. 6d. net.—This play has been specially adapted with a view to amateur acting. It has, we are told in the preface, stood the test of repeated performance. Full particulars as to the idiosyncrasies of the characters are given, and teachers looking for a play to be acted by their scholars will find it useful.

London University Guide and University Correspondence College Calendar. 1902-3. Gratis.—The private student who wishes to graduate at the University of London will find here very useful assistance as to how to set to work. The University Correspondence College has arranged courses of work for every examination of the London University, and its successes in previous years are quite enough to convince students willing to follow instructions that they may reasonably hope to find their names amongst the successful candidates in future examinations.

To Girls: a Budget of Letters. By Heloise Edwina Hersey. xii.+247 pp. (Ginn.) 4s. 6d. net.—It is long since we have seen a book, especially one addressed to girls and dealing with the serious side of life, which is so fresh, vigorous, and altogether healthy as this volume. Miss Hersey is a new Englander, and her book is primarily intended for New England girls, but there is practically nothing in it except the chapter on "The Civic Opportunity for Women," and perhaps that on "Criticism of the Theatre," which does not apply equally well to the girl in the older England on this side of the Atlantic. Briefly, the book is characterised by a remarkably sane tone and by uncommon insight into the difficulties—mental, moral, and social—which, small as they may seem when we look back at them later on in life, are very real to the girl of seventeen or eighteen; and the author manages to convey a good deal of sound moral and religious help without in the least appearing to preach. Miss Hersey disclaims any notion of writing for older people, but her book should prove almost as helpful to all who are interested in girls as to the audience to which she primarily addresses herself.

Model Course of Physical Training. By Board of Education. 72 pp. (Eyre and Spottiswoode.) 3d.—This is a revision of the pamphlet on Physical Training which was fully described in the number of THE SCHOOL WORLD for August last. This revised edition contains a few woodcuts explanatory of the letterpress. There are no alterations in the exercises worthy of note. A few practical suggestions, chiefly for rural schools, appear at the end, and there are other suggestions relating to the training of school teachers. This model course is not compulsory, as was at first anticipated, but is issued by the Board of Education "as a model course which will be found useful either for adoption as it stands, or as giving suggestions to teachers and managers who prefer to frame schemes for themselves."

The Art of Speaking. By E. Ernest Pertwee. 122 pp. (Swan Sonnenschein.) 2s. 6d.—Of books on speaking there is no end, and yet we do not speak well. This book does not differ from its comrades in arrangement of matter. There are chapters on respiration, on the larynx, on articulation and on gesture. There are the usual diagrams and exercises. We do not think that any teacher working conscientiously through the book could fail to improve himself and his class: but we fail to find any principles referred to on which rules and suggestions may be built. The most useful book for such work is a live teacher: there seems to be scarcely any limit to his power of inspiration in the matter of speaking and reading. All such books as this are useful to the live teacher, though they are, after all, but dry bones. As Mr. Pertwee says, we want more attention to the subject and more teaching.

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 Study of Modern Languages.

VOULEZ-VOUS me permettre d'ajouter quelques remarques à la lettre de M. Baumann¹ concernant l'origine de l'expression qu'a citée M. Payen-Payne. En poussant mes recherches un peu plus loin que je ne l'avais fait auparavant, j'ai trouvé que Charles-Quint, à qui on attribue la paternité de la phrase, n'a fait que répéter un mot des Turcs, et qu'au lieu d'un nombre déterminé de langues (soit deux ou quatre) il est question seulement de multiplier l'homme par un nombre quelconque suivant le cas. Voici un extrait de Brantôme, "Capitaines étrangers":

"Charles-Quint, qui parloit cinq ou six langues, disoit souvent, quand il tomboit sur leurs différentes beautés, que selon l'opinion des Turcs, autant de langues que l'homme scait parler, autant de fois est-il homme; tellement que si un brave homme parloit de neuf ou dix sortes de langage, il l'estimoit autant luy tout seul qu'il eust fait dix autres."

La forme actuelle du dicton est:

Autant de langues on sait,
autant d'hommes l'on est.

C'est Mme. de Staël qui dit ("Corinne," liv. 7, ch. 1) que "Charles-Quint disoit qu'un homme qui sait quatre langues," &c.

E. LATHAM.

Croydon.

Geometry at the Cambridge Local Examinations.

I AM surprised to see, among the new Geometry regulations for the Cambridge Local Examinations, that the use of a *hard* pencil is insisted on.

I have had some experience in marking examination papers containing figures drawn with pencils so hard that the lines were practically invisible, especially by artificial light, and I have on several occasions complained of the indistinctness of the figures. In many cases there is considerable risk of the candidates losing marks through these faint-lined diagrams escaping the notice of the examiners, who are usually compelled to mark many of the papers by the light of the midnight oil.

Unless the proposed regulations are altered, it will be found necessary to add an instruction to the examiners to the effect that they are only to mark the papers in the daytime in sunny weather, and the date for sending in the marks will have to be extended to suit the meteorological conditions prevalent at the time. If this is not done, I do not envy the Local examiners their task. They will wish "hard pencils" anywhere.

G. H. BRYAN.

Duplicators and Hektographs.

MR. JARVIS, in his interesting article on "School Furniture," in your December issue, advocates the advantages of duplicators as opposed to hektographs. But there are many occasions when a few copies are wanted when the duplicator is not worth setting up, and also fine-line work cannot be done on it.

Your readers might like to know that Mr. Gilson, now at King Edward's High School, Birmingham, so modified the composition used in his hektograph as to make washing un-

¹ THE SCHOOL WORLD, December, 1902.

necessary. Thus the process becomes a cleanly one, and we find the instrument so made invaluable for daily use as opposed to the more occasional use of the duplicator. The "curling up" can of course be obviated by passing the hand over the paper as it is taken from the jelly. Prints removed in this way do not curl unless put in front of the fire.

Harrow.

A. VASSALL.

History of Mathematics.

CAN any of the readers of THE SCHOOL WORLD guide me to a book, periodical, or discourse that gives a full account of the history of mathematics since their early period under the Chaldeans and Egyptians up to the present?

I should like also to know the publisher's address of the *Mathematical Gazette*.

I am a native of Syria and have a liking for mathematics, and enjoy the reading of THE SCHOOL WORLD very much.

G. HAMMAM.

Oriental College, Zahleh,
Mount Lebanon, Syria.

By far the best history of mathematics from the earliest times is M. Kantor's "Geschichte der Mathematik" (Leipzig: Teubner). This is a large and rather expensive work; there is no English translation.

Of works in English there are:—

W. W. Rouse Ball, "A Short Account of the History of Mathematics." (Macmillan.) 10s. net.

F. Cajori, "History of Mathematics." (Macmillan.) 14s. net. "History of Elementary Mathematics." (Macmillan.) 6s. 6d. net.

Gow, "History of Greek Mathematics." (Cambridge University Press.) 10s. 6d.

Heath, "Apollonius"; "Archimedes." (Cambridge University Press.) 15s. each.

The last three are good, but only deal with part of the subject.

The *Mathematical Gazette* is published by Messrs. Geo. Bell and Sons, York Street, Covent Garden, London.

Books for Science Study.

Do you know another hand-book on Practical Botany besides that of Strasburger?

Where can I find a book on Invertebrates which will aid me in collecting specimens, and also a book on Microscopy?

Will you recommend a post-graduate course in Comparative Anatomy for one who has taken his M.A. for work in biology?

ROBERT CHAMBERS.

Bithynia High School,
Bardizag, Ismid,

Via Constantinople.

(1) "A Course of Practical Instruction in Botany," Prof. F. O. Bower. (Macmillan.) 10s. 6d.

"Structural Botany," Prof. D. H. Scott. 2 vols. (Black.) 3s. 6d. each.

(2) "Handbook of Instructions for Collectors." (London: printed for the Trustees of the British Museum.)

(3) "The Microscope and its Revelations." By Dr. Dallinger, F.R.S. (Churchill.) 28s.

"A Popular Hand-book to the Microscope." By Lewis Wright. (Religious Tract Society.) 2s. 6d.

"Modern Microscopy." M. J. Cross and Martin J. Cole. (Baillière, Tindall & Cox.) 4s. net.

Monthly articles on "Microscopy" appear in *Knowledge*.

(4) There are such courses at Oxford. Write to Dr. G. C. Bourne, New College, Oxford.

School Galvanometers.

THERE is a small galvanometer made by Messrs. W. G. Pye & Co., of Cambridge, which has been used here for two years, and has proved a very satisfactory substitute for ordinary astatic galvanometers. The needles are not arranged astatically and quickly come to rest.

A figure and a short description of it were given in THE SCHOOL WORLD for December, 1899, but it is not so widely known as it deserves to be.

P. HENDERSON.

High School, Dundee.

PRIZE COMPETITION.

No. 16.—Most Popular School-books in English Grammar and Composition.

IN the January number we offered two prizes of books, one of the published value of a guinea, the other of half-a-guinea, to be chosen from the catalogue of Messrs. Macmillan & Co., Ltd., for the two lists of six text-books of English grammar and composition **now in use in schools**, which are by those taking part in this competition considered to be the most popular.

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

In naming a book, its title, author, publisher and price should be given, and books named may deal with both English grammar and composition or with only one of these subjects.

Each list of books sent in must be accompanied by a coupon printed on p. xiii., though a reader may send in more than one list. Replies must reach the Editors of THE SCHOOL WORLD, St. Martin's Street, London, W.C., **on or before Monday, February 9th, 1903** (see p. 71).

The result will be published in the March number, when the successful lists will be 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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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. 51.

MARCH, 1903.

SIXPENCE.

A CHAPTER IN VERY ELEMENTARY ARITHMETIC.

By SIR OLIVER LODGE, F.R.S.
Principal of the University of Birmingham.

SIMPLE PROPORTION.

ANY number of sums are of the following character:—

If 3 sheep cost £20, what will 100 cost?

Now, the so-called "rule of three" method of dealing with sums of this kind, though permissible, is not really a good method, because it leads to nothing beyond, and employs an antiquated system of notation.

The answer is, one hundred thirds of twenty pounds = $\frac{100}{3} \times £20 = £\frac{2000}{3} = £666\frac{2}{3} = £666\frac{2}{3} = £666\frac{2}{3}$ = £666 13s. 4d.

If the answer is not obvious, it can be arrived at by the intermediate step of considering one sheep, which will cost the third of £20, namely, £6 13s. 4d.¹ And so a hundred sheep will cost 600 pounds, 1300 shillings, and 400 pence.

The 1300 shillings reduce to 65 pounds, since 100 shillings is five pounds; and the 400 pence make £1 13s. 4d., since 240 pence is a pound, and so 400 pence is thirty shillings and 40 pence (or 3s. 4d.) over.

This is not an orthodox way of doing the sum, but it is just as good as any other, and it is one that a boy might scheme for himself. There would be no need to snub him for it. Everything which is troublesome about such a sum results from the miserable property of the number ten that it is not divisible by 3.

If we had set the following very similar question:

If 3 sheep cost £24, what would 100 cost?

an infant could answer, £800, doing it in its head. But it would clearly do it by the same process, viz., the process of considering the price per single sheep, and that is therefore the natural and simplest method.

To summarise: the childish method is the method

by units, and may be written out at length; the adult method is the method by ratio; what place is there for the rule of three? The rule of three with its symbols : :: : is reserved for antiquated school-instruction.

Observe, there is no harm in writing a ratio as $2 : 3$ or $a : b$, and occasionally it may be convenient to do so, though $2 \div 3$, or $a \div b$, is precisely the same thing, but usually the form $\frac{2}{3}$ or $\frac{a}{b}$ is in every

way better. So also the symbol :: is needless, because replaced by =. The fact is that : connotes the theoretical idea of ratio, while \div indicates the practical operation of division, which is the actual means of working a ratio out. The vulgar-fraction form may be used instead of either of these signs, and is usually best. The division then may or may not be actually performed, as we please.

I feel inclined to illustrate good and bad methods at this stage a little further, by taking a few more very simple examples. For instance:—

If twenty dogs pulling equally at a sledge exert a horizontal force of 1 cwt., what force do any three of them exert?

ADULT METHOD:—

$$\frac{3}{20} \text{ of 1 cwt.} = \frac{3 \times 112 \text{ lbs.}}{20} = 16\cdot8 \text{ lbs. wt.}$$

GOOD CHILDISH METHOD:—

$$\begin{aligned} 20 \text{ dogs pull } &112 \text{ lbs.} \\ 10 \text{ dogs pull } &56 \text{ ,,} \\ 1 \text{ dog pulls } &5\cdot6 \text{ ,,} \\ 3 \text{ dogs pull } &3 \times 5\cdot6 = 16\cdot8 \text{ lbs.} \end{aligned}$$

If it be asked, why not stop at $\frac{3}{20}$ ths of a cwt. and give the answer as 0·15 cwt., I reply, no reason against it at all; but children should be accustomed to realise forces and other things in actual homely units that they can feel and appreciate, and a cwt. is too big for them.

MECHANICAL METHOD:—

$$20 : 3 :: 112 : \text{the answer.}$$

Rule.—Multiply the means and divide by one extreme, and you get the other extreme.

∴ the answer is &c.

BRITISH METHOD:—

There is indeed a barbarous way of complicating the sum, which is typical of much that goes on in these islands at inferior schools:—

	lbs.	ozs.	drachms.
20	/ 336	0	0
	16	12	12½

which is done thus:—

¹It would not come out even so well as this but for the fortunate duodecimal division of the shilling into pence; so that one-third of a pound, viz., 6s. 8d., and two-thirds, viz., 13s. 4d., can be exactly specified without fractions. These amounts are worth remembering as one-third and two-thirds of a sovereign.

Twenty into 336 goes 16 and 16 over, that is 16 lbs. over, which equals 256 ounces. Twenty into this goes 12 times and 16 over, that is 16 ounces, or 256 drachms, into which twenty again goes 12 times and $\frac{16}{20}$ ths over, which last equals $\frac{4}{5}$ ths, that is $\frac{4}{5}$ ths of a drachm.

So the answer is 16 lbs., 12 ozs., $12\frac{4}{5}$ drachms.

On this one has to remark that since the unfortunate $\frac{4}{5}$ has to appear (as it happens) sooner or later, why should it not appear at first? Why is $\frac{4}{5}$ ths of a drachm easier to understand than $\frac{4}{5}$ ths of a pound? The fact is that it is not easier to understand, and by children is not understood; the "4 over" which remains at the end is a continual puzzle to them. They have been so accustomed to getting rid of fractions by reducing to a lower denomination, that at the end, when lower denominations unaccountably fail them, they are non-plussed. Quite rightly so: the fault is not with the children.

Whenever an attentive child finds a persistent difficulty, teachers should be sure that there is something wrong with their mode of presenting it, probably with their own comprehension of it. Nothing is difficult when properly put. The whole art of teaching should be so to lead on that everything arrives naturally and easily and happily, like fruit and flowers out of seeds.

ANOTHER BRITISH METHOD:—

Usually, however, the sum is not recorded so briefly as this, but is written out in what is known as the long-division plan; and it is perhaps the safest mode of getting the right answer, if the answer is required to be thus barbarously specified, for it certainly shirks nothing. This is the way of it:—

To divide 336 lbs. av. into 20 equal parts.

20	336	(	16	)	12	)	12 $\frac{4}{5}$	
	20							
	136							
	120							
	16							
	16 ¹							
	96							
	16							
	256 oz.							
	240							
	16							
	16 ¹							
	96							
	10							
	256 dr.							
	240							
	16 remainder							and $\frac{16}{20} = \frac{4}{5}$ drs.

This may look like a parody, but it is soberly the way in which innumerable children have been taught in the past to do such a sum. And the fact that they have been so taught can easily be tested by setting it to people who were children a few years ago.

ANOTHER METHOD.—If the factor plan of division is adopted there is great danger of confusion and error about the carrying figure. For instance, in dividing 336 lbs. into 20 equal parts, a child as at present taught will sometimes proceed thus:—

$$\begin{array}{r} 2 \ / \ 336 \text{ lbs.} \\ 10 \ / \ 168 \\ \hline 16 \text{ and } 8 \text{ over.} \end{array}$$

8 what over? They are apt to take it as 8 lbs. over, and so interpret it as 128 ounces, and proceed to divide these again by 20 by the same process:

$$\begin{array}{r} 2 \ / \ 128 \text{ oz.} \\ 10 \ / \ 64 \\ \hline 6 \text{ and } 4 \text{ over,} \end{array}$$

apt to be called 4 ounces over, which are interpreted as 64 drachms, and so on.

This is all wrong. The 8 over in the first little sum was really 8 double-pounds, and so the second little sum is all wrong. If it had been right, the 4 over could not have been 4 ounces, but 4 double-ounces; but what needless trouble and risk of error is introduced by having to perceive this!

Again, let many children be asked to divide £336 by 25; few of them will have been taught to proceed thus:

$$\begin{aligned} \frac{336}{25} &= 3 \cdot 36 \times 4 = \text{£}13 \cdot 44, \\ &= \text{£}13 \text{ } 8 \cdot 8 \text{s.}, \\ &= \text{£}13 \text{ } 8 \text{s. } 9 \cdot 6 \text{d.}, \\ &\text{or about } 9 \frac{1}{2} \text{d.;} \end{aligned}$$

but they will proceed, either by long division on much the same lines as in the last example, which is long to write, or else by short division, dividing by 5 twice over, which is not too long to write:

$$\begin{array}{r} \text{£} \quad \text{s.} \quad \text{d.} \\ 5 \ / \ 336 \quad 0 \quad 0 \\ 5 \ / \ 67 \quad 4 \quad 0 \\ \hline 13 \quad 8 \quad 9 \frac{1}{2} \end{array}$$

Short to write, but rather hard to do. Such trivial sums should not call for so much brain-power as is involved in various and complicated carryings.

Money sums, however, are the best examples of the kind. If it was 336 tons that had to be divided into 25 equal parts, grown people would be satisfied to say that each part must be 13.44 tons; but at some schools it would have to be done thus, if not by a still longer process equally liable to accidental error:

$$\begin{array}{r} \text{Tons. cwt. qrs. lbs. ozs. dr.} \\ 5 \ / \ 336 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \\ 5 \ / \ 67 \quad 4 \quad 0 \quad 0 \quad 0 \quad 0 \\ \hline 13 \quad 8 \quad 3 \quad 5 \quad 9 \quad 9 \frac{1}{2} \text{ Ans.} \end{array}$$

BREAKDOWN OF SIMPLE PROPORTION.

Simple proportion, or the rule of three, is by some teachers regarded as a kind of fetish; its extreme simplicity makes it a rather favourite rule with children, and they will naturally do many exercises in it: not always, it is to be hoped, by

¹ If any mathematician glances through this paper, as I hope he may, he will require at these stages to be reminded if British, to be informed if foreign, that in these islands a drachm is defined to be the sixteenth of an ounce, and that an ounce avoirdupois is one-sixteenth of an avoirdupois pound; moreover, that a drachm is the lowest recognised denomination of avoirdupois weight. After that fractions are permitted. Pennyweights and grains belong to a system of measures to which the name of "Troy" is (for some, to me, unknown reason) prefixed. There is a "Troy pound" and a "Troy ounce," for "metallurgical" use, but they differ from their "grocery" cousins, which are explicitly asserted "to have some weight." Then between grains and troy ounces there are other denominations used by "apothecaries," called scruples and drams. This dram is not the same as the grocery drachm. There appears, however, to be only one kind of "grain," and 7,000 of them make one pound avoirdupois, while 5,760 of them make one pound troy.

the same mechanical method. But there is all the more necessity for bringing home to them the fact (strange if it is unknown to any teacher) that it does not always work. For instance:

A stone dropped down an empty well 16 feet deep reaches the bottom in one second. How deep will a well be if the stone takes two seconds to reach the bottom?

The answer expected is, of course, 32 feet; but it is not right. The correct answer is 64 feet.

If a stone drops 16 feet in one second, how far will it drop in a quarter second? Answer, 12 inches.

Again, if a stone dropped over a cliff descends 64 feet in 2 seconds, how far will it drop in the next second? Answer, 80 feet.

A steamer is propelled at the rate of 8 knots by its engines exerting themselves at the rate of 1000 horse-power. What power would drive it at 12 knots?

Probably no one would expect the answer 1500 to this; for on that principle 10,000 horse-power would propel it at 80 knots.

An initial velocity of 1600 feet a second will carry a rifle bullet 3 miles. What velocity would carry it 6 miles?

An ounce weight drops 4 feet in half a second, how far will a pound weight drop in the same time? Answer, by experiment, 4 feet likewise. A most important fact, discovered by Galileo.

Let it not be dogmatised on, but illustrated by dropping things together; and if it appears puzzling, so much the better. Cotton wool and feathers and bits of paper will drop more slowly, but the reason is obvious. A bullet will drop more slowly in treacle than in air. That is because the air resistance is small. It is not zero, and if a bullet and a pea were dropped from too great a height air-friction would begin perceptibly to retard the lighter body. So it is that big raindrops fall quicker than little ones, and these small drops quicker than mist and cloud globules. So also does heavy fine powder, even gold powder, fall slowly in water; not because it is buoyed up, but because it is resisted. Remove the air, and in a vacuum a coin and a feather will fall at the same rate. The statement does not *explain* the fact. The full explanation of the fact is not even yet known.

A balloon 18 feet in diameter can carry a load equal to one man. What load can a similar balloon carry which is 36 feet in diameter?

A rope stretches half an inch when loaded with an extra hundredweight. How much would it stretch if loaded with an extra ton?

A half-crown is ten times the value of a three-penny bit. How many threepenny bits can lie on half a crown without overlapping the edge. (Ans., by experiment, one.)

A boy slides 20 yards with an initial run of 10 feet. What initial run would enable him to slide half a mile?

If two peacocks can waken one man, how many can waken six?

If a diamond is worth ten thousand pounds, what would 950 similar diamonds be worth?

If a camel can stand a load of 5 cwt. for six hours, for how long could he stand a load of ten tons?

These things cannot be done by simple proportion. They require something more to be known before they can be done at all; and accordingly it would appear as if generations of teachers had discreetly shied at them all indiscriminately, and excluded them from arithmetical consideration altogether. It is just as if, in geometry, finding straight lines simpler than curves, they had agreed to found all their examples upon straight lines.

Directly the elements of mechanics, and of heat, and of chemistry have been begun, any number of useful and fairly interesting examples can be constructed. They afford practice in arithmetic of the best and most useful kind, quick and ingenious computation being what is wanted, not laborious dwelling upon long artificial sums. Long sums are never done in adult practice; there are always grown-up methods of avoiding them.

It is cruel to subject children to any such disciplinary process as part of what might be their happy and stimulating education. Before they have been subjected to it, they are often eager to have lessons; but experience of the average lesson, as often administered, soon kills off any enthusiasm, and instils the fatal habits of listlessness and inattention which check the sap of intellectual growth for a long time.

If the teacher of arithmetic knows arithmetic and nothing else, he is not fit to teach it. His mind should be alive with concrete and living examples, and it is well to utilise actual measurements, weighings, surveyings, laboratory experiments, and the like, to furnish other opportunities for arithmetical exercises.

Arithmetical exercise can be obtained unconsciously, as bodily exercise is obtained by playing an outdoor game. The mechanical-drill or constitutional-walk form of exercise has its place, doubtless, but its place among children is limited.

There used to be too much of it, and too little spontaneity of bodily exercise, in girls' schools. Now the spontaneity and freshness is permitted to the body, but too often denied to the mind.

The same kind of reform is called for in both cases. The object of the book in which this paper will appear is to assist in hastening this vital reform.

LEVELS AND CONTOUR-LINES.

By A. MORLEY DAVIES, B.Sc.(Lond.), A.R.C.Sc.(Lond.)

I.

WHEN we who are now teaching were learning geography at school, we carefully copied maps of various countries, paying particular attention to the political boundaries to which we gave a delicate edging of colour. Rivers we inserted with wriggling lines, gradually increasing in thickness from source to mouth, and then for mountains we laid down what have been disrespectfully called "caterpillars." At the present time the best map-makers have not made any great

improvement on our old methods of delineating boundaries and rivers, but with mountains it is otherwise: the contoured map has come, and come to stay.

The inadequacy of the "caterpillar" to express the real forms of the land is evident. Look at old-style maps of S. America and S. Africa, for instance: we see on the western side of the former the Andes, and on the eastern side of the latter the Drakensberg; but we see nothing to suggest to us that the two ranges are altogether different in character—that the former is a true mountain-range, having a central culminating line from which the ground falls at an equal rate on either side, while the latter is the steep edge of a great plateau. Or, to take a smaller example, who would guess from the hill-shading of the Cotteswold or Chiltern hills on a map of England what they were really like? Who would imagine that when he had climbed their steep north-western slope he would find himself on a plateau, cut and scored, it is true, by many a deep valley, but still with a broad expanse of flat ground, on the roads of which the cyclist can ride mile after mile with much less exertion than he needs on the roads that follow the main valleys, and that continually have to surmount spurs of the hill-side? The truth is that when we have said "hills" or "mountains" we have used a very vague word, and that if we want to know what a country is really like we must learn to distinguish between different kinds of hills and mountains. And towards this end our caterpillar will not carry us. We want some means of distinguishing steep from gentle slopes; high-lying flat ground from peaks and ridges; and the best means that we have is *contouring*.

It is easy to define a contour-line: it is "a line passing through all points of equal height on any given sloping surface," or "the line of intersection of a horizontal plane of given altitude with the surface of the ground." But a definition without examples is unsatisfying food. We must learn what contour-lines and slopes really mean by studying them on the ground. Let us go out with our pupils into the country, armed only with the local sheet of the six-inch Ordnance map, a reflecting level, and a note-book and pencil.

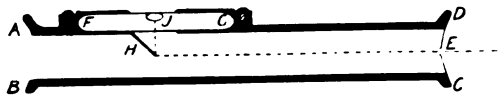


FIG. 1.—A REFLECTING LEVEL.

Longitudinal vertical section, one-half the actual dimensions.

THE REFLECTING LEVEL¹ (Fig. 1) is a very simple portable substitute for a theodolite, and enables anyone to measure heights on sloping ground in terms of the height of his own eye above the ground as unit. It consists of a simple metal tube, A B C D,

about four inches long and half-inch diameter, without any lenses, but having one end closed except for a minute peephole, E. Part of the upper surface of this tube is cut away, and over this is fixed a small spirit-level, F G. The upper half of the tube contains a mirror, H, inclined at 45° to the long axis of the tube and to the vertical. Looking through the hole, E, one sees a circular field of view, the lower half of which is occupied by a small part of the landscape, the upper by the mirror in which is reflected the spirit-level. When the tube is held exactly horizontal, the air-bubble, J, is seen reflected in the centre of the field, its image being bisected by the lower edge of the mirror. If then the observer is looking towards rising ground, he sees, coincident with the lower edge of the mirror, ground on the level with his eye, and therefore at one unit or "eye-height" above the ground on which he is standing. The value of this unit in feet or other standard units is of course variable, dependent not only on individual stature, but also on the pose of head and body. The writer finds a difference of an inch-and-a-half in his own "eye-height" according to whether he "stands at ease" or at "attention." Each member of the class must determine his own unit, and drill himself into always standing with head erect while using the instrument. The determination of the unit is made by standing on the floor of a well-lighted room or level playground, five or six yards away from a vertical post or wall, on which heights from the ground are clearly marked at intervals of an inch. It is then a simple matter to sight one's own eye-height at the level of the lower edge of the mirror, H.

The height thus read off should in theory be identical with the height of the eye as directly measured: there is a general tendency for it to be actually a little less, partly owing to an unavoidable tendency to bend forward when intently looking, and partly owing to the fact that, as the mirror blocks out the view *above* the exact eye-level, one is almost impelled to choose a point a trifle below it, and fancy that is exactly level. This latter source of error comes much more strongly into play in field-work, and, while it must be guarded against as much as possible, it cannot be entirely eliminated, and it may be found that the unit for practical use will have to be taken a trifle less than that determined as above.

Before explaining how to test the value of the unit in the field, we must say a few words about the six-inch map. As every school where geography is properly taught must of necessity possess copies of at least the 1-inch, 6-inch, and 25-inch Ordnance sheets of its district, it is, I hope, unnecessary to mention that Fig. 2 is not a facsimile of a 6-inch map, but a reduction to the scale of the three-inches-to-the-mile of a simplified copy of a portion of such a map. It will serve to illustrate the four ways in which the altitude of points are marked on the Ordnance maps.

(1) The numbers 319, 339, 402, 476, 514 and 539 (meaning so many feet above "Ordnance datum"—the mean water-level at Liverpool) are placed each against a dot in the centre of a road or path. These are the measurements of greatest value to

¹ Made by Messrs. Troughton & Simms, 138, Fleet Street, E.C. Price 12s. 6d. and £1. A more elaborate form is Abney's level, in which the spirit-level can be rotated in a vertical plane with reference to the tube, and the angle between them measured on a graduated arc with a vernier. Thus the angular altitude of distant objects can be determined, as with a theodolite; but this is not essential for our purpose.

us, as they are exact heights of points on the actual ground.

(2) 498 and 543 stand against a dot enclosed in a triangle. These are "triangulation points," or stations in the trigonometrical survey on which the map is based. Though very accurate heights, they are not of use to us, as the stations are naturally chosen for convenience on open ground suitable for viewing distant objects, and not in a series along a definite road or path.

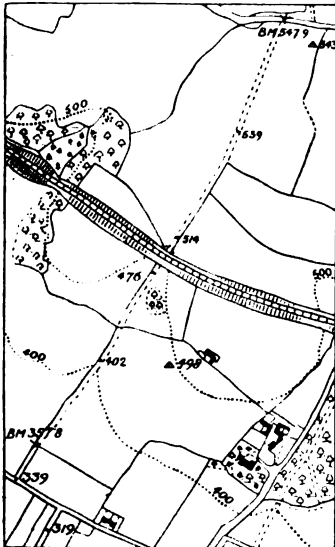


FIG. 2.—Simplified reduction of part of six-inch sheet 43 N.W. (Bucks). Scale, 3 inches to a mile.

(3) 357.8 and 547.9 are marked with the letters B.M. and a broad arrow \blacktriangle , and denote the height of "bench - marks" made by the Survey officers on buildings, gate-posts, &c. As these are invariably above the ground level, it is necessary to find them (and they are sometimes defaced or hidden by ivy, &c.) and measure down from them if we want to know the height of the ground.

(4) The dotted lines marked 400 and 500 are contour-lines. On some sheets a distinction is made between *instrumental* and *sketched* contour-lines, the former being accurately determined at intervals of 100 feet; the latter, approximate only, at intervals of 25 feet. There are no sketched lines on the present map, and therefore the two lines in question can be trusted absolutely on the open ground. But it is not safe to trust a contour-line where it crosses a road or even a path, since the level of these is almost always not that of the natural surface of the ground—paths are generally a foot or two lower.

Now we are ready for actual field-work. We will take the path which runs uphill from the S.W. to the N.E. corner of Fig. 2. It has both good and bad points for our purpose. The good are: (1) it runs very straight uphill: a winding path involves possible miscalculation of distances; (2) it has a number of exact heights marked, including its starting point. The bad points are: (1) it is a path, not a road, and so has many local irregularities of surface; (2) it crosses a railway embankment by two sets of up-and-down wooden steps, which interfere with the perfect continuity of our measurements; and (3) the crest of the hill (which comes between the 514 and 539 points) has no mark of its exact altitude.

It is possible for a single person working alone to obtain fairly accurate results, but it is far better

for two to work together—one (Smith) to use the reflecting level, the other (Brown) to act as a living measuring-post, obeying Smith's instructions and keeping records in a note-book. Brown may indeed be relieved of the note-book by a third member of the class, but any further members will be spectators, pure and simple, unless additional instruments are available. In arranging work with a class it will be necessary to resist the natural desire to take turns with the instrument: it is essential that the whole of one piece of levelling, from the bottom of the hill to the top, should be done by one observer, or we shall have a varying unit.

Smith begins by planting himself in the centre of the road running along the foot of the hill, at the point marked 339. He faces the path, and Brown walks forward until the soles of his feet are shown by the reflecting-level to be level with Smith's eye. Smith then calls to him to stop, and, after any necessary adjustment in Brown's position has been made, Smith walks forward in a straight line to him, counting his paces, which must be natural, not forced. Brown makes the first entry in the table already prepared in the note-book, and then the whole process is repeated.

The note-book after a time shows the following observations:—

Starting point—in Back Lane, Amersham, about 320 yards W. of School. Height, 339 feet above O. D.

Eye-heights.	Paces.	Total Paces.	Notes.
1	26	26	
2	44	70	
3	39	109	
4	57	166	At 46 paces hedge on R.
5	46	212	

This means that at first there is a rather abrupt rise, so that only 26 paces suffice to raise Smith's feet to the level at which his eyes stood at first.

Then follows a more gentle slope, the inclination of which is locally greater or less as the numbers in the second column are smaller or larger. This variation in slope would be less marked on a metalled road.

In spite of this very evident variation in slope, we shall not err seriously if we assume the slope to be constant for the interval between two successive stations; and infer that the height of the ground at the point where the hedge is passed on our right is $3\frac{4}{5}$ (or say 3.8) "eye-heights" above the starting point—the fraction being obtained from the proportion between the number of paces from the fourth station to the hedge and to the next station respectively, as indicated in the fourth and second columns. It is at the end of the hedge that the bench-mark 357.8 occurs, and if we can find the height above the ground it will serve to check our results; but it will be better to postpone the checking until the observations are complete all the way up the hill.

As we near the crest of the hill, for our last measurements we have to modify slightly our method, for it is not likely that the top of the hill will be an exact number of eye-heights above the starting-point. Smith is standing at what is evi-

dently more than one eye-height, but less than two, below the hill-top. Instead of pacing forward to Brown as hitherto, he stops when his instrument shows him the hill-top on a level with his eye. Then he paces on to the top. The last entries in the note-book will therefore be after this kind :—

Eye-heights.	Paces.	Total Paces.	Notes.
42	34	1205	
43	38	1243	
44	47	1290	
45	53	1343	
		1417	At 23 paces, one eye-height below top. Thence 104 to top.

We therefore calculate the total height, in terms of our unit, as 45 plus the fraction represented by the 23 paces, which we may take as $\frac{3}{8}$, or, say, 45.4. The reason for this modification of our method is evident.

The slope is diminishing rapidly as we near the top. If Smith simply paced the fifty-three paces that answer to the last integral eye-height, he would have 74 paces ($104 + 23 - 53$) left to bring him to the top, and would have no means of equating length with height; for to assume it to be $\frac{7}{3}$ eye-heights is manifestly absurd.

If now the actual height of the top of the hill is stated on the map, then this *minus* 339 should equal 45.4 eye-heights. We can thus obtain the value of our unit, and it ought to agree within 2 per cent. with the determination made by sighting a point on the wall.

Also by measuring on the map the horizontal distance between the starting and finishing points of our work, and dividing that by the total number of paces (1417), we find the average length of a pace. This we can check by measuring each section of the path marked by "a hedge on the right," or "centre of railway," &c., as marked in the fourth column of our note-book. Similarly we can check our determination of heights by means of each intermediate point the exact height of which is marked on the map. If there are any serious discrepancies in the several results, our conclusion must be that Smith is not a trustworthy observer, and we must try Jones.

When we are satisfied, by thus working over ground accurately surveyed already, that we can measure heights with the reflecting level within a small margin of error, we can proceed to measure unknown heights in the same way.

If an open hill-side is available, we can use the reflecting level to mark out a contour-line in tangible form. This might be done by sticking a series of pointed sticks into the ground at intervals of three or four yards, each one on a level with the same eye. When they have been carried as far on either side of the holder of the instrument as convenient, he must shift his ground, using his instrument this time to tell him that his eye is again on a level with one of the stakes already planted; and then we proceed as before. If the use of stakes is impracticable, the members of the class might post themselves as living stakes, all standing on the same level.

HISTORY OF THE BRITISH EMPIRE, 1763-1878.¹

By C. S. FEARENSIDE, M.A.(Oxon.)

A YEAR ago, when the Cambridge Local Syndics announced the "History of the British Empire" as a new alternative History subject, they actually prescribed only the first half of that history (1492-1784) for the 1902 examination; and some curiosity was felt as to how the subject would be completed. They have hit upon an ingenious and, on the whole, satisfactory way out of the difficulty. The "Empire Subject" for 1903 is the period 1763-1878. This arrangement involves certain overlapping, and does not quite bring us down to our own day; but each of these characteristics has as good claims to be considered a merit as a defect. It is an almost unmixed benefit to have to go twice through the American Revolution, 1763-1783—one year as the end of "Britain's First Empire," and the following year as the beginning of "Britain's Second Empire"; for that period is, as regards both America and India, the central and most dramatic portion of our whole colonial history. And considering the difficulty of studying quite recent events either calmly or in due perspective, we may well be rather thankful than not sorrowful to have the scramble for Africa included within our school curriculum. The year 1877, which witnessed the second annexation of the Transvaal and the formal proclamation of Queen Victoria as Empress of India, seems a more significant date in our colonial history than the year 1878; but the choice of the latter date as the closing limit of our studies makes it pretty clear that we are not expected to trace the course of the complicated colonial renaissance of the last quarter century.

The period actually prescribed, however, "will furnish all we need to ask" in both dramatic interest and quiet developments. It includes the American Revolution, the Great War, and the Indian Mutiny on the one hand, and on the other such topics as convict settlements, the abolition of slavery, and diverse experiments in colonial government in all parts of the Empire. It also includes a great deal of exploring activity, chiefly in the inland regions of Africa, Australia and North America; and this, though less well known, is no less deserving of combined geographico-historical study than the maritime explorations of Drake, Dampier, Anson and Cook.

(i.) CLASS BOOKS.—If we turn to consider the questions where and how we are to study the allotted 115 years, we are met at the outset by a serious difficulty. The books recommended by the Syndicate are José's "Growth of the British Empire" (Murray, 6s.), and Woodward's "The Expansion of the British Empire" (Camb. Press,

¹ One of the three alternative History subjects prescribed for the Cambridge Local Examination (Senior and Junior), December, 1902. The corresponding subject for 1902 was treated in the February, 1902, issue of THE SCHOOL WORLD.

4s.). Now the papers set in December, 1902, were evidently based almost entirely on the latter book; and, so far, that would seem to be the safest book to adopt, especially as the new edition brings the story down to the close of the Boer War. Neither book attempts a comprehensive survey of colonial history by periods; but each follows exclusively the practice of treating each group of colonies separately. Nor does either book pay much attention to historical and descriptive geography. These defects may be partly made good by the use of the excellent selection of extracts which Miss Elizabeth Lee has issued under the title of "Britain over the Seas" (Murray, 2s. 6d.). This cheap and stimulating "reader" (more than half of which deals with our prescribed period) ought assuredly to be in the hands of all candidates, senior and junior.

In any case, however, whether either of the recommended books or any other of the numerous short books on the subject be adopted as class-books, there will be a great deal left for the teacher to supply from other sources; and it is to this point that I propose to devote the rest of my available space.

(ii.) REFERENCE BOOKS.—Seeley's "Expansion of England" has little bearing on our later colonial history; and, as we have now comparatively little to do with the older English colonies in America, we can almost ignore books on United States history. The West Indies were steadily sinking in importance, and in 1878 the South African colonies had still to prove their value. Hence the following "guinea parcel" of books provides for reading on the Indian, Canadian and Australian groups only, in addition to general works:

PAYNE, E. J., "European Colonies" ... Macmillan	£	s.	d.
LUCAS, C. P., "Introduction to the Historical Geography of the British Colonies" ... Frowde	0	4	6
ROBINSON, H. J., "Colonial Chronology," published at 16s. but now on sale at about ...	0	4	0
LYALL, SIR A., "Rise of British Dominion in India" ... Murray	0	4	6
JENKS, E., "The Australasian Colonies" ... Clay	0	6	0
BOURINOT, Sir J. G., "Canada" ... Unwin	0	5	0
Gross cost ...	1	8	6
Less discount ...	0	7	0
Net cost ...	£1	1	6

If further books on the British colonies in the West Indies and in Africa be desired, recourse should be had to the relevant volumes in Mr. C. P. Lucas's "Historical Geography of the British Colonies." If these be too elaborate and expensive, the cheapest effective substitute will be found in the eighteen-penny volumes in Messrs. Marshall's "Story of the Empire" series. These should certainly be found in every school library.

Many of these books, though constantly useful, are too encyclopædic in character to bear continuous reading; but there are one or two standard books which combine readableness and utility to such a degree as to deserve purchasing. Chief among these are H. E. Egerton's "Short History of British Colonial Policy" (Methuen, 12s. 6d.)—this contains

a good select bibliography—and Sir G. C. Lewis's "Essay on the Government of Dependencies," originally published in 1841, and now obtainable in the reprint issued in 1891 by the Oxford Press, under the editorship of Mr. C. P. Lucas (Frowde, 14s.). Each of these books illustrates the very different views regarding the colonies commonly held during the early Victorian Era from those which have recently come into fashion; and this difference is one of the facts which must be constantly borne in mind in studying the colonial history of the period.

(iii.) READABLE BOOKS.—Besides these books, which are chiefly but not solely recommended for their *constant usefulness*, and may therefore claim a place on the teacher's shelves, there are many others which come nearer satisfying Prof. Armstrong's requirement of "readableness," but which may perhaps best be tasted first in a copy borrowed from a library. Partly on this account, partly because many of these books are "classics" obtainable in several editions, I do not give the prices and publishers, but arrange them in the order of their composition. This list will be some help towards mastering one of the most important aspects of our present field of study—the growth and development of ideas about the relations between colonies and mother country. Some of these twenty books will be found suitable for inclusion in the school library, for holiday tasks, or for reward books.

BURKE, EDMUND, "Speeches on American Taxation," &c. ...	1774-5
Best edition by E. J. Payne. (Frowde, 4s. 6d.)	
SMITH, ADAM, "The Wealth of Nations" ...	1776
Book IV., ch. vii., viii., deals with the old Colonial System; cheap reprint edited by J. S. NICHOLSON. (Nelson, 4s.)	
FRANKLIN, BENJAMIN (d. 1790), "Autobiography" ...	
DURHAM, LORD, "Report on British North America" ...	1839
This "Magna Carta of the British Colonies" has been recently reprinted. (Methuen, 7s. 6d.)	
MERIVALE, HERMAN, "Lectures on Colonisation and the Colonies" ...	1842
DARWIN, CHARLES, "Naturalist's Voyage Round the World" ...	1845
KINGLAKE, A. W., "Eothen" ...	1845
WAKEFIELD, E. G., "View of the Art of Colonisation" ...	1849
CARLYLE, THOMAS, "Latter-Day Pamphlets" (esp. "Downing Street") ...	1850
GREY, LORD, "Colonial Policy of Lord John Russell's Administration" ...	1853
DILKE, Sir CHARLES, "Greater Britain" (a Tour) ...	1808
FROUDE, J. A., "England and her Colonies" and "The Colonies Once More" ...	1870
In "Short Studies on Great Subjects," second series. Longmans, 3s. 6d.	
KINGSLEY, CHARLES, "At Last, or a Christmas in the West Indies" ...	1871
CREASY, Sir EDWARD, "Imperial and Colonial Constitutions of the Britannic Empire" ...	1872
BUTLER, Sir W. F., "The Great Lone Land" ...	1872
" " " " "The Wild North Land" ...	1873
Travels through Hudson's Bay Territory.	
TODD, ALPHUS, "Parliamentary Government in the British Colonies" ...	1880
SEELEY, Sir J. R., "Expansion of England" ...	1883
FREEMAN, E. A., "Greater Greece and Greater Britain: George Washington, the Expander of England" ...	1886
HÜBNER, BARON J. A., "Through the British Empire" ...	1886

The books by Profs. Seeley and Freeman represent respectively the "Imperialist" and the "Old Liberal" views on the British colonies.

This list, extensive though it be, does not include books of travels, except in one or two cases where these have attained celebrity from a strictly literary standpoint; but the exploration of the interior of Africa and of Australia is closely connected with our subject and can be studied in numerous interesting books. Nor does it include historical fiction, which is exceptionally helpful on this period; but here sound advice in selecting books is readily accessible in Mr. Jonathan Nield's "Guide to the Best Historical Novels and Tales" (Mathews, 5s. net).

(iv.) BIOGRAPHIES.—There is a further class of books calling for mention—biographies. These ought to be "readable," but, as they have in many cases been written to order for inclusion in "series," they need not necessarily be so. Naval and Anglo-Indian biography is more fully represented than lives dealing with the history of Australian and Canadian colonies. Most of the available lives dealing with our period will be found in Messrs. Macmillan's "English Men of Action" (2s. 6d. each), in the Oxford University Press "Rulers of India" series (2s. 6d. each), and in Mr. Unwin's "Builders of Greater Britain" (5s. each).

SCHOOL FURNITURE AND EQUIPMENT IN SECONDARY SCHOOLS FOR GIRLS.

By CAROLINE TURNER.

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11.

IN this article what are sometimes considered minor fittings in the equipment of schools are to be dealt with. They are not so directly connected with the physical health of the pupils, but are nevertheless of great importance.

All class-rooms should be fitted with one or more BLACKBOARDS, and these should, if possible, be placed so that the children as well as the mistresses can make free use of them. Much of the work, now done by pupils in a cramped and awkward position, could be done without injury if more blackboards were available. Many advocate the arrangement of fixed blackboards round the walls of the class-room, and this arrangement is carried out in many schools in America, on the Continent, and occasionally in England. The space thus gained for writing or drawing is very valuable, but if there is a large class at work, unless there is a top light, many children must be working under unfavourable conditions with regard to light. For the ordinary school and class-room the choice seems to lie between: (1) the sliding wall-blackboard or glass tablet; (2) the swinging

board or slate on a frame; (3) the sliding board on a frame. A good selection of these is offered by the Bennet Furnishing Co. They also offer a revolving wall-blackboard at a moderate price.

For small rooms the old-fashioned loose board on a folding easel, which can be put away against the wall, is perhaps the most convenient. The swing board gets out of order more easily than the sliding board, and takes up more room; but it is often an advantage to be able to tilt the board in different positions. Blackboards mounted on frames should always be fitted with castors, and the extra charge for these is very slight. Folding easels should be fitted with chains to prevent slipping. A development of the blackboard which I have found useful, suitable for small rooms, and easily moved from room to room, is the Viaduct Drawing Demonstration Frame.¹ (Fig. 1.)

This has no elaborate mechanism to get out of order, and can be used for drawing, solid geometry, stand for models, drawing to scale, or as an ordinary blackboard. The wooden pockets for chalk in the frame of this blackboard are not an advantage; they are difficult to clean, and chalk is better kept in the loose chalk-boxes with hooks for attaching to the easel, or in the shallow chalk-groove to be found in many easels.

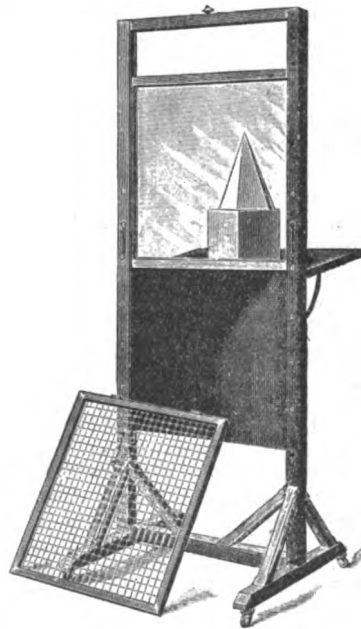


FIG. 1.—Viaduct Drawing Demonstration Frame

Most of the school-furnishing firms will make blackboards to any size. I had a very useful one made to my own measurements, and suitable for a large room lighted on both sides. It was a large sliding-board on a frame; it could be used on either side, and eight children could use it for arithmetic, writing, or drawing, working at different sides, four on each side; the frame ran easily on castors, and the board also served as a temporary partition in a large class-room, and was used for experiments in bi-manual work. The chief difficulty in the use of these large boards by a number of children is the amount of chalk dust distributed in the air when the board is being cleaned. A damp sponge, or cloth, smears the board for the next set of children, and time is wasted while the board is drying; the use of a dry

¹ The Educational Supply Association.

cloth raises clouds of chalk dust. Though the question of cleaning these large boards rapidly and effectively is a practical difficulty in the way of their general use by large numbers of children in succession, I am quite convinced of the advantage of the use of blackboards by the children.

The change afforded by this work to a standing position, and the free movement of the arms, are excellent as natural physical exercises, and though I have at present, after many experiments, an open mind on the subject of bi-manual and ambidextrous training, I think there is a good deal to be said in favour of the physical advantage of the position assumed by the child in doing this work.

One wall of a class-room can always be converted into a large blackboard, and this, though not decorative, is a useful arrangement for the illustration of many lessons. For example, in a single history-lesson it is often desirable to have as illustrations genealogical tables, outline maps, plans, or diagrams. The small blackboards give no room for these. If several boards are used, the room is overcrowded, and the teacher is often driven to make her maps, &c., on large sheets of paper which are difficult to handle, to dispense with these illustrations altogether, or to dictate illustrative matter to the class, thus weakening the interest of the children, and adding to the already heavy burden of written work for the pupils, and of correction for the teacher.

One or more CUPBOARDS are an absolute necessity for all class-rooms. Those built into the wall are often made too high and too deep, but they take up less room than the movable cupboards, though the latter are perhaps more common. Many of the mistresses' desks are fitted with cupboards, but these should, I think, be considered the property of the form mistress, and not used, as is often the case, where there are few cupboards, for form stationery.

There are many varieties of school cupboards in different sizes and qualities, costing from £3 upwards. For ordinary class-rooms where only one cupboard is supplied, I prefer those with wooden doors and made in two depths—upper part, say, 12 inches deep; lower part, 19 inches deep. The glass cupboards are suitable for school libraries or museums, and, if kept neat, help to decorate a room; but the glass is easily broken, and school books vary so much in size and binding that these cupboards are apt to look untidy. The deeper, lower part of the cupboard can be used for exercise books, class-room stationery, diagrams, or pictures for illustrating lessons. Some schools provide a set of large pigeon-holes fastened to the wall for exercise books. If possible, these should be fitted with sliding doors.

All school cupboards should be provided with strong locks and duplicate keys—one for the form mistress and one to be kept in the head-mistress's office or private room. This seems a minor point, but it is an important one; a missing key often causes waste of time and great confusion.

INKWELL TRAYS are a necessity with portable desks. The desks supplied to me by the Educational

Supply Association¹ have been fitted with inkwell holes and sliding brass-tops, but it is safer to remove the inkwells when the desks are folded. The portable inkwell-trays with metal handles should be kept on a special shelf in each class-room cupboard. There are convenient inkwell cupboards for general school use, and all large schools should be provided with one at least of these.

MAPS and DIAGRAMS are expensive items in school apparatus, and should be carefully kept. Some advocate hanging these on the walls of the class-rooms, but this is not a suitable arrangement, as they cannot be kept free from dust. The closed cupboards with hooks for rolled maps supplied by many firms are very convenient. These can be made to hold thirty maps of different sizes, and can be placed in corridors or landings if a separate room cannot be spared.

An arrangement that is very convenient for smaller diagrams or pictures which should be kept flat is a frame with glass and a movable back. These can be made by any picture framer, and can be hung in the class-room and used for many different illustrations, such as suggestions for designs, historical pictures, newspaper cuttings, charts, &c.

BOXES WITH GLASS LIDS are also very useful. These can be used as temporary museum-cases where space or funds do not admit of the ordinary museum cases. Illustrated books, which might be injured by careless handling and are too thick for the movable frames, can be shown conveniently and quickly to a class in this way, especially if a table is provided in each class-room.

A convenient form of TABLE is one that folds into small compass and is said to be strong and without any complicated mechanism. I have not used this table, but, judging by the convenience and strength of folding desks, I should think it would be satisfactory. The ordinary table requires more space than can be allowed in an average class-room, and yet a table is constantly needed if many lessons are to be suitably illustrated.

Many convenient MUSEUM-CASES are to be had, from cases to stand on small tables to elaborate fittings for a room set apart for a school museum.

If possible, each class-room should have its museum case, however small, but this should not be filled with dusty specimens that have no meaning for the children. Some children, who have parents and friends abroad, can often bring valuable and interesting specimens as a loan or gift to the school, and people are more willing to lend specimens if they know that they will be kept in a locked glass-case. I would suggest that the form mistress should in every case take a personal interest in the contents of the museum case, and where possible, see that it contains something that has a bearing on her own special subjects.

I have found that all children, young and old, take an intense interest in even a tiny AQUARIUM. These can be procured very cheaply, if a small bell glass is used, for from 3s. to 4s., and they are an

¹ See THE SCHOOL WORLD, February, 1903 (p. 57).

endless source of pleasure and healthy interest. Those who live near the sea can have one for salt water and one for fresh water, and I have known enthusiastic teachers who have kept a salt-water aquarium in a healthy state for many months at a time in a town some miles from the sea.

Teachers of science have, of course, the advantage of superior knowledge and experience in managing the class-room aquarium, but any mistress who has an intelligent interest in what she sees around her, and who is guided by some of the many excellent nature-books now published, can find more than enough animal and plant life to interest herself and her class during the whole school year.

GEOMETRICAL DRAWING IN RELATION TO MATHEMATICAL TEACHING.

By the Rev. PERCY W. UNWIN, M.A.
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THERE is no subject, perhaps, in our school curriculum which, quite apart from all consideration of examination needs, furnishes greater educational advantages than does the teaching of Euclid and the exercises of geometrical deduction. And yet we are told that as a school subject Euclid is doomed, and various text-books are already taking the place which he has occupied for so many years in our school teaching.

Euclid is, indeed, becoming a name of the past, so far as school work is concerned, and modern and experimental geometry is taking its place. For some time past the whole of geometrical teaching has been enveloped in a state of unrest. It may even be said to have passed through a period of chaos from which it has emerged in a new and unknown shape, a shape as unwelcome, as it is unexpected to many a conservative adherent to the programme of Euclidean geometry.

On almost all sides we learn that with the instruction devoted to geometry, be it called Euclid, or be it known by any other name, must be given a definite course of training in experimental work. Whether these two systems of instruction should be contemporaneous, or whether one should precede the other, and which should first be applied, are points which are at present uncertain, and upon which I do not now wish to dwell.

I write to give greater prominence to the all-important suggestions already made, to the effect that much of the time at present devoted to the teaching of geometrical drawing ought to be counted as given to this course of experimental work. To attain this end the teaching of geometrical drawing must undergo a radical change. It *must* become more mathematical. And this change must be effected without sacrificing in the very least the neatness, accuracy and finish hitherto so

prominently set forth in the geometrical drawing-lesson.

A change is being made in the teaching of geometry. It is becoming more like geometrical drawing. A complementary change is also needed in the geometrical drawing-lesson—a change in the direction of mathematics. To quote from the preface of Prof. Henrici's "Elementary Geometry, Congruent Figures"—

Geometrical drawing ought to be combined systematically with the teaching of geometry. This is scarcely possible in connexion with Euclid. . . . Geometrical drawing belongs, in fact, to a branch of geometry of which Euclid knew nothing, and where Euclid's propositions are of little use.

Let us briefly review the general lines upon which instruction in geometrical drawing has been given in the past, and the results which this system has produced.

The subject may be roughly divided into four heads:—(i.) Geometrical Drawing; (ii.) the Construction of Scales; (iii.) Pattern Drawing and Design; (iv.) Solid Geometry and Projection. With section iii. we need not now concern ourselves, for, while it is the ultimate goal at which a large number of the students of geometrical drawing are aiming, it has little or nothing to do with the mathematical side of the question.

Section i. has included as a start the more useful of Euclid's *problems*, though in the majority of cases the constructions employed have been far simpler, Euclid having laboured under two great disadvantages unknown to the propounders of geometrical drawing: namely, the necessity of *proving* his construction by *geometrical* methods, and his inability to make use of any proposition not *already* proved. These elementary constructions have been followed by others more advanced, and both classes have been of the nature of material to be used in future work. As instances of the first class we may quote the bisection of an angle and the construction of lines at right angles. Examples of the second class are the construction on a given line of the segment of a circle containing a given angle, and the finding of a mean proportional between two given straight lines.

After these materials have been provided, the student has been put to various groups of problems which can only be solved by the repeated application of such elementary constructions as those already learnt.

The order in which these groups have been approached has been more or less immaterial. While one group would deal with circles and lines in many different combinations, another with triangles, another with polygons, there would be included in another such problems as deal with the construction of areas of given magnitude, and the division of figures into equal or proportional parts. The number of such problems is almost endless, and, while many of the more important have become almost as stereotyped as the bookwork of Euclid, others are seldom met with, and any one of such may be faced for the first time in some important examination.

Sections ii. and iv., though very important, are less variable in character. The construction of scales involves the necessity of arithmetical calculation, of peculiar neatness, and of absolute accuracy, and it may be thought by some to form a suitable basis for early instruction, since it requires very little previous knowledge of geometry, while it offers ample opportunity for acquiring neatness and accuracy. To teach this important branch of geometrical drawing, one must be provided with a good, clear, and simple method—the simpler the better. And, while the *minutiae* of finish play an important part in teaching accuracy, neatness and uniformity of work, I do not think they are of great value from an examination point of view, though then, as always, the results acquired by the continual practice of such details are all-important.

Solid geometry has been reserved for more advanced students, and seems likely to become more and more so in those schools which work mainly for the Army examinations, for the new Army scheme proposes to make this branch of geometrical drawing obligatory for the Woolwich candidates only. A good text-book, with a large number of well-drawn plates, is a necessity in teaching solid geometry, for the figures are so intricate that to draw many of them neatly on the board requires more time, if not more skill, than the master often has at his disposal.

Except in cases of special necessity, the teaching of solid geometry will be postponed till the upper forms are reached, though the consideration and measurement of the regular solids will doubtless be included in some early scheme of experimental work.

For the teaching of geometrical drawing, as described in section i., I believe that a text-book is practically unnecessary, save as a collection of numerous and varied examples. Too much has been left to the text-book in the past, and in many cases the main instruction a student has received has been that of the book, and not of the master. He has been allowed to copy figure by figure from the book. He has not always taken the trouble to read the statement of construction, and thus the steps of work have been taken in wrong order, circles have been described with wrong centres, the brain has not been exercised, and the power of reproducing the figure without help at any future time has not been acquired.

What seems most needed at the present time is a good system of instruction, based upon a carefully drawn-up scheme of work, more especially if the teaching of geometrical drawing is to continue side by side with the mathematical instruction in geometry.

In the past, geometrical drawing has been so dealt with, that pupils have learnt the use of instruments, have grasped the methods of scale construction, and have become acquainted with the working of a large number of geometrical problems. They have acquired neatness, finish, and accuracy of work, and have been able to reproduce exactly any given problem so long as

the figure has been left before them. But how small a percentage are able a week later to solve a similar problem, or even the same one, without some assistance from the master or from a book! Why is this? Because in many cases the teaching has been unmathematical. Geometrical drawing has been styled "Euclid without any proofs," and this has often been considered sufficiently good reason for ignoring the possible existence of a proof. In most problems *the reason why* has neither been sought nor given, and in many cases the instructor, even if he would, could not have given the class a reason for the method of solution adopted.

Of course there are many constructions which depend on theorems by no means geometrical, or on mathematical knowledge far in advance of that at which the class in question has arrived. There are others which, while perfectly accurate, possess practically no logical reason for their use. But I maintain that, if a reason for any method of construction can be given which will appeal to the mathematical knowledge of the class, to leave this problem for another without first revealing that reason, without, if possible, making use of the reason—as a means of *discovering* the solution to the problem—is not only to teach badly, but in nine cases out of ten to fail to teach at all.

There has been a tendency to allow pupils to work with the hand only, and not with the head, and, while it is gratifying to the master to know that his pupils look forward to the geometrical drawing-lesson, they must on no account be allowed to regard it *wholly* as a period of relaxation as compared with other subjects. In the actual drawing-lesson it is true that the mind is far less busy than when dealing with an algebraical problem, or with a *vider* in geometry. But the actual drawing-lesson is only one part, and not the most important part, of instruction in geometrical drawing.

Now, if this subject is merely to lead to the acquisition of neatness and accuracy, we spend too much time upon it. In the school to which I belong, all forms from the Remove to the Upper VI. spend two hours each week on geometrical drawing. Thus, a boy who passes through them all, without failing to gain his promotion at the end of every term, has given to this subject two hours each week for *seven* terms by the time he reaches the Upper VI. But, surely, the instruction in geometrical drawing can be so arranged that none of the time devoted to it can be said to be wasted, and the subject made, if not actually a branch of mathematics, at least a very useful handmaid to mathematical instruction? There is a tendency at the present time to include it in the mathematical programme of the future.

From the schedule lately published by the Cambridge Locals authorities I gather that far greater importance is to be attached to the ability *to make* and *to understand* geometrical constructions. Here is an opportunity for geometrical drawing, which deals with *problems* only, the more important part of that great subject hitherto called "Euclid."

Again, the new Army Scheme already referred to proposes to do away with the actual paper on geometrical drawing, and to include the first two sections I have spoken of in Mathematics I., while the solid geometry, for Woolwich candidates only, will be covered by the papers on Higher Mathematics. Geometrical papers, recently set in Naval and other examinations, contain questions which are nothing more than problems in geometrical drawing, and for the construction of which a mere statement without proof is all that is considered necessary; while the geometrical drawing-papers as set in the Army examination contain questions which, if found elsewhere, would be called Euclid *riders*. The present custom is to set such papers in geometry for which the teaching of Euclid, as carried out until quite recently, forms a very inadequate preparation.

Much of the necessary instruction can, of course, be provided by the mathematical lesson, and by some such elementary course of experimental work as has often been suggested of late. But there is much more which the geometrical drawing-lesson can far more readily supply.

The course I suggest, and on the lines of which I have been working for some time, is doubtless one which has been tried successfully by several other teachers; but I believe the older methods still prevail in many schools.

Beginners have, as a rule, had little or no experience of a course of experimental work. Let them first acquire a thorough knowledge of the use of instruments for measurements and general work, and of the varied applications possible in the case of the Marquise scales.

Let them next learn carefully the construction of scales, plain and diagonal. The actual drawing of the scales requires nothing beyond a knowledge of the use of instruments, and of the geometrical division of a line into a given number of equal parts, and gives ample opportunity for neatness and accuracy. Then the simple and advanced constructions should be worked through with the greatest care, each being explained as thoroughly as possible.

These materials having been acquired during a pupil's progress through the two lowest forms, he is now in a position to begin upon the more advanced problems in geometrical drawing. A paper of questions on any group of problems should be set, and one or two of a similar nature should be worked on the board as examples—not solved straight away but worked at by the method of *analysis* and *synthesis*.

As an example of this method let us take the following problem, which, though too hard for junior students, is an excellent illustration of a problem which is almost impossible of solution by anyone who has not seen it before, unless he first approaches it by principles of *analysis*.

Construct a triangle having given its perimeter, its altitude, and its vertical angle.

Suppose the triangle ABC (Fig. 1.) to be the triangle required.

Then the angle BAC is of known magnitude, and the perpendicular AD from A on to BC is of given length.

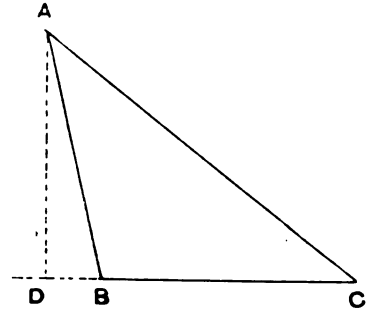


Fig. 1.

Produce BC (Fig. 2.) both ways, making BE = BA, and CF = CA.

Then EF = AB + BC + CA = given perimeter.

Also, since AD is of fixed length, A lies on a parallel to EF at a distance from it equal to AD the given altitude.

Join EA and FA.

If we can show that the angle EAF is of fixed magnitude, it follows that the point A will also lie on a fixed segment of

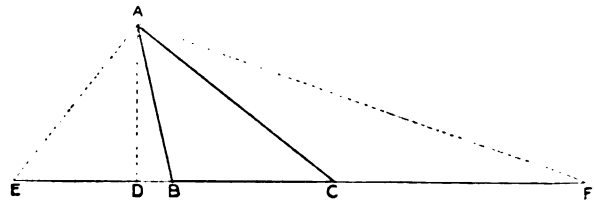


Fig. 2.

a circle, namely, the segment described on EF, and containing an angle of this fixed magnitude.

Now BA = BE.

$$\therefore \angle BAE = \angle BEA.$$

$$\therefore \angle BAE = \frac{1}{2} \angle ABC. \text{ Similarly } \angle CAF = \frac{1}{2} \angle ACB.$$

$$\therefore \angle EAF = \frac{1}{2} \angle ABC + \frac{1}{2} \angle BCA + \angle CAB,$$

$$= \frac{1}{2}(\text{sum of angles of a } \Delta) + \frac{1}{2} \angle CAB,$$

$$= 90^\circ + \frac{1}{2} \angle CAB.$$

And as the angle CAB is fixed by *hypothesis*, the angle EAF is also fixed.

Thus the solution required is as follows:—

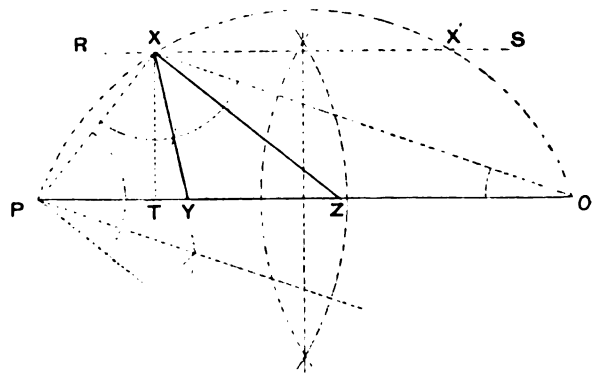


Fig. 3.

Draw PO equal to the given perimeter. Draw RS parallel to PO and at a distance from it equal to the given altitude. On PO describe the segment of a circle containing an angle

equal to 90° + half the given vertical \angle , and cutting RS in X and X'.

At the point X in XP make an angle PNY equal to the angle OPX, and at the point X in XO make the angle ONZ equal to the \angle POX.

Then XYZ is a solution of the problem.

The proof is obvious from the analysis given.

To take one more illustration of an easier nature. Suppose the students have become thoroughly well acquainted with the group of truths of which the following are examples :

(i.) The locus of the centres of all circles which touch two given straight lines is the bisector of the angle contained by those lines.

(ii.) The locus of the centres of all circles which touch a given circle at a given point is the diameter of the circle passing through that point and produced indefinitely. Let us consider the problem :—

Describe a circle to touch a given circle at a given point, and to touch a given straight line.

The students should be taught to effect its solution in some such way as this :—

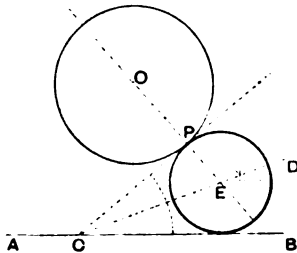


Fig. 4.

Since the circle required has to touch the given \odot at the given point P, its centre must lie in the line OP (Fig. 4).

Since the required circle has to touch the given circle at P, it will also touch the tangent to the given circle at P.

It will therefore touch both the lines CP and CB.

Therefore the centre of the required circle will lie in CD, the bisector of the angle PCB.

But the centre lies in OP, therefore it must be at the point E, the only point common to OP and CD.

In making use of such methods of solution as the two here suggested, students should be taught to discover the cases of failure which exist in nearly all problems, and also to note the number of different solutions which are possible. In the last example, for instance, a second solution is possible, namely, that found by bisecting the angle PCA. But there is no case in which the problem is impossible. In the first example a second solution is obtained from the point X', and two more exactly similar to the first two, by drawing RS and the segment of the circle on the other side of PQ. The solution becomes impossible when the segment of the circle does not intersect RS; that is, when either the altitude or the vertical angle is too great.

When these illustrations have been carefully worked out by the master, on the lines here suggested, or others like them, the students should be set to work on the problems before them, treat-

ing them exactly as geometrical *riders*. Their solutions need not in the first place be drawn with laborious care, and may be made on rough paper. When sufficient time has been allowed for the best boys to solve them all, or before if necessary, as will often be the case, the whole should be worked through on the board, and marks assigned for the solutions obtained. An extra mark may be given for any logical proof produced.

More than one solution of a problem will be offered, as a rule, and their relative merits should be discussed and explained. Finally, the whole batch of problems should be neatly and accurately reproduced either at the next lesson or in evening work, and marks then assigned for the *drawing only*; the solutions shown up being, of course, those only which the master has finally pointed out to the class as the best of several suggested for the problems in question.

In this way pupils will gradually acquire the power of working for themselves, a power which it is well-nigh impossible to acquire by such methods as have often been applied to the instruction of geometrical drawing in the past. These methods have often degenerated into mere mechanical copying of figures and patterns given in a book. And unless this ability to think out a problem for himself has been acquired and constantly exercised by the pupil, he is scarcely likely to find that his mathematical work gains much assistance from the geometrical drawing-lesson.

I do not wish to suggest that the system I have tried to describe here is the only one likely to achieve successfully the end in view, but I do believe that it lays stress on one point which is most essential, and that is the necessity for giving each pupil some opportunity to discover for himself the solution of the problems he is set to draw.

The exercises may be gradually made harder and harder, and after a year of such work it will be found that the standard of neatness and accuracy has in no degree been lowered, while the sum total of ability to work out geometrical riders will be greater than ever before, and geometrical drawing will have played no small part in achieving this very desirable end.

How to Work Arithmetic. By L. Norman. Parts I. and II. Each xvi. + 78 pp. (G. E. Over: the Rugby Press.) 1s. 6d. each part.—Full solutions of 136 questions, given as they would actually be sent up by an expert candidate at an examination. Mr. Norman has really done a useful work: for many arithmetics, otherwise good, do not give the details of actual computation in a proper form. Parts I. and II. contain the same problems, but the methods of solution in Part II. are often less elementary than those in Part I. Part II., in another edition, might with advantage be enlarged by adding examples of other types, such as calculation with logarithms, mensuration, &c. It is interesting to see that these books have been published at Rugby. The typography is very good, especially the figures.

THE ASSOCIATION OF HEAD- MISTRESSES.

THE original name of this Society, at its foundation in 1874, was "The Association of Headmistresses of Endowed and Proprietary Schools." The title was changed in 1896, when, in order to include the new class of schools created under the Welsh Intermediate Education Act, and to justify the inclusion of certain "class schools," it was found necessary to modify the



MISS CONNOLLY.

Headmistress of the Haberdashers' School, Hatcham, S.E.; President of the Incorporated Association of Headmistresses.

name, which then took its present form, "The Association of Headmistresses, Incorporated by the Board of Trade, 1896."

The Association rejoices to honour Miss Buss as its foundress and first President. She, however, with characteristic modesty, would have wished other names to be associated with hers in the work of drawing together those on whom was laid the burden of ruling, and to some extent creating, public schools for girls.

In 1866 Miss Emily Davies founded "The Association of London Schoolmistresses," in which Miss Buss took from the first a leading part. The meetings of the London schoolmistresses were frequently held at Miss Davies's house. Questions as to school methods, curriculum, the relation of

headmistresses to their colleagues, and many other points, came under discussion, and opportunities were thus given for helpful intercourse to many otherwise isolated workers.

In 1866 public schools for girls were almost unknown. Cheltenham Ladies' College had for eight years been under the wise, courageous rule of Miss Beale. There were a few schools for clergymen's daughters which had a semi-public nature, and the North London Collegiate School for Girls had been at work about sixteen years, but as a private venture. Between the foundation by Miss Davies of the Association of London Schoolmistresses in 1866, and that of the Headmistresses' Association by Miss Buss in 1874, changes, amounting almost to a revolution regarding the education of girls, took place.

In 1870, Miss Buss transferred her school to trustees, making it a public school on a permanent footing. In the same year her friend, Miss Davies (whose great services to the cause of education were fittingly recognised, when in 1901 the University of Glasgow conferred on her a degree), founded Girton College. In 1871 other honoured pioneers were at work. In that year, mainly through the efforts of Mrs. William Grey and her sister, Miss Sheriff, the Women's Education Union was founded, the work of which led to the formation of the Girls' Public Day Schools Company, which was begun in the hope of providing sound liberal education for girls, who, unlike their brothers, did not benefit to any great extent from the educational endowments of the country. It was at the same time that the Endowed Schools Commissioners were feeling their way and doing all in their power to give a fair share of the trust money with which they had to deal to the education of girls. The first endowed school opened for girls under the Commissioners was at Keighley, in Yorkshire. The first headmistress of that school was Miss Porter, who, in 1873, became the first headmistress under the Girls' Public Day Schools Company.

When once the work was begun it proceeded rapidly. Miss Buss, knowing how much help the London schoolmistresses had gained from intercourse and co-operation, had a private meeting at the end of 1873 with Miss Beale, Miss Jones (of Notting Hill), and Miss Porter, at which she proposed that she should invite certain mistresses to form a new Society, at once broader and narrower than that which Miss E. Davies had founded eight years before. The new Society was not to be limited to the headmistresses of London schools; public schools throughout the country were to be associated with those in London, but the mistresses of private schools were to be excluded. This was decided upon in no ungracious spirit, the good and necessary work done in private schools was fully recognised, but the new Association had to take a definite line as to those eligible for membership, and the line then laid down has never been overstepped.

The proposed meeting took place in December, 1874, at Miss Buss's private house. Those present were Miss Buss, Miss Beale, Miss Cheveley

(Huddersfield), Miss Day (Manchester), Miss Day (Westminster), Miss Derrick (St. Martin's-in-the-Fields), Miss Hadland (Milton Mount), Miss Jones, Miss Leicester (Leicester), Miss Neligan (Croydon), and Miss Porter. Of these first eleven members, three were working under schemes of the Endowed School Commissioners, three under the Girls' Day Schools Company, four under local companies, and one in what may be called a "class school." At that first meeting, Miss Brough, who had been actively associated with the Women's Education Union, was present at Miss Buss's request, to act as Secretary, an office which she held until December, 1901, when she retired, to the regret of many old friends.

Miss Buss, notwithstanding many attempts at resignation, which she made from time to time, remained the President of the Association until, on Christmas Eve, 1894, she, having served her generation, by the will of God, fell on sleep. During the last few years of her life much of the work of the President was done for her with never-failing courtesy and discretion by her friend, Miss Jones, to whom the Association is greatly indebted. Miss Beale was elected President in June, 1895. When her term of office ended in June, 1897, and a new President had to be chosen, Miss Beale announced from the chair, "Ladies, I have before me a great number of nomination papers, but they all bear one name, that of Miss Jones." This was sufficient evidence, were any needed, of her colleagues' appreciation of her many services.

Miss Day, of Westminster, became President in 1899, and Miss Connolly, of Hatcham, succeeded her in 1901.

The work of the Association, thus started in 1874, has been many sided. Parliamentary action with regard to education has been closely watched, schemes for the training and registration of teachers have from very early days been favorably regarded, and the admission of women to the universities has been eagerly advocated; but, above all this public work, the chief concern of the Association has been the wise uprearing of a noble school-tradition for girls, a desire to be satisfied with nothing less than the best in education. The headmistresses were not hampered with narrow precedents; they sought to develop the capacities of their girls in every direction. The noble motto of Prince Henry the Navigator, "*Le talent (desire) de bien faire,*" fitly indicates the view they had taken regarding their work.

In glancing through the old minute-books it is extraordinary to see the variety of subjects in which the Association concerned itself. For instance, in 1879, the chief topics at the meetings were, early in the year, "What precautions should be taken against infectious diseases." Soon after the members were busy over a memorial to the Senate of London University, praying for the establishment of examinations in the theory and practice of education. Another memorial followed, urging the Charity Commissioners to make it possible to pension assistant-mistresses.

In June, 1879, the members were full of Dr. Lyon Playfair's Registration Bill. In 1880 they memorialised the authorities at Oxford and Cambridge about the admission of women to degrees. In the following year the physical training of girls was a vital question. Dress reform, cookery, Latin, the teaching of science, spelling reform, gymnastics, organised games, music examinations, were all talked over, and more or less action resulted from the discussions.

The annual conferences of the Association are held alternately in London and in the country. Meetings have taken place at Bedford, Birmingham, Bradford, Cheltenham, Clifton, Edgbaston, Manchester, Milton Mount, Oxford, Plymouth, Sheffield, and Worcester, as well as in many of the London and suburban schools. The meeting for 1903 will take place at Cambridge.

Two conferences call for special mention, those of 1887 and 1894. They were notable specially, because by the kind invitation, first of Mr. Thring, and secondly of Mr. Welldon (now Bishop Welldon), the meetings were held at boys' schools. Mr. Thring, the founder of the Headmasters' Conference, watched with sympathetic interest the movement in regard to the education of girls. The Association felt deeply the honour shown to it by his invitation. The exceeding kindness shown to the seventy headmistresses who were fortunate enough to be present at Uppingham in 1887 will not easily be forgotten. It so happened that St. Barnabas Day (the festival of the school) coincided with the conference, and the headmistresses were welcomed to the chapel service on that day. When, after the death of this great headmaster, the Association was allowed to show its appreciation of him, by putting a memorial window in his honour in the school chapel, it was decided that one of the saints depicted in the headmistresses' window should be "The Son of Consolation."

At the Harrow meeting, which was held in June, 1894, Mr. Welldon gave an address of great interest in the Vaughan Library, and he and his colleagues were most kind to their guests.

It was felt by the members of the Association to be a great encouragement to them in their work, thus to have the right hand of fellowship extended to them by such distinguished headmasters.

It is impossible in this brief notice to record all that has been done or attempted by the Association. Perhaps the following movements have been those in which the interest of the headmistresses has been keenest and most persevering:—

- (a) The work of training teachers.
- (b) The establishment of examinations in the theory and practice of teaching.
- (c) The promotion of pension schemes for teachers.
- (d) The registration of teachers.
- (e) The admission of women to degrees at the universities.

Since 1874 nearly all that was then hoped for has been granted, and the Association may justly claim a share in this satisfactory result.

Besides the Annual Conference of the Association, much work is done by the Executive Committee, and by the various sub-committees; among others may be mentioned the Parliamentary Committee, the Printing Committee, the Scholarship Committee. Representatives of the Association are sent by invitation to serve on the Councils of various bodies, *e.g.*, the Maria Grey Training College, the Cambridge Training College, the Norland Institute. Others represent the Association in the Joint Advisory Committee, which serves as a common ground for the Headmasters' Association and that of the Headmistresses, on the Joint Scholarship Board, the Joint Registry Committee, &c. In 1894 the Association was invited to send two representatives to give evidence before the Royal Commissioners on Secondary Education. Those elected were Miss Jones and Miss Day, of Manchester; and in 1902 Mrs. Woodhouse, of Clapham, was chosen to serve as representative of the Association on the new Registration Council.

It only remains to say that the Association now numbers nearly two hundred headmistresses. Membership is no longer limited to England and Wales. A few schools in Scotland are represented, as well as one at Constantinople, and one in India. The Association has been enabled in past years to do much for the higher education of girls, and there is reason to believe that there is a great future of usefulness awaiting it, and that its characteristic marks will be found to be a love of thoroughness, joined to a desire to move so steadily forward that it may have few, or no, steps to retrace. The pioneers in the Women's Education Movement were noted for their breadth of view, and sobriety of judgment, combined with untiring zeal, and those who follow them in their work will not be content with any lower ideals.

A SYSTEMATIC STUDY OF SHAKESPEARE IN SCHOOLS.

By ESTHER S. THORN, B.A.(Lond.)
Assistant-mistress, Camden School for Girls.

IN this paper I wish to indicate briefly the lines on which I think the study of Shakespeare in our schools might be made more beneficial to the pupils and certainly more interesting to the teacher. At present most of the pupils, in our upper forms even, come to the study of a play of Shakespeare with a very inadequate equipment. Necessarily, a rather large proportion of time must be spent on the elucidation of the text and on explanations which, in many cases, unduly tax the memory of the pupils. This cannot but militate against a cultivation of the spirit of pure literary enjoyment, and the evil might be avoided by a carefully graded syllabus of instruction. Further, the syllabus should be drawn up to meet the requirements of at least two-thirds of the number

of forms in the school. Too often, nowadays, the study of Shakespeare is confined to a few of the upper forms only. This is a mistake, though one which is usually realised too late. I have no wish to dogmatise on the subject of Shakespeare teaching, but shall merely sketch a course of instruction which will be found quite practicable in an ordinary secondary-school. The question of the time to be spent in such teaching will be dealt with later.

In the lowest forms the teaching should be given by means of stories from the plays, carefully selected and simply told. Naturally, the language used must be well within the comprehension of the pupils, and with very young children it is better to narrate an interesting story embracing only one incident in a play. The greatest care must be taken to avoid confusion by introducing too many characters and endeavouring to epitomise a whole play. Then, life and interest must be imparted to the story by the use of illustrations wherever possible. Pictures of places or incidents mentioned should be procured and freely used. In order to give stability to the work done, the children should be encouraged to reproduce the story last told in their own words before the beginning of the new lesson. If this plan is followed, care must be taken that the work of orally reproducing should not be confined to a few bright children. There will not be time probably to listen to more than one or two children before each lesson, but an effort should be made to get through the whole class during the term. Or, if the children are not too young, the plan of asking them to write a composition occasionally may be adopted.

In the middle forms of the school a play will of course be studied, and on the method of studying the play I need say nothing. But there are some points which call for an extended consideration at this stage of a pupil's progress. *Pari passu* with the study of a play should proceed the study of the times of Shakespeare. The pupils should be made to realise vividly the London of Elizabeth and the ordinary every-day life of the people. A map of Elizabethan London (which can easily be made by the teacher) is a wonderful help in this connection. In order to do this part of the work effectively the teacher must be prepared to read widely and imaginatively. And the teacher who does this will be more than repaid—not merely by the increased interest of the pupils—but by the actual benefit derived. The mention of a few books, leaving aside those definitely dealing with Shakespeare and his work, may perhaps be useful. The works of John Stow are invaluable, and his "Annals" and "Survey of London" should certainly be read. The latter is particularly fascinating. The "History of Elizabeth" of William Camden is a good one to read in conjunction with Stow's "Annals." For the teacher's own benefit a vivid picture of the more bohemian life of the times may be obtained from Robert Greene's "Groatworth of Wit" and the "Pierce Penniless" of Thomas Nash. More modern works, which, however, help one to realise the age of Shakespeare

with a fair amount of fidelity, are Robert Hall's "Society in the Elizabethan Age," Thomas Wright's "Homes of other Days," and Lucy Aikin's "Memoirs of the Court of Queen Elizabeth." One work professedly on Shakespeare may perhaps be noted, as it is somewhat off the beaten track. I refer to the book entitled "The Folk-Lore of Shakespeare," by T. F. T. Dyer.

And then Stratford-on-Avon, the place so dear to the heart of our great dramatist, must not be forgotten. Its country freshness and undying charm should, through the medium of the teacher, make as permanent an impression on the pupil as the London of Shakespeare. In fact, the two places form contrasting backgrounds on which to picture the life of the times. Perhaps the courtly side of London's amusements can be read nowhere better than in the large but interesting records of John Nichols entitled "The Progresses of Elizabeth" (1788 edition). On the dramatic side, the pupils must be given clear ideas of the theatre in the days of Shakespeare.

What I have said with regard to the middle forms applies, naturally with modifications and extensions, to the upper forms. Here, however, some careful attention should be paid to studying the grammar of Shakespeare, and the play chosen for special study should receive careful attention in this respect. Systematic lessons should be given in the grammar, and half-an-hour a week might well be devoted to it. I do not advocate the use of any text-book by the pupils, for good lessons on the part of the teacher are quite sufficient. Here I should like to remark that the work of studying a play of Shakespeare's would be much less hard for the pupils if the ordinary lessons in English grammar throughout the school took a more historical turn than is in general the case. The outlines of Anglo-Saxon grammar, so far as necessary for the proper understanding of the present English tongue, may be made tolerably familiar by a proper use of the usual grammar lessons in every form but the lowest. Speaking from a practical point of view, I find that pupils are usually interested in tracing the changes through which a word passes in its history. In the upper forms, too, some little time should be given to a study of the dramatists contemporary with Shakespeare.

In every form there should be a certain amount of essay writing, not too frequent, but sufficient to prove an incentive to the pupils to think out things for themselves. In the upper forms, where time admits, a fortnightly discussion-class is very stimulating, under good leadership, and forms an excellent training ground for a college debating-club. The scheme sketched is necessarily a rough one, and needs to be carefully graded to the requirements of each form separately, whereas I have in this paper merely considered the matter under three broad divisions. As to the all-important question of time, I believe it will be found that, by a judicious arrangement, three-quarters of an hour weekly will be found sufficient for the lowest forms, whilst two lessons a week each of

half-an-hour will be enough for the middle forms. Of the higher forms it is difficult to speak, as so much depends on the individual circumstances of the school. But, with careful arrangement, no other subject need suffer for the more systematic study of Shakespeare which I advocate. I feel sure that there is no need to dwell on the gain to be derived from an attempt to form the literary taste of our pupils and to cultivate it, for it will be generally acknowledged that few things are more detrimental than the notion some pupils seem to obtain that a play of Shakespeare is something to be dissected for a Local Examination.

VIVA-VOCE EXAMINATIONS IN FRENCH.

By DE V. PAYEN-PAYNE.

Principal of Kensington Coaching College.

NO feature in the examination system of this country has afforded such satisfaction to modern-language teachers as the impetus that has been given lately to viva-voce examinations. If modern languages are to take a place beside the other chief branches of learning, they must be treated as living and not as dead languages in the class-room; and this side of a modern-language teacher's work deserves inspection or examination as much as any other. For the Army, 300 marks out of a total of 2,000 have been given for dictation and conversation for some years past. But we fear that this proportion has not been sufficient to render it worth a candidate's while to devote much time to them. Four years ago, the University of London made it compulsory for every Arts candidate presenting himself in modern languages to read a portion of French or German and to answer a few questions arising out of the piece read. The College of Preceptors has given a maximum of 100 marks (compared with 200 for the written examination) for a voluntary oral test in French and German to first-class candidates. We should like to see this made compulsory for the first class, and voluntary for the other classes, who are at present debarred from an oral test altogether. The Delegates of the Oxford and Cambridge Local Examinations are this year beginning a viva-voce test for their Senior candidates. We may hope, therefore, in the near future to find that no one will be permitted to pass an examination in modern languages without having satisfied the examiners that he has a reasonable acquaintance with the spoken tongue. It is not so very long ago that at a well-known public school, in a class taught by a Frenchman, the boys were allowed to spell every French word they came to instead of pronouncing it; so instead of saying *je suis* they spelt j-e s-u-i-s.

As in most examinations, there are a few candidates very good, a few very bad, while the main body are of average attainments. The chief mis-

takes made by the latter can be grouped under a few heads.

I.—The first lesson they have to learn is the proper division of the syllables. They will *not* begin each syllable with a consonant: this is especially noticeable after an unaccented *e*. Thus, they pronounce *se-ra*, or *ce-lui*, as if spelt *ser-a*, or *cel-ui*. *Demi* is more often than not pronounced *demmi*, which is too like Mr. Mantilini to be correct. In fact, the stress is usually placed, as in English, at the beginning of a word, and the rest of the word slurred over; whereas, in French, the stress should be on the last syllable, or on the last but one if the last is an *e* mute.

II.—The nasal sounds are sometimes fairly correct; but almost invariably a mistake is made in words beginning with *im* or *in* coming before a vowel or another *m* or *n*. For example, *immense*, *innocent*, and *inouï*, are given an incorrect nasal sound.

III.—The rules of liaison are perhaps those most consistently broken, for it requires a great deal of reading at sight to be able to bring in liaison correctly, yet without undue emphasis, while reading at a fairly rapid rate.

IV.—*Ch* and *th* should not present the difficulties that they often do. Words like *monarchique* and *thésée* ought to be pronounced correctly even by students who have not had to pronounce them before.

V.—Another mistake that is easily avoidable is the wrong pronunciation of the feminine of words ending in *ain* or *ein*, which are pronounced too often like their masculine. *e.g.*, *pleine*, *contemporaine*.

VI.—The vowel *a* in the middle of an unknown word is rarely given its proper sound, and *er* is almost invariably pronounced as in English, *e.g.*, *casurne* for *caserne*.

VII.—*Qu* is well known by most to be invariably a “k” sound, but how often is this forgotten in such a word as *squelette* and pronounced *skwellet*?

VIII.—*Au* is another pit-fall in such a word as *Auguste*, where the English “aw” sound is often substituted for the French “o.” *Eu* in *Eu-rope* is rarely right.

IX.—The *u* that is placed after *g* to keep it hard is often pronounced; *e.g.*, *gou-ôpes* for *guôpes*, or *prodigoo-ês* for *prodiguês*.

X.—Other miscellaneous words that are more often than not pronounced wrongly are *Jean* (which is not “Jay-an” or “Gin”); *gagner*, *campagne*, and such *gn* sounds; *aile* (which is not pronounced as *aille*, the present subjunctive of *aller*, but like the English “ale”); *mœurs* (in which the *s* is often left silent).

These errors have been so consistently made in my hearing by candidates for some years past that I trust the foregoing remarks may be of help to them as danger signals.

PEOPLE imagine that experiments in education are unnecessary, and that we can judge from our reason whether anything is good or not. This is a great mistake, and experience teaches us that the results of an experiment are often entirely different from what we expected.—Kant.

A LONG-NEEDED BOOK.¹

THIS is a considerable book, not only from the amount of information which it contains (and there is a great deal, for the print is small), but because it is the first attempt to embody the results of comparative philology in a book of reasonable compass. There is nothing of the sort in existence. Curtius's “Small Greek Grammar” has been long out of date; and grammars on the plan of Brugmann's (in Müller's “Handbücher”) would be quite useless in a school. Teachers have long felt the need of such a book for their own use; and as for boys, whilst the less advanced may ignore the specially philological parts, and use the rest with advantage, the more advanced will find in it everything they want. It will also prove useful to Cambridge men reading for the First Part of the Tripos as reconstituted under the new conditions.

Mr. Thompson has had a difficult task before him. The study of philology is so beset with technicalities, and involves such a mass of detail, that it must have been more than difficult so to present the results as not wholly to mystify the tyro. Yet we believe he has done this. It is true that no one familiar with philological problems and methods can fully realise the effect of this statement upon those who know nothing about them; but it does seem to us that Mr. Thompson has made himself clearly intelligible. In the body of the work he must of course take the principles of sound-change for granted; but any reader who is puzzled by their application, or whose curiosity is excited to learn more, will find them succinctly stated in Appendix III. It is really delightful to examine this appendix, and to see the facts so clearly tabulated and explained, for those who having been driven to acquire their knowledge from German books have been repelled by the clumsy methods of arrangement which tell nothing at all to the eye. In this respect Brugmann himself is a great sinner, and even Giles's “Manual” leaves much to be desired; but here are the main facts in a compass of fourteen pages. For the more serious student it is to be regretted that Mr. Thompson did not deal in the same way with the syntax. He says enough to show that he knows a good deal of comparative syntax, but he does not treat it with anything like the same fulness as he treats the morphology. It must be admitted, however, that such a treatment would have largely increased the bulk of the book.

We may now call attention to a few details. Something should have been said of inscriptions (which are hardly mentioned), and of the history of the alphabet; and it ought to have been made clear that the iota subscript (p. 5) was never used by the Greeks, who wrote it adscript. Clearly, this sound was pronounced when it was written, and it is a pity that Greek books, at least scholars'

¹ “A Greek Grammar Accidence and Syntax for Schools and Colleges.” By John Thompson, M.A., formerly Scholar of Christ's College, Cambridge; Senior Classical Master, the High School, Dublin. xiii. + 494 pp. (Murray.)

books, are all (except Leaf's "Iliad") enslaved to the mediæval convention of the subscript. Similarly, it ought to have been said that the breathings are not classical. Mr. Thompson's account of the smooth breathing (p. 7), as indicating "only the raising of the voice which is necessary for the pronunciation of a vowel when no consonant precedes," is at least debatable; it may represent a "catch" something like that which is heard in some parts of Germany where *r* precedes a vowel, as in *der andere*. A list of the numeral signs of Attic Greek (not the late alphabetic system, but that in which, e.g., Η stands for ΗΕΚΑΤΟΝ) would have been useful. Other interesting points would have been elucidated if Mr. Thompson had included the Alphabet in his book. On p. 44 he implies that *χρυσή* is the contraction of *χρυσέα*, whereas the *η* is due to analogy. (A reference is omitted on this page, line 9 from foot.) It is not quite scientific to say that the augment in a compound verb is sometimes placed before the preposition "by oversight" (p. 115); this happens when the compound is felt by the popular consciousness as a single verb (compare *πείσω*, a prehistoric compound, with *είω*). The author might have pointed out that double augments increase in number in later Greek, e.g., in writers like "Demetrius" and in the papyri; and, as all literary vagaries should be included, we expect to find such forms as Herodas's *δρῶρηκα* mentioned (p. 127). Inscriptions furnish useful illustrations of the *Schema Pindaricum* (p. 229.3). On the same page, the blundered use of dual for plural things, found in Theocritus, might have been mentioned. In the accounts of the Attic calendar (p. 468) Mr. Thompson omits to record the regular type, *δευτέρα, &c. με'εκάδας*, for the last decade of the month, and that the regular word for the fourth of each decade is *τετράς*, not *τετάρη*. But it is inevitable that in the first edition of such a work there should be slips and omissions. Taking it as a whole, we are impressed with its fulness and accuracy, and we predict that it will soon win the public confidence.

MODERN SCHOOL-BUILDINGS AND THEIR EQUIPMENT.¹

IF every practical schoolmaster were free to plan his ideal school, it is certain that the design and equipment of each would differ in some notable respects from those of all the others. For not only will locality, numbers, age, sex, and the social position of the pupils, impose special requirements on their own account, but the type and range of education which has to be imparted—as well as the racial characteristics of the people for whom they are established—will also imply restrictions and demands which cannot be ignored when considering the architectural arrangements of the buildings in almost every detail. In other words, the modern school-building, intended to meet the needs of modern education, is an example of the

particular application of certain general principles, in which appropriate variation and combination of details present a problem of extreme complexity and interest.

How recent and how rapid has been the development of the present forms of our systems of primary and secondary education is perhaps seldom recognised.

The ancient grammar-schools of this country originated mainly in the Tudor period; but, including Eton, Carlisle, and Winchester, they numbered but thirty-five prior to the accession of Henry the Eighth. The dissolution of the monasteries gave a stimulus to the founding of similar establishments, and also furnished in many cases the means of their maintenance. Not a few were founded and endowed by wealthy private individuals; and in all, down to the time of the Civil War, nearly 800 "Grammar School" foundations were created. Their progress and ultimate fate was curiously diverse. Expansion of the details of the originally simple curriculum entailed increased expenses which the diminishing revenues of the original foundations failed in many cases to meet.

Increased facilities of communication materially aided in developing the boarding-house system by which famous and popular establishments attracted pupils from increasing distances, with pecuniary benefit to themselves and to the financial detriment of less successful rivals. In their wake arose the early "Private Adventure" and the "Preparatory" schools—the latter so recent an innovation that none is said to be traceable prior to the accession of Queen Victoria.

The modern type of Elementary School may be said to have had its beginning in the "Lancastrian" schools started on the pupil-teacher system at the end of the eighteenth century. And the modern Board School building is a development of the Ben Johnson School, erected in 1872 after designs by Mr. T. Roger Smith.

The modern Girls' School did not exist at all before 1850, at about which date both the North London Collegiate School and the Cheltenham Ladies' College came into existence. And it was not until after the publication, of the Schools Enquiry Commission in 1867 that a real impetus was given to the provision for girls of educational opportunities in any degree comparable to those open to boys, both in quality and in amount.

Thus it is that, amongst the eighty-five illustrations of various schools which appear in the informing and sumptuous volume compiled by Mr. Francis Clay, there is no example of an English public school—as that term is usually understood—with the single exception of Christ's Hospital on its new site at Horsham. The dignity of age is scarcely compatible with organic reconstruction; and, despite the most ingenious and well-meaning intentions, no modifications of, or additions to, the fabric of the older foundations could really place them in structural plan and treatment on the same utilitarian level as a school of equal size designed and built *ab initio* in accordance with modern educational ideas. As its title indicates, the book

¹ "Modern School-buildings, Elementary and Secondary." By Felix Clay, B.A., Architect. (Batsford.) 25s. net.

was not written for the antiquary. But, for everyone interested in the practical work of education, it teems with information; to the architect and the schoolmaster alike it will prove an invaluable work of reference. Every type of secondary and elementary school is fully illustrated and adequately described. The modern schools, and the more important and characteristic details of their management, of other countries—especially those of Germany and America—are illustrated and described, and their contrasting differences, as compared with British methods, are clearly expounded. Village schools, schools for crippled and for mentally defective children, Poor Law schools, Barrack Schools and Cottage Homes, are also dealt with; their description being, as in the case of all the other types of schools, rendered particularly clear by the aid of plans and examples of the several cases dealt with. And the volume is brought up to date by the reprint, as an appendix, of the rules for planning and fitting up Public Elementary schools, issued by the Board of Education in November of last year.

Within the limits of a single notice it is impossible to do more than indicate some of the subjects appertaining to school planning, construction and fitting which are treated within the 430 pages of this work. But it may be said that, with the help of its excellent index, there is no detail pertinent to its wide range of subjects on which the reader may not gain prompt and trustworthy information; while the bibliographical table of works on schools and their architecture affords the means of prosecuting enquiry into practically every department of the subject.

Mr. Clay treats technical details without technical obscurity; and discusses subjects which are too often viewed controversially with a refreshing and dignified impartiality, while at the same time his conclusions are expressed tersely and with clearness. The numerous illustrations, including many explanatory diagrams, really deserve their name; the type is large, and the printing excellent. A short chapter dealing with the alteration of existing buildings, and of private houses intended to be used as schools, with the cost of schools, and with the care of buildings, contains some valuable information. The remarks as to sites and playgrounds, and as to the details which specially require attention in planning the individual and relative arrangement and proportion of the several parts of each kind of school, are likely to prove extremely useful; and here and there the reader comes across a pregnant sentence which sums up the whole matter in one abiding phrase, as—when dealing with staircases—"The test of a well-planned staircase is the absence of any staircase rules in the school regulations."

The hygienic aspect of school construction and management is adequately and soundly dealt with; and the section relating to ventilation and warming may be referred to as, within its limits, a model essay on the subject—temperate, clear, and eminently useful. In this connection may be mentioned the only serious omission which we have been able to note; serious, indeed, mainly

because indicative of the undeserved indifference with which a common difficulty is almost invariably regarded. Every other department is written of fully and in careful detail; but no word is said of the School Chapel. Yet everyone knows that, while the *general* principles which govern the problems of properly ventilating and warming a building are the same in all cases, their successful application to the Chapel has yet to be exemplified. The architect and the engineer must share the blame for this between them. One is tempted to ask whether this silence on a matter of so much importance is but another example of the too often and too painfully obvious fact that, in the designing, building and management of places of worship, the matter which appears to be considered last and least of all is the bodily health of the congregation?

THE HOUSE OF SELEUCUS.¹

WE offer a hearty welcome to this book, a courageous attempt to throw light on an epoch which is no less obscure than important. The neglect which the subject has met with in the past (the last monograph on the Selenids bearing date 1744) is due partly to the very natural feeling that with Alexander the romance of Greek history comes to its zenith, which detracts from the interest of what followed; and partly to the accident that the chief records of the time have perished. And yet a perusal of this book shows that even the romance of history did not cease with the death of Alexander: the rise of the first Seleucus, and the ups and downs of Antiochus III., not to speak of others, are sufficient to show it for all the scantiness of our material. The material, too, has received not inconsiderable additions of late years from the discovery of inscriptions, and Mr. Bevan has the advantage of the work of many scholars who have studied the period as a whole or small portions of it: Ramsay and P. Gardner in this country; Droysen, Niese, Schürer and others, abroad. Not nearly so much has been discovered or done in this field as in that of the Ptolemaic dynasty, which makes our debt to Mr. Bevan the greater.

To criticise the work fully would be to go into minute detail. Mr. Bevan is not afraid to use his own judgment, whether in combining scattered allusions into one picture or in his view of the accounts given by Polybius and Livy. Many of those points are matters of opinion, many are open to doubt. Thus Mr. Bevan follows ancient tradition perhaps too closely when he regards the Macedonians as "barbarians" who understood Greek—so at least, although he does not use the word, we gather from his introductory chapter. But the Greeks were exclusive in that matter, and the correct view depends largely on the denunciations of Demosthenes, himself by force of circumstances a strong partisan. A suggestion, moreover, that the conical stone may have been meant for the

¹ "The House of Seleucus." By Edwyn Robert Bevan, M.A. With plates and maps. 2 vols. xii. + 330, viii. + 333 pp. (Arnold.) 30s. net.

symbol of a mountain in miniature (i. 226^a) will hardly commend itself to students of primitive culture; or another which connects the Zoroastrian respect for the cow with a desire to support agriculture (i. 260). We may add that the map opposite ii. 75 ought to face the other way for practical use. We do not propose to discuss the various details we have noted, which would be more appropriate to a critical than to a scholastic journal; but we would call attention to the broader lines of the work, which give it a value quite independent of minor criticisms.

One such matter is the relation of the Seleucids to Syria. They are usually thought of as a Syrian dynasty; yet Syria was rather one of several districts which they always aspired to rule than the seat of their empire. They did, in fact, hold it only a brief space, and on Syrian soil suffered more than one serious reverse. But in the person of Antiochus IV. they come into special importance in Jewish history, whilst a critical interpretation of the Book of Daniel shows a large number of references to the dynasty. Again, Mr. Bevan shows much shrewdness in estimating the characters and aims of the personages, and shows how a great kingdom was more than once gained, and might have been consolidated, if the monarch had only been content to gain no more. He is not unsuccessful in his attempt to reconcile the strange inconsistencies of Antiochus III., which were "a puzzle even to his contemporaries." He had physical courage in abundance, like all his house; but lacked political nerve, as shown by "the contrast between the energy with which his earlier political plans and campaigns were carried through and the hesitation, rashness, and puerile trifling of his war with Rome." His energy was one "which shows itself rather in bursts when confronted by an obstacle than in the deliberate and resolute provision of the means towards the end in view, which marks the true practical genius. It is displayed . . . rather in the beginnings of an enterprise, when the difficulties and dangers appear most formidable, and languishes with success. It is the energy of impulse, not of reason." But Mr. Bevan does not fail to point out that at that date no one (except perhaps Hannibal) could have known the latent power of Rome. In the earlier days of his story, Mr. Bevan is often at a loss for material; but where he has material to work on his descriptions are lucid and forcible. We may mention as examples the invasion of Palestine, checked by Ptolemy's defeat of Antiochus, and the capture of Achaeus. The author deserves credit for firmly refusing to fill up gaps out of his own imagination. Nor is Mr. Bevan blind to the practical importance of his work for modern politicians. The discerning reader will see the modern problems of our Indian empire foreshadowed in Asia Minor, and may grasp the supreme importance of the sea.

The reader will see by this time that Mr. Bevan has done a good piece of work, and one that needed doing. It is pleasant to recognise another sign amongst many that English scholars are doing their share of the work of research.

NATURE NOTES FOR MARCH.

By REV. CANON STEWARD, M.A. Oxon.
Principal of Salisbury Training College.

Animal Life.—*N.B.*—*The Wild Birds Protection Acts provide a close time for shooting and taking wild birds from March to August 1st.*

Migration of birds increases; nesting begins with Blackbird, Thrush, Hedge-sparrow, Robin, Rook, Missel-Thrush, and Longtailed Tit, Little Grebe, Owls, Pigeons and Lapwings. The Wheat-ear arrives on Southern downs. In mid-month the Chiffchaff comes, restless and vociferous. Sand Martins, earliest of the Swallow tribe, appear about 28th. Woodcock, Fieldfares and Redwings leave us for the north: Snipe disperse, some remaining to breed. Golden Plovers pass through. Occasionally a Kingfisher may be seen, and the song of the Golden-crested Wren be heard. In spring and autumn some birds, as Crows, Rooks, Herons, Magpies and Starlings, assemble in large numbers and appear to deliberate in solemn council.

On warm days common Snakes and the Tortoises emerge from their winter quarters, and Queen Wasps and Bumble Bees appear. Frogs spawn and Tadpoles are hatched. Garden Spiders are busy spinning.

Entomologists will this month do well to replenish their stock of pins and boxes, killing bottles and breeding cages. The following Lepidoptera may be seen: Brimstone B., green-veined White B., Red Admiral, Small and Great Tortoiseshell, Peacock, Painted Lady B., Clouded Drab M., Light O., Underwing M., Dotted Border M., Tissue M., March M., Early Thorn M., Herald M., Quaker M., Oak Beauty M., and Xylocampa.

Plant Life.—Germination and embryology with microscopic study of tissues may advantageously be proceeded with now.

The following plants may be expected to be found in flower: Buttercup, Daffodil, Whitlow Grass (walls), Ground Ivy, Wood Sorrel, Wood Violet, Marsh Marigold, "Palm" Willows, Wood Anemone, Moschatel, Greater Stitchwort, Cuckoo Flower, Germaner Speedwell, Field Woodrush, Primrose, Cowslip, Thyme-leaved Speedwell, Viola hirta (chalk pastures), Creeping Crowsfoot, Wild Hyacinth, Luzula pilosa, Prunus, Fritillary, and (near Swansea) Draba Aizoides.

The Willow tribe may now be studied, and the species distinguished. The flower may be found: *Salix purpurea* (Norwich); *S. helix*, *S. Lambertiana* (Wilts); *S. Forbyana* (E. Anglia); *S. rubra*, *undulata*, *anydalina*, *stipularis* and *oleifolia*.

All who have access to a barometer should record its movements on a chart, and note the coincidence of phenomena, both before and at the time, in the condition of the atmosphere, and among animal and plant life, especially, perhaps, among birds and insects.

Observant eyes will discover the prevalent direction of the strongest gales in any locality by the form and one-sided growths of the trees, and may be able to determine the points of the compass by the effect of a northern or a southern aspect on plant life; e.g., the colour and growths of moss or lichens on tree trunks or the sides of rocks.

Folk-lore.

March hack ham,

Comes in like a lion, goes out like a lamb.

A peck of March dust is worth a king's ransom.

March'll search ye, April try ye,

May'll tell whether live or die ye.

As many misties in March,

So many frosties in May.

HOW TO MAKE PRACTICAL WORK OF USE TO BIG, LOW FORMS.¹

By E. C. SHERWOOD, M.A.
St. Peter's College, Westminster.

SCIENCE as sometimes taught consists of lectures without any connection with the course of practical work which is carried on at the same time. This plan of teaching is open to many serious drawbacks. To begin with, the boys do not appreciate the practical side of these lectures or the theoretical side of their practical work. Before sending them into the laboratory it is always necessary to give a short lecture on the work to be done, and the time for this has to be taken out of the hour devoted to laboratory work. Moreover, even though the actual experiment is done before the eyes of the boys, and they are compelled to take notes of why and how it is to be done, they do not take it in because they are fidgety for the moment when they may go and begin to work themselves. They have no time to think over and learn their hasty instructions, and they work with one finger, so to speak, on their notes. Question the average boy while he is at an experiment, and he will disclose the most astounding difficulties. After he has been convinced that a particular investigation is desirable, he cannot always see what the experiment has to do with the thing to be found out, or how he has found it out by means of the experiment.

In such a simple experiment as the separation of sand and salt, I have known the boy boil the mixture with water and throw away the filtrate. A boy who had not done this, if suddenly asked "Where's the salt now?" would frequently require time and occasionally assistance to answer.

The weak spot in the method is generally lack of time to make the boy appreciate the significance of the practical work, and the only way to get the time is to contrive the two courses of teaching by so choosing the laboratory experiments that they illustrate the lectures. Since there is no chance on the lecture day of going into the laboratory, the form has to make the best of a bad job and listen to the lesson. My usual course of proceeding on lecture days was as follows: slips of paper were served out, and about eight questions were asked on the prepared work (which was the subject matter of the previous lecture, learned from the notes, the practical work, and a text-book). The slips were then exchanged, the answers corrected, and the marks taken. Any boy who did not get half marks was sent to detention school. It was very seldom necessary to punish a boy in this way. Next the work of the last day in the laboratory was criticised, mistakes were pointed out, and difficulties were explained. Finally, a lesson was given on the new piece of work.

It is here that most of my heuristic teaching is done. The boys are frequently asked to jot down how they intended to attack the particular problem under discussion; more generally my questions are answered orally, one answer often leading on to another. "Next boy! why is that a silly answer?" and so on. The answers given are often very suggestive, though sometimes disheartening. At first the prevalent idea of solving any problem in chemistry was to "heat it very strongly," but such drastic methods gave place to more reasonable ones, under the influence of time and ridicule. As the right way of doing the experiment was arrived at the details of manipulation were written down in pencil. If the experiment was quantitative the results were of course not given, but if it was qualitative it was found necessary to tell the boys what kind of phenomenon to look out for: for

example, if asked to describe the effect of heat on sulphur, they were told to record colour changes and changes in fluidity. If the lesson was on the combustion of various elements in oxygen gas, they were asked to record the vigour and duration of the flame; the colour of the light emitted; and the appearance of the resulting product; its smell; its solubility or otherwise in water; the action of the water solution on litmus. These preliminary notes were taken away, copied out neatly into a book, and learned for preparation ready for the next laboratory day.

When possible each boy does the whole experiment by himself: if this is not possible the boys work in pairs. The objection to their working always in pairs is that it generally ends in one of each pair doing all the work. With a big low form I find it impossible to have sets of boys doing different experiments at the same time: the experiments are therefore limited to those which can be done with the ordinary laboratory apparatus, the disadvantage of this being more than compensated for by the possibility of teaching the form as a whole. Besides the principal experiment which all must make, I find it expedient to set a subsidiary one, so that the boys who work fast may have something to occupy their time, and the sharper boys some practice in the simplest kind of problems. The boys could not conveniently be provided with sets of apparatus each, for their own use, as the required apparatus and materials were set out beforehand on the benches by the bottlewasher. At the end of the lesson it was the duty of each boy to leave the things as far as possible in the state and position in which he found them.

Discipline in a laboratory, where many of the boys are always out of sight, must be very strict. A good punishment to apply to any boy found idling, or prosecuting the kind of original research so dear to boys, and so expensive in materials, is expulsion, for the rest of the lesson, to the duller regions of the lecture-room. I owe it to the form to say that it was very good, and gave me very little trouble in this respect.

The general manipulation of the form having been described, it remains to discuss the aims and object of a first course in science. A great deal has been written and said on the heuristic method of teaching, which means, unless I am mistaken, that the pupil should be put in a position to discover for himself the facts of science. One of the chief doctrines of the method is that you should tell the boy as little as possible. I hope to demonstrate that a truer principle of education is contained in the doctrine that you should make him find out as much as is expedient. The differences between the above two ideals may be studied from the three points of view, the practical, the utilitarian, and the moral.

Firstly, the practical difficulties of the purely heuristic method are enormous. Given unlimited time with a few children of ordinary intelligence, and it may be applied with great success; but a big low form contains from twenty-five to forty boys, whose average intelligence is usually below the normal, and whose interest and industry is often even lower still. Each boy has his own difficulties, and, do what you will, you cannot find time to give him two minutes of undivided attention; therefore, unless you tell him exactly what to do, you give an idle boy a ready-made excuse for doing nothing at all. Send the form into the laboratory to devise the simplest investigation and many of the boys will do nothing, while the others do what they see their immediate neighbours doing. If you doubt the truth of this statement, examine the ordinary text-books written by heuristic teachers for use with their own methods, and you will be convinced that many of their own prophets have to confess something very like failure. One constantly finds the following style: "Smell the gas. Of what does the smell remind you? Does it remind you of rotten eggs?" Or this sort of heading for an experiment, "To find out whether acid and chalk give

¹ Being a Paper read before the Association of Public-school Science Masters, January 17th, 1903.

chalk-gas or not?" It has obviously been found necessary by these teachers to tell the boys what to look for, or they expect nothing, and find out nothing.

Again, in the case of variation in period, as the length of a simple pendulum is altered; the boys are directed to find the periods, square them, divide by the lengths, and notice what they can. They do not discover the law. They have been told what is expedient, and the reason why it is expedient is because the sharpest boy could scarcely be expected to discover the law for himself, let alone the average boy. Really, to place the boys in the position of discoverers ends in *fiasco*. To tell them sufficient to enable them to draw the final conclusion, and call it discovery, is to attempt to keep up an impossible illusion: the boy sees through the humbug at once, and loses his respect for you and his work. Again, owing to the system of promotion in public schools, whereby other subjects often determine the science promotions, your class will contain those who have attended the course before; and almost all the boys are likely to know the result of the supposed experiment before they go into the laboratory; so the investigation becomes a complete farce. It is like hiding a ball for a dog under a chair and not letting it find it till you give the signal. Please remember that I am speaking of a first course of science. I have the very greatest belief in problems for older boys. A heuristic attitude towards all the facts learned, that is, a very clear perception of the connection between the experiment and its result, even though that experiment is not performed, is the true spirit of scientific study. If you limit your teaching to purely heuristic methods in the case of a big low form, progress must of necessity be very slow, and I venture to think an admixture of teaching the work of others in the above spirit will be a real advantage, even at the very beginning.

Secondly, a purely heuristic course is a mistake from the utilitarian point of view, and by that I do not mean the narrow point of view of those who teach a boy nothing but what will be directly useful in his subsequent career. I mean in view of mental qualification for the work he is likely to have to do. If you confine his work in the early stages to rediscovering facts, you are neglecting one side of his mental development altogether, that of scientific reconstructive imagination and memory. On the classical side the training of the imagination and memory has been attempted by the use of *verse-writing* and repetition, and depend upon it, if this side of a boy's nature is neglected his education will suffer. Make him read, think out, and remember historical experiments, and experiments which it is impossible or inexpedient to repeat, and you will give him in his plastic days an extra power which purely heuristic teaching alone does not necessarily give.

Thirdly, there is the moral point of view. Is there any moral virtue in the old-fashioned task? Our forefathers were given pages of the dullest facts to learn by heart, and if that process did a boy any good it gave him perseverance and grit. If we are to make the paths of learning thornless, and avoid anything, however useful, which is a task in the old-fashioned sense of the word, without other educational value, are we not in danger of unfitting the future generations for the strenuous grind which must await them if they are to do anything in the world? The great complaint that many teachers make against the Kindergarten system is that it unfits the children for the serious business of school. We must be careful that school training does not unfit them for the serious business of life. Furthermore, shall we be able to train discoverers of new general laws, which depend on the correlation of numerous and apparently isolated facts, if we do not train them to make their minds encyclopædic as well as critical?

Possibly, I have wandered from the subject to give a general theory of scientific education: let me apply it to the particular

case of a big, low form. Boy is born with a hereditary acceptance of the apparently inevitable, and this must be replaced as soon as possible by a scientific distrust of what others say. The first step towards this is the gaining of the power to observe carefully and describe accurately. I have had no experience in teaching Nature-study, the flora and fauna of Dean's Yard, Westminster, being so strictly limited as to make outdoor work impossible; but I should think it is admirably adapted to training both these faculties. If the science taught is chemistry or physics, as it is with many of us, don't be in too great a hurry at first. Use the first course primarily to teach observation and description, incidentally to give familiarity with the nature and properties of common substances, and the object and application of the easier methods of manipulation. We need not be afraid of making a boy learn a little easy theory, and it is well to take care that he gets a certain amount of historical science which will tax his memory.

Be specially careful to insist on the connection between scientific cause and effect. Then the second course will have the first for its definitions, postulates and axioms, so that problems, real ones, however easy, may be set with some chance of solution by the student, and much of your ordinary teaching will naturally become really and truly heuristic.

PREPARATION OF LANTERN SLIDES.¹

By HAROLD BUSBRIDGE, A.R.I.B.A.

MY intention is to show how diagrams for the lantern may be produced by methods which, being non-photographic, commend themselves to the science teacher of limited means, because of their cheapness, as well as by the ease and rapidity with which such slides may be prepared. Photographs on glass may be made from actual specimens, from book illustrations, or from original drawings; but many teachers have neither the time nor do they possess the knowledge and apparatus necessary to do this themselves, whilst if a skilled photographer be employed the slides become very costly, to say nothing of the delay always incurred in the process, caused by the time required for developing, fixing and printing the transparency.

Mr. Lineham, head of the engineering department of the Goldsmiths' Institute, has made extensive use of diagrams drawn upon smoked glass for illustrating his class lectures, and at his suggestion I tried the method, a good lime-light lantern being provided by the Institute. The process was found so easy of manipulation that my first slides turned out remarkably well, and since then I have made many scores of them with great facility, illustrating a great variety of subjects. In so doing, a few simple methods have occurred to me for obtaining different effects which, although perhaps very trivial in themselves, have nevertheless contributed greatly to the interest of the lessons, and have helped to impress many important truths upon the minds of my students in a pleasant and agreeable manner.

Before describing the method which to me has been the most useful, perhaps it would be well to consider a simple and beautiful means of making slides upon ground glass. For this method we are indebted to Dr. W. H. Dallinger, F.R.S. "On finely ground glass, drawing with a blacklead pencil is as easy as drawing on London board. I get 4-inch squares of glass to suit my lantern, carefully ground on one side like the focusing

¹ From an Address to the Chelsea Conference of Science Teachers, January 10th, 1903, arranged by the London Technical Education Board.

glass of a camera. Now, with the ground side up, the camera lucida may be used with this as well as with a drawing board, if a piece of white paper be placed beneath it." (N.B.—The camera lucida is intended to be used in connection with a microscope.) "For outlining and delicate shading I employ HHH and HHHH pencils; for deep shadows I use HB. By a very delicate employment of the pencil, shadows softer than can be secured by lithography may be made. The camera lucida, of course, is not necessary; we may draw with the hand and eye alone. If it be necessary to put in colour it may be done cleanly and carefully *over* the shading; thus one layer of colour suffices. Now, of course, although we have a perfect drawing

until hard. Slides varnished with mastic require twenty-four hours to dry, but they may be finished for use the same day by employing celluloid or crystal varnish instead of the mastic. Having tried both, I find the crystal varnish is preferable, although still far inferior to mastic. The slides may be finished complete in paper-binding at a cost of about 3d. each, or in metal binders for 3½d. each.

It may now be worth while to describe other methods of obtaining transparent lantern-slides with figures shown by black or coloured lines. An ordinary photographer should be able, for a small charge, to fix, wash, and dry a number of unexposed photographic lantern-plates. Taking one of these, a black line-drawing may now be made upon the clear gelatine film by means of liquid indian-ink. Coloured lines may also be easily obtained by using ordinary red or green writing-ink, or Prussian blue in water, either a drawing pen or a fine steel writing-pen being employed as may be preferred. A blacklead pencil will give very faint lines which are sometimes useful for shading and other effects. The diagram may be bound with a cover-glass as soon as the ink is dry. It is then ready for immediate use. A dozen or two of the plates should be prepared at once; they will then be available for notes or sketches whenever required. These slides should cost, when bound with paper, about 2½d. each, or, with metal binder, about 3½d. each.

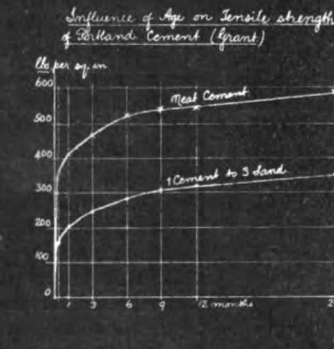
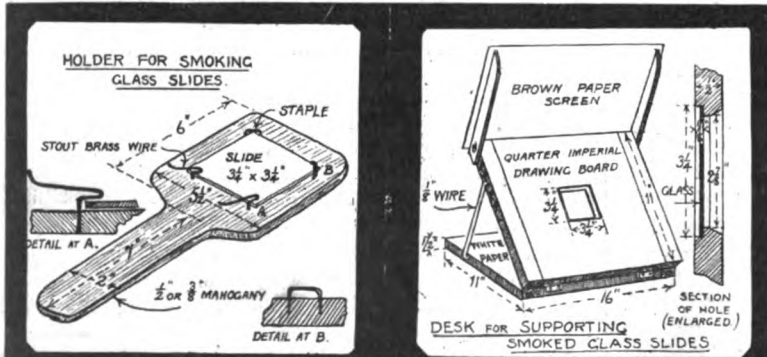
Another useful method of obtaining black lines upon a transparent slide may be here described. Powder some common resin and dissolve in a little warm spirits of turpentine until the solution attains the consistency of thin varnish. A clean piece of glass, 3¼ in. square, is rubbed with a drop or two of this solution until an even coating is obtained, free from streaks. After drying for an hour or two a sketch may be made, either with Indian ink or with a soft pencil, upon the prepared side of the glass, which will be ready for binding as soon as the ink has dried. A clear glass cover is applied to the face of the slide. It may then be finished with either paper or metal binding. The cost of these slides is approximately 1½d. each bound with paper, or

2d. each if bound with metal. Other methods of making slides which show dark lines upon a clear ground are described by Rev. F. C. Lambert in his handbook on "Lantern-Slide Making"; but some of these being more troublesome than those here described, or less adapted to the ordinary requirements of teachers, no further reference need be made to them.

The following method has so many points to recommend it to the science teacher, in spite of its drawbacks, that it has been almost exclusively adopted both by Mr. Lineham and myself for the purpose of illustrating our class teaching. All that is necessary is to obtain an even deposit of soot upon the face of a piece of clear glass 3¼ in. square, and to scratch upon this with a sharp point any sketch or writing that may be desired. In order to smoke the glass, a holder is made of mahogany about ¼ in. thick, and shaped with a handle like a battledore, the wide part of the holder being 6 in. or 8 in. long and 5 in. or 6 in. wide (Fig. 1, No. 1). The edges are well rounded so as not to catch fire easily,

No. 1.

No. 2.



No. 3.

No. 4.

FIG. 1.—The Manufacture of Lantern Slides.
 No. 1. Indian ink on gelatine. No. 2. Pencil on ground glass (crystal varnish).
 No. 3. Pencil on ground glass (crystal varnish).
 No. 4. Smoke on plain glass. (Cover glasses bound with paper lantern-binding.)

of the object, with all the detail accurately given, it is not a transparency. But we can easily make it one. Thin some good pale Canada balsam with benzine to about the consistency of cream, and simply float it over the ground surface of your glass; pour off till the drop comes very sluggishly, then reverse the glass so that the corner from which the balsam was flowing off be placed upwards. Let the return flow reach to about the middle; then reverse it again and move it in several directions to get the balsam level. This may be done with a very little practice so that the surface shall be indistinguishable from glass. We now have a perfect transparency. All that is required is twenty-four hours for hardening (keeping the glass level), and then another square of glass fastened on to it by strips of paper at the edges, with small pieces of card at the corners to prevent contact, and it makes an admirable lantern transparency." In a recent letter, Dr. Dallinger has kindly informed me that instead of the Canada balsam he now uses mastic picture-varnish, painted on with a rather wide brush, the slide being kept flat

and the glass to be smoked is held at the two outer corners by U-shaped staples driven into the wood, the other corners being held by buttons made of stout brass wire, so as to be easily turned by the fingers when it is required to release the plate after having been smoked. The holder, with the plate in position, is held over the flame of an ordinary burner, the plate being at first held some little distance above the flame so as to warm it gradually, and then, after any condensed moisture that may appear has completely evaporated, it is brought close down over the flame so as to receive a thick deposit of soot. The plate should be moved continuously in a horizontal direction so as to receive an even deposit of soot up to the extreme edges. After several seconds' smoking it may be removed from the flame, and when cool, held by the edges and examined by transmitted light. If sufficiently smoked it should appear of a uniformly dark brown tint, but not perfectly black. A brown-coloured film will be much easier to write or draw upon than a perfectly opaque deposit, although it will still be quite dark enough for use in the lantern. If the coating of soot is considered too thin, the slide may be returned to the holder and receive an additional smoking; but a sooty deposit which is too dense will cause the lines drawn upon it to have ragged edges. The cover-glasses made for photographic lantern-slides answer very well for smoking, and these may be obtained in three qualities, viz., thick, medium, and thin, the thick being the cheapest. Now, I always use the thin kind, which may be bought at 7s. per gross. In order to write or draw upon the smoked glass, it must be supported in such a way that it may be seen by transmitted light. A photographer's retouching desk may be used for this purpose, with an opening of quarter-plate size, viz., $4\frac{1}{4}$ in. by $3\frac{1}{2}$ in. The space between the upper edge of the smoked cover-glass and the top edge of the aperture may be blocked up temporarily by gumming a piece of black paper across the opening. My own desk, being home-made, is formed of a pair of small drawing-boards hinged together by their long slides, an opening 3 in. square being cut in the centre of the upper board, and a rebate $3\frac{1}{2}$ in. square and $\frac{1}{2}$ in. deep made to receive the smoked glass. The smoked surface thus falls below the surface of the drawing board (Fig. 1, No. 2).

T and set squares may now be freely used in drawing the diagram without fear of smudging the slide by contact with the smoke-film. The upper board is held at any desired inclination by means of a wood strut hinged to the back of the board at its top end, its lower extremity fitting into a stepped rack on the lower board; or a stout wire stay may be fitted into holes bored into the end of each board. A sheet of white paper placed upon the lower board will reflect sufficient light through the slide, if placed opposite to the window, and one works with greater comfort if the eyes are screened from superfluous direct light by a piece of brown paper pinned to uprights which are fixed to the top of the upper board. The diagram or writing is made by means of a sharp steel point fixed into a wood pen-holder. A piece about 1 inch or $1\frac{1}{2}$ inches long, broken from the end of a lady's glass-headed hat-pin and stuck into a holder, answers admirably, ordinary sewing-needles being too flexible. The hand should rest upon a broad, flat ruler, or upon a T-square blade, whilst writing or drawing, since wherever the glass is touched a white smudge appears which cannot be obliterated. If a mistake occurs the sketch must be begun afresh upon another piece of smoked glass, since there is no means of erasing a false stroke. It is a very great advantage to be able to use T and set squares freely in making these slides, and for this reason I much prefer my drawing-board arrangement to any of the ordinary retouching desks.

At a very early stage I felt the need of being able to get my sketches, at any rate, approximately correct as regards their scale. The solution of the difficulty soon presented itself in the

use of a transparent medium ruled into small squares like the ordinary squared paper used in scientific laboratories. Thin sheets of gelatine were obtained cut to $3\frac{1}{4}$ -inch squares, and these were ruled with coloured inks into squares of $\frac{1}{16}$ inch, $\frac{1}{8}$ inch and $\frac{1}{4}$ inch respectively, ordinary red and green writing-inks and a drawing pen being employed. One of these transparent ruled squares being selected as most appropriate to the intended sketch, it is placed in the rebated aperture of the desk, beneath the smoked slide, and then, by working over the coloured lines, it is very easy to produce a sketch in tolerably correct proportion.

The diagram having been finished, the film of soot must be protected by a glass cover. In order to prevent this from coming in contact with the diagram, I generally stick a strip of gummed lantern-binding round the edges of the cover-glass, which, when dry, is placed upon the inside of a Moore's metal binder, and then the smoked slide is placed face downwards upon this. The edges of the metal binder having been turned down and rubbed smooth, the slide is ready for immediate use. Gummed strips from the edges of postage-stamp sheets, when cut to a width of $\frac{1}{8}$ inch and a length of $13\frac{1}{4}$ inches, answer just as well as the binding strips which are sold ready made. The metal binders cost 12s. per gross, and have the advantage of requiring no time for drying after the slides have been bound. They can also be re-used in the event of breakage or when a slide is done with. A mask of stout paper or thin cardboard may be cut and placed between the smoked glass and the cover, instead of binding the edges of the latter with paper, but I have always found the method first described to be perfectly efficient many of my smoked-glass slides having been used over a dozen times without the least sign of damage to the smoke-film. Slides thus prepared give brilliant white lines of perfect sharpness and even quality upon a dark ground (Fig. 1, No. 4). These slides are so distinct that, if the illumination of the class-room is so arranged as to throw a subdued light upon the students' desks, whilst no direct light is allowed to reach the lantern screen, it is quite easy for students to make careful sketches of the slides when a lime-light or electric lantern is employed. Coloured lines may be obtained by mixing ordinary Prussian blue, red ink or green ink with gum-water and applying to the outside of the smoked slide or its cover-glass by means of a small brush or hand pen. The paint will dry in a few minutes, and the striking results which may be obtained are an ample justification for this rough-and-ready process.

A rather better method of imparting colour to slides, and one which has the merit of permanence and durability, is to employ certain artists' colours ground in oil. None but transparent pigments may be used, the following being the most suitable, viz., crimson lake, Prussian blue, Italian pink, verdigris and burnt sienna. They may be obtained in collapsible metal tubes of most artists' colourmen at about 4d. each. The colours should be thinned with copal varnish and applied with a small brush, either of camel's hair or sable. If the colour works too stiffly, it may be thinned with a little turpentine. The brushes should be rinsed out in turpentine immediately after being used and then wiped dry upon a piece of rag. The oil colours take at least twenty-four hours to get hard, during which time the slides must be kept away from dust. Ordinary photographic slides may be coloured in this way, but a good deal of skill in manipulation and some little experience is required in order to obtain satisfactory results.

Mr. F. W. Rudler, the Curator of the Jermyn-street Museum, once kindly informed me that in colouring photographic slides of geological subjects to illustrate his lectures he always employs the aniline dyes (such as Judson's) dissolved in warm water. They may be obtained either as powders or in sixpenny bottles at most oil and colourmen's.

In many branches of science it is often very desirable to express certain laws, or to show the results of experiments, by means of curve diagrams. For this purpose faintly-ruled horizontal and perpendicular lines are necessary which should be subordinate in their intensity to the curved line which expresses the results. For showing such diagrams upon smoked glass, my practice is to administer a slight preliminary smoking to a square of glass, which is then ruled as required with horizontals and perpendiculars. It next receives a second dose of smoke, and when cool enough the slide is proceeded with and finished in the usual way (Fig. 1, No. 4).

The approximate cost of smoked-glass slides is less than 1½d. if bound with paper, or under 2½d. each when metal bound.

One other method of obtaining white lines upon a dark ground may be described. An ordinary photographic lantern-plate is exposed to light, developed to maximum density, fixed, washed and dried. A steel point is then applied to the gelatine film with sufficient force to scratch completely through the film. The slide may then be bound with a cover-glass, and will show white lines upon a black ground. If the plates have to be developed by a photographer, the method becomes rather expensive, as he would probably charge at least 4s. 6d. per dozen for them, bringing their cost up to 5d. each bound in paper, or 6d. each when metal bound.

From what has been said it will be seen that, in schools or institutions where a small lantern is available, the teacher never need allow his instruction to suffer for want of adequate illustration. By means of a few simple sketches on glass, which need not take more than a few minutes each to prepare, he will be enabled to impart a freshness and originality to his work which will go very far towards enlisting the sympathetic attention of his class.

GEOMETRY AT THE CAMBRIDGE LOCAL EXAMINATIONS OF 1903.

SPECIMEN papers in Geometry (Preliminary and Junior), of the same general character as those that will be set in December, 1903, at the Cambridge Local Examinations, have now been published. They are to be found in the Book of Examination-papers for 1902. These papers will be so useful to mathematical teachers in secondary schools, in showing them how the new schedules for Geometry (published in THE SCHOOL WORLD for December, 1902) are likely to be interpreted by the examiners, that they are here reprinted. Arrangements have been made for the publication, in an early number of this magazine, of an article explaining how the new subjects may best be taught and what books are available for the purpose.

Geometry.—Preliminary.

SPECIMEN PAPERS IN ACCORDANCE WITH SCHEDULE ISSUED FOR 1903.

Candidates can pass in Geometry by doing sufficiently well in Part I. Figures should be drawn accurately with a hard pencil. In the constructions numbered 1, 2, 7, 8, all lines required in the constructions must be clearly shown: but no explanations are required. 2 hours.

PART I.

(1) Draw a straight line 3 inches long, and draw straight lines making angles of 90° and 60° with it at its middle point.

(The set square and protractor are not to be used in answering question 1.)

(2) Construct a parallelogram with sides 8 centimetres and 11 centimetres in length, whose area is equal to that of a square

described on the shorter side; and measure the acute angle of the parallelogram.

(3) Can a straight line be drawn (a) on the surface of a sphere, (b) on the surface of a cylinder?

(4) Prove that, if a triangle has two sides equal, the angles opposite those sides are also equal.

A quadrilateral $ABCD$ has the side AB equal to AD , and CB equal to CD . Shew that two angles of the quadrilateral are equal.

(5) Prove that, if a side of a triangle is produced, the exterior angle is greater than either of the interior opposite angles.

The sides AB , AC of a triangle ABC are equal. Shew that, if D is any point in BC , then AD is less than either of the equal sides.

(6) Prove that the straight lines joining the extremities of two equal and parallel straight lines are either equal and parallel, or else bisect each other.

PART II.

(7) Describe a circle of radius 1·7 inches, and draw a tangent to it from a point distant 3·3 inches from the centre.

(8) Construct a triangle the lengths of whose sides are 7, 10, and 12 centimetres respectively, and find the centre of the circumscribed circle. Measure the radius of this circle.

(9) Prove that, if the sum of the squares described on two sides of a triangle is equal to the square described on the third side, then the angle opposite the third side is a right angle.

Prove that a triangle whose sides are respectively 6, 8, and 10 inches in length is right angled.

If two of the three sides of a right-angled triangle are respectively 5 and 7 inches in length, find the two possible lengths of the third side.

(10) Prove that the straight line drawn at right angles to a diameter of a circle, at an extremity of the diameter, falls without the circle.

Show that all the circles which touch a given straight line at a given point have their centres on a straight line.

Geometry.—Junior.

Candidates can pass in Geometry by doing sufficiently well in Part I. Figures should be drawn accurately with a hard pencil. In the practical questions (1-2 of Part I. and 7-8 of Part II.) candidates are not required to furnish proofs of the validity of the constructions, but all lines required in the constructions must be shown clearly. 2½ hours.

PART I.

(1) Draw an equilateral triangle, and from one vertex draw a perpendicular to the opposite side. Determine by measurement, and express as a decimal, the ratio of the length of this perpendicular to that of a side of the triangle.

(2) Construct the inscribed circle of a triangle the lengths of whose sides are 6, 9, and 12 centimetres.

(3) Prove that, if two triangles have two sides and the included angle of the one equal respectively to two sides and the included angle of the other, the triangles are equal in all respects.

A quadrilateral made of paper is such that, when it is folded along either diagonal, the two parts are exactly superposed. Shew that the quadrilateral has all its sides equal.

(4) Prove that an exterior angle of a triangle is greater than either of the interior opposite angles.

Show that, if a straight line terminated by the sides of a triangle is bisected, no other straight line terminated by the same two sides will be bisected in the same point.

(5) Prove that the angle which an arc of a circle subtends at the centre is double of the angle which the arc subtends at the circumference.

(6) Prove that two of the straight lines joining the extremities of two equal chords of a circle are parallel, and that the other two are equal. When will the pair that are parallel be also equal?

PART II.

(7) Construct a square equal in area to a rectangle the lengths of whose sides are 8 and 5 centimetres respectively.

(8) In a circle whose radius is $2\frac{1}{2}$ inches in length inscribe a regular octagon. In this octagon inscribe a circle. Measure the radius of this circle.

(9) Show how a rectangular figure can be used to illustrate the identity

$$(a-b)^2 = a^2 - 2ab + b^2.$$

(10) Prove that, if two triangles are equiangular to one another, they are similar.

The circumference of one circle passes through the centre O of another; and through A , one of the points of intersection, a diameter AB is drawn to the first meeting the other in C . Show that $AB \cdot AC = 2OC^2$.

(11) Prove that, if an angle of a triangle is bisected by a straight line which cuts the opposite side or that side produced, the ratio of the segments of that side is equal to the ratio of the other sides of the triangle.

(12) Shew that, if ABC is a triangle, and D, E, F are the feet of the perpendiculars from A, B, C , on the opposite sides, then AD, BE, CF , meet in a point.

Show also that, if O is this point, then the rectangles $DO \cdot DA$ and $DE \cdot DF$ are equal.

SUPPLEMENTARY COURSES FOR SCOTTISH SCHOOLS.¹

THEIR Lordships have had under consideration the question of what is the most suitable curriculum of study to be followed in the interval between obtaining the Merit Certificate and leaving school, by those pupils who may be expected to be withdrawn at the minimum age allowed in normal circumstances by the Education (Scotland) Act, 1901.

My Lords are of opinion, from a consideration of the facts, that the tendency—not confined to any one class of school—to make one and the same school with one and the same staff serve many different functions is the weak point of educational organisation in Scotland as compared with that of other countries, with which, in other respects, Scotland might justly challenge comparison, and they are satisfied that increasing division of function, as between different types of schools, is an essential condition of further educational progress. This division of function does not necessarily imply a distinction of higher and lower, but simply a difference of aim and purpose with a corresponding difference in the subjects of instruction. They would accordingly urge, in the case under consideration, that the exceptional pupils for whom instruction in secondary subjects (in languages particularly) is desired, should, wherever possible, be transferred at a sufficiently early age (say before twelve years of age) to schools, whether schools under the Code or secondary schools, in which these subjects form the staple of the curriculum. They recognise that there are many cases, particularly in rural districts, where such transference is difficult or impossible, and they have no desire to limit the freedom of instruction in such cases pro-

vided always that the real interests of the majority of the pupils are not sacrificed to the special requirements of one or two.

The following differentiated lines of work are suggested:—

Preparation for commercial pursuits. (Commercial Course.)

Preparation for manual occupations and trades. (Industrial Course.)

Preparation for rural life. (Course for Rural Schools.)

For Girls—Preparation for domestic duties. (Household Management Course.)

School work has for its end and aim objects more important than preparation in the narrow sense for any particular occupation. It should aim at producing the useful citizen, imbued with a sense of responsibility and of obligation towards the society in which he lives. It should render him—so far as the school can do so—fit in body and alert in mind, and should prepare him for the rational enjoyment of his leisure time, as well as fit him for earning his living. These are ideals, no doubt; but they are ideals towards which the school should constantly strive. It follows that instruction in certain matters of general import should in all cases be combined with, and should even take precedence of, the instruction special to each of the courses of the preceding paragraph. An outline of the subject-matter of this more general instruction is given under the following heads:—

A Study of English.—The main object of this study should be, if possible, to create a taste for good literature. What is wanted for this purpose is chiefly proper direction as to the choice of books for home reading, and an efficient system of reviewing, explaining and testing in school the work so done at home. The committing to memory, after sufficient explanation, of suitable pieces of verse and prose should be a regularly recurring exercise. No time should be wasted on mere routine reading aloud in class, nor should much labour be spent upon the subtleties of grammatical analysis. The books for home reading should *not* be chosen from the literature of the day, nor, on the other hand, should they be too remote in language and sentiment to be easily comprehended by the pupils.

This study should include the systematic teaching of English composition. It is to be presumed that at this stage the pupils have a fair acquaintance with the elementary principles of sentence formation, and attention should now be directed to enabling them to express a given sequence of ideas clearly, logically, and with a due regard to the proportion of the several parts of the composition. For this purpose it is not sufficient merely to give a pupil a subject, and then leave him to his own devices. The effort of composition is considerable in itself, and the pupil should not be distracted at the outset by the additional difficulty of finding material. To begin with, therefore, the subject to be written about should be discussed with the pupils, the several heads of the composition should be selected, and the question of the best order of treatment fully considered. Only gradually should these various helps be withdrawn and the pupil be left, first to make his own arrangement of given heads, and finally to find his own material for composition. For this latter purpose full use should be made of the books prescribed for home reading.

Certain general studies bearing upon matters which it concerns the pupils to know in after life, whatever the occupation followed may be. Under this head may be specified:—(a) The proper care of the body, the value of exercise and of pure air, the proper selection of food, the means of preventing the spread of disease, and various other matters such as might be treated in a slightly extended ambulance course. (b) Such information as to the institutions of government under which we live, the conditions of trade and employment, the history and growth of the Empire, the colonies, and the openings for enterprise which they afford, as will help to make intelligent and patriotic citizens.

¹ Abridged from a circular (C. 374), "Suggestions for Supplementary Courses in Day Schools," issued by the Scotch Education Department on February 16th, 1903.

It is understood that the pupils at this stage will continue to take part, as a rule, in certain exercises common to the school. It may also be found possible to continue certain studies begun at an earlier stage, such as nature-study and drawing.

But, whether in town or in country, whatever the opportunities for collective instruction may be, the distinguishing note of the work of the pupils in the supplementary courses should be individual study directed to practical ends. So far as the acquisition of knowledge is concerned, the object should be, not so much to impart information to the pupil, as to exercise him in obtaining for himself from sources within his reach, and setting out, in an orderly manner, all necessary facts relative to a given topic. Great use may be made of the daily newspaper as a starting point of such investigations. For instance, having made an analysis of the shipping returns for a given port, the pupil may ascertain the general character of its trade; look up in an atlas the various places mentioned in the shipping list; make note of their relative position and distance; gather from school geography, gazetteer, or encyclopedia certain information as to the more important of them; and finally set forth the information obtained in a well digested and orderly form. He may proceed to make a similar investigation for another port, and institute a comparison; or he may be referred to the sources of accurate information as to the total exports and imports of a place and be asked to make an analysis of these over a series of years. Similarly, historical allusions in the leading article, or elsewhere, in the newspaper may be made the occasion for reference to such sources of information as are to be found in the school library, and for a certain amount of collateral reading of authorities, the results of which should be embodied in *précis* form. All this is not matter for formal and regularly recurring lessons in geography or history, but for individual investigation extending over, it may be, several days. The newspaper will also be useful in other ways. Its various articles will afford material for exercise in *précis* writing; difficulties of vocabulary will give occasion for frequent and useful reference to the dictionary: above all, perhaps, the market reports will furnish a body of material for exercises in calculation much superior to the cut-and-dried examples designed to illustrate the rules of a text-book, while their perusal may be made the occasion of acquiring much incidental information of practical value. It is by means such as these that a sense of actuality may be given to the work and a spirit of initiative cultivated in the pupils. But the examples given are not intended as directions to be implicitly followed; it is much more important that individual teachers should exercise their ingenuity in devising for themselves the best means they can for achieving the essential objects aimed at.

The exercises in the preceding paragraph presuppose that every school with a supplementary course will be equipped with a proper set of reference books, *e.g.*, a standard dictionary (etymological), a reference atlas with index, various historical books, including a handbook of European history, a biographical dictionary, a dictionary of dates, and one or more of the comprehensive year-books now issued by various publishers.

It is also highly desirable that such schools should possess a small lending library of carefully selected books of literature.

TEACHERS will be interested to hear that the following additions have been made to the appendices of the Registration Order in Council—viz. (1) To Appendix C has been added: The certificate and diploma in education of the University of Wales. (2) To Appendix D: The course of training for the teaching associateship of the Royal College of Science. It has further been decided that all teachers who begin work in April or May, 1903, will be counted as having completed three years' service for the purposes of the order by March 6th, 1906.

ITEMS OF INTEREST.

GENERAL.

THE Education Bill for London was referred to in the King's speech in the following words: "Proposals will be submitted to you for completing the scheme of educational reform passed last Session by extending and adapting it to the metropolitan area." In all probability the present Technical Education Board of the London County Council will form the nucleus of the new educational authority for London.

THE Education Act, 1902, lays it down that in the appointment of education committees, councils shall provide for the appointment, on the nomination or recommendation, where it appears desirable, of other bodies (including associations of voluntary schools), of persons of experience in education, and of persons acquainted with the needs of the various kinds of schools in the area. In a memorandum issued on February 12th, the Board of Education further interprets the expressions "nomination or recommendation," and "persons of experience in education." This memorandum contains a model scheme for the guidance of councils, and in it the only organisation accorded the right of nomination is the University. It is also explained that the interests which "persons of experience in education" are always to represent include university education, secondary education of boys and girls, technical instruction and commercial and industrial education, and the training of teachers. In view of this explanation by the Board of Education, there seems little likelihood that councils will be allowed to forget the needs of higher and secondary education in their districts. At all events, if they are, it will be the fault of the members of the committee appointed on the recommendation of outside bodies.

THE Council of the Central Guild, who represent the London members of the Teachers' Guild, have passed the following resolution and note: "That in the opinion of this Council no Education Bill for London will be satisfactory which does not provide for the inclusion by Statute on the Statutory Committee or Committees of the Education Authority for London of representatives (men and women) of the University of London and of recognised bodies of teachers, both secondary and elementary, within the area of the county." [*Note.*—Such representatives of educational opinion need not (in the view of the Council of the Central Guild) be members of the associations which they represent, nor be actually engaged in teaching.] The resolution and note have been sent to all members of the Cabinet and to Sir William Anson, also to Sir William Abney, Mr. Morant, and Mr. White, of the Board of Education.

SIR W. ABNEY has accepted the post of Adviser to the Board of Education on matters connected with science. Mr. Grant Ogilvie, Director of the Edinburgh Museum of Science and Art, has been appointed Principal Assistant Secretary of the Board in charge of the division for matters connected with technology and higher education in science and art, and Mr. W. N. Bruce, Assistant Secretary of the Board, is to be promoted to be Principal Assistant Secretary in charge of another division which will be organized to deal with secondary schools.

DURING the past year the Incorporated Association of Assistant-mistresses in Public Secondary Schools has, its report shows, discussed the Registration Order in Council and the Education Bill. Finding that no provision had been made for the direct representation of assistant-mistresses on the Teachers' Registration Council, the Duke of Devonshire was memorialised on the subject. At the last annual meeting the Order was again discussed and the following resolutions adopted: (1) That

this meeting is of opinion that the exclusion in the future, from the Register, of women whose knowledge qualification is of the standard of the Cambridge ordinary degree, such standard being considered sufficient for men, is an anomaly which should be removed. (2) That in the opinion of this meeting it is inadvisable that the words "next preceding" in "during the three years next preceding" in Clause 4 (2) (i.) should be rigidly enforced to the exclusion of otherwise qualified teachers. (3) That this meeting is of opinion that the year of training mentioned in Clause 3 (2) (i. and ii.) might if desired be spent partly in a recognised school under supervision, and partly in a training college. (4) That the salary of a teacher during the probationary year should be that of a fully qualified teacher. The Association sent two delegates to attend the meetings of the Educational Science Section of the British Association. One hundred new members have joined during the past year, and the Association is now represented in about 150 of the most important schools for girls in Great Britain, and it is hoped that other schools will shortly be represented.

WE understand that head and assistant-masters in secondary schools are acting together through their associations to secure the appointment by county councils of persons of experience in education on the new committees. The councils are being approached by circular, and they are urged to remember that knowledge of, and interest in, education are not equivalent to experience in secondary education. Councils have been asked to appoint members upon the joint recommendation of the Incorporated Association of Headmasters and of the Incorporated Association of Assistant-masters.

IN our last issue (p. 71) we referred to the success of Clifton College in the last Sandhurst examination as evidence of the efficiency of at least some of our public schools. Mention might also have been made of the Dover College results at the examinations for the services last July. Nine candidates were sent up, none of them having attempted any public examination previously, or received special tuition beyond that given at the College. All candidates were successful. One obtained first place for Indian Forests, one was fourteenth for Woolwich, and a third forty-first for Sandhurst—which for a school of 150 boys is excellent. The Dover College record of Army successes shows a total of twenty-six candidates in the last five years, of whom all but three passed at the first try direct from the College.

IT seems rather a satire on our civilisation that Mr. Carnegie should be presenting public libraries to London suburbs and unimportant Scottish towns, while the University of the Metropolis has not sufficient funds to house the books it possesses. Those whose business takes them to the University are well aware of the stacks of dust-covered books which litter the floors of many of the rooms. Surely there ought to be a huge library attached to the University, properly fitted, and suited not only to undergraduate but to post-graduate work. What a chance this would be for a man to become as famous as Sir Thomas Bodley! If the right man were appointed as librarian, what hours of useless toil he might save the poor student who, after labouring through a long text-book, finds it unsuited to the work he has in hand. Last month Convocation held an indignation meeting on this subject at the University, but the members were either convinced of the uselessness of protest, or are strangely blind to the real functions of a University, for the necessary quorum of fifty could not be maintained until the end of the debate.

AT a recent meeting of the Derbyshire Dairy Farmers' Association at Derby, the Duke of Devonshire said he did not

know what our educational system, as it had too generally been administered in the past, had done for the advantage of the farmers. They had seen it mainly from this point of view—that it had taken the best and brightest boys and girls from the country districts away to employment in the towns, and that it had done nothing to improve the character of the labour which was still left to them in the country. The education which the children received in rural districts might have been such as to fit the children for occupations in towns, but it had not been such as to make a boy or a girl a better member of the agricultural community. What they wanted was, first, to form the character of the children, to make them honest, industrious, and steadfast; and next, to improve their intelligence so that they might do whatever class of work might fall to their lot in a better and more intelligent manner. The village school which did not have this effect upon the children was not a school conducted as it ought to be.

IN a recent address to the Rochdale Educational Society, Archdeacon Wilson dealt with two important educational problems which will confront teachers and local education authorities under the new Act. The first, far more important than any questions of administration, is the supply of teachers. This problem divides itself, said Archdeacon Wilson, into two parts: how to get the ablest young people to adopt the teaching profession; and how to provide good training for pupil teachers, and good training colleges for King's scholars. As regards the first requirement, we must have many probationers on trial, and pay them enough to keep the ablest and best boys and girls continuing their education, with their eyes on the position of a teacher as a reward. The local educational authority might offer such probationerships to be awarded by the managers after conference with the principal teacher. The next stage is that of pupil teachers, and it seems now to be demonstrated that there is no other source, except the pupil-teacher system, to which to look for a supply of good teachers. The pupil teachers ought to be able to take part fully in some teaching and discipline. The work of pupil teachers in school must be real, though they do not count on the staff. The pupil-teacher centre in a town should include the probationers, and become a large half-time secondary school of the most important kind.

THE second problem with which Archdeacon Wilson dealt was how to make the body of elementary-school teachers more of a profession and less of a trades-union. The main distinction, in his opinion, between a profession and a trades union is that a profession gives every facility for exceptional merit and industry to show itself and win distinction and high salaries; that it detests jealousy of superiority; and that it permits the failures to fail. A profession gives no guarantee, in general, for incompetence. On the other hand, the characteristic aim of an English trade-union seems to be that the number of apprentices must be limited; that all employés should be paid as far as possible alike; that the amount of work should be fixed not too high for the weaker half; and that no one should do more than his neighbour. Elementary education is, on every ground, in its nature, a profession. Should any prevailing opinion among teachers, any regulation proceeding from any source, impose limits on the freedom of teachers to show merit and ability and enthusiasm, such a tone or regulation is inconsistent with the interests of education. The schools will never get the best from the teachers, nor the teachers win the social status to which their education and work entitles them, till they are placed in circumstances which facilitate the professional spirit.

AT the recent Conference arranged by the Froebel Society and the British Child-Study Association, Mr. M. E. Sadler gave

an address on individuality in education and the claims of the State. He said, one of the deeper notes in recent educational thought was the insistence on the social responsibility of the schools, and a tendency to regard the service which schools might render in the bettering of the tone and conditions of a community as being prior in importance to—though, of course, not inconsistent with—the intellectual advancement which they might afford to individual scholars. Ought not those who were likely to have to earn their living by manual labour to be given at school a definite bent and aptitude for skilled craftsmanship, which could be done without any sacrifice of the deeper influence of a liberal training? Ought not the majority of girls to be prepared at school to be homemakers, and to be competent for the upbringing and early education of children? On this point the claim of the State seemed very strong, because it was the claim of the next generation of her citizens. And did we not need to imprint, without teaching men “drum and trumpet” patriotism, a greater sense of national unity on English education? Had the masses of our people any vivid idea of the actual appearance of the different parts of the Empire and of its social and economic opportunities?

SIR FREDERICK BRIDGE, King Edward Professor of Music in the University of London, in his recent inaugural lecture on the place of music in education, claimed for music a place in the scheme of national education. Music is not, he said, merely a thing to be studied for its own sake by specialists, but is worthy of being put side by side with the other subjects included in a liberal education. Music was originally a part of general education as far back as the days of Greek philosophy. The same idea was seen running through the University schemes of the Middle Ages. As late as 1431 music was a compulsory subject for the arts degrees at Oxford, and it was only after about 1500 that special degrees were given in music. About 1650 a new era opened leading to the divorce of professional and amateur music. From that day until recently they found the best practical music cultivated by professionals, whose education had, as a rule, been of a poor description; while amateurs of better general culture had been distinguished more by their love of music than by their efficient knowledge of it.

THE memory of the late Mr. W. H. Austin, whose distinguished career will be familiar to some of our readers, has been suitably perpetuated in his native city. Mr. Austin's education commenced at Jenkins Street Board School, Birmingham, was continued at Five Ways' Grammar School and Mason College of the same city, and completed at Cambridge, where he graduated as Senior Wrangler. A memorial tablet has been erected in the lecture theatre of Birmingham University, where, for the last year or two of his life, Mr. Austin lectured in mathematics. A grave has been purchased, and a memorial stone erected in Lodge Hill cemetery, where he is buried. An Austin Memorial Prize has been founded to be given in perpetuity at the University to the student who shows special proficiency in mathematics; and an annuity has been purchased for the benefit of Mr. Austin's mother.

THE Committee of the Geographical Association, in their annual Report for 1902, record a large increase in the number of members during the past twelve months. While 15 names have been removed from the roll through resignation or neglect to pay subscriptions, 103 new members have been added to it, and the present membership is 278. The members now include teachers of every grade, school inspectors, technical education committees, and others interested in geographical education. The number of members in primary schools and pupil teachers' centres, in Colonial schools and English schools abroad, is steadily increasing.

TWO years ago, Dr. Lunn arranged a Public Schools cruise to the Isles of Greece, and the experiment, which was described briefly in our issue for April, 1901, was a great success. This cruise he is repeating next Easter, and with the exception of one or two single cabins and odd berths the available accommodation has been taken up. Dr. Lunn has also arranged to set apart similarly, up to a certain time, a cruise he has arranged to the North Cape in June, and to the northern capitals of Europe during the summer vacation. This year, too, a series of tours has been arranged to Spain. Mr. George Lunn has spent the winter in Spain, and has made arrangements with the leading hotels which will insure the comfort of those who decide to make this journey.

THE Southampton School Board has sent to all their head-teachers a copy of a recent letter of the Board's medical officer, in which attention is called to the danger of spreading infectious diseases among school children by the indiscriminate use of books and slates. It is recommended that children should be retained as much as possible in the same seats, and that each scholar's place should have separate provision made for his or her own books, slate, &c., which no other scholar should be allowed to use. After the remarks of Mr. Rooper and other inspectors on this subject in official reports, such precautions are very desirable, and it is to be hoped they may prove possible to carry out.

A DEPARTMENT of practical Chinese has been established at the University of London with a branch at Birkbeck Bank Chambers, Chancery Lane, W.C. The department is under the directorship of Mr. George Brown, late H.M. Consul, Kew Kiang, who is assisted by native assistants from Nanking University.

THE *Athenæum* states that a selection from the educational papers of the late Prof. H. L. Withers is to be published. A short biographical sketch will be prefixed to the volume, and perhaps a selection from his correspondence. Any friends who possess letters from the professor on subjects of general interest will confer a favour by sending them to Mr. J. H. Fowler, of Clifton College, who will carefully return them to their owners.

WE have received a copy of the *Mungret Annual* for 1902. The magazine maintains the high character of which we have spoken in former years. It is one of the best school magazines we know.

SCOTTISH.

THE question of the degree to which the chronological study of English literature should be recognised at examinations is, as was pointed out in one of last month's Items, at present engaging the attention of the Scotch Education Department. In criticising there the Department's circular on this subject the statement was made: “Junior pupils last year were asked to state what they knew of Hooker and Jeremy Taylor. Such a question is a direct encouragement to text-book cramming and second-hand knowledge.” It has been pointed out to us that the actual terms of the question do not justify the above summary and that the criticism based on it, therefore, falls to the ground. The original question was: “Name one famous work of each of the following writers, indicating the kind to which it belongs and the approximate date of its appearance: Keats, Pope, Hooker, Dryden, Browning, Jeremy Taylor, Cowper. Give a fuller description of any *one* of the above works.” The question as thus stated is certainly not so objectionable as it was made to appear in last month's crude summary of it; and as one must be just, even to examiners, the *amende honorable* is willingly made. The gravamen of the criticism still holds true, however, that it is only by cramming lists of authors, their works, and dates that

the question could be answered. At the same time it may frankly be admitted, as has frequently been done in these columns, that the Scotch Leaving Certificate papers on the whole are based on the soundest educational principles, and of late years the examinations have had the entire confidence of the teachers of Scotland.

AN important circular has just been issued by the Scotch Education Department giving further details regarding the proposed Commercial and Technical Leaving Certificates. The Commercial Certificate is intended to mark the conclusion of a curriculum specially suited for lads who propose to enter on a business career. Very wisely, the Department does not propose to lay down a rigidly uniform curriculum. Any scheme considered suitable by a local authority will receive favourable consideration, but the Department suggests that in the drawing up of the schemes the educational bodies should consult the local chambers of commerce, upon whose hearty co-operation the success of the scheme will ultimately depend. The only condition laid down by the Department is that the Certificate will only be given in schools in possession of a regularly organised commercial department, the staff, appliances, and curriculum of which have been approved as satisfactory. The Department is also prepared to consider, on parallel lines, proposals for a technical curriculum and a corresponding Technical Leaving Certificate. Here, also, there is no insistence upon a uniform programme, and managers are invited to draw up curricula suited to local needs.

THE latest circular shows the Department in a spirit of sweet reasonableness. Their Lordships state that they have no desire to check local initiative, and are ready to consider any special curriculum which managers may lay before them. If this curriculum serves a definite purpose, is well ordered in its choice of subjects, and is followed as a distinct and separate course by all the pupils of the school, or by a definite section of them, it will receive the Department's approval, and a special Group Certificate will be issued to the successful candidates who are not less than seventeen years of age. This concession will be greatly valued by teachers and managers, and brings to a successful close the long fight for the adequate recognition of modern languages in the curricula of secondary schools.

FROM Lord Balfour's address in Glasgow it is easy to gather what will be the leading features of the coming Education Bill for Scotland. It is to be an Education Bill, not a Higher Education Bill, as the recent deputation of Unionist M.P.'s desired. The present education areas are to be greatly enlarged, and an *ad hoc* authority is to be set up to look after all kinds of education. The Parish Council with strictly limited powers may act as local managers under this education authority. It will be seen that, save in the enlargement of the area of administration, the Scottish Bill is to have no resemblance to the English measure. It will probably be found that Lord Balfour's proposed solution of the educational problems in Scotland may have some influence on the nature of the London Education Bill.

A MEETING convened by the Association of County Councils in Scotland was held in Edinburgh to consider the provisions of the forthcoming Education Bill. After a long sederunt the following resolutions were arrived at: (1) That the six large cities, and in other cases the county, should be the area for higher and technical education, and that the parish and group of parishes should be the area for elementary education. (2) That powers be given the higher education authority to levy a rate not exceeding 1d. in the £. (3) That not less than three-fourths of the members of the higher education authority be

electd from their own members by the county councils, borough councils, or school boards of the area represented. (4) That the local higher education authorities be represented on some central authority for the purpose of providing and controlling training colleges for teachers. (5) That the control of all existing secondary and technical schools should be in the hands of the higher education authority, who might appoint as managers the school board of the area within which the school is situated.

AN interesting ceremony took place at the end of January at Aberdeen, when Dr. Alexander Ogilvie, headmaster of Gordon's College, 1872-1901, was presented with his portrait in oil by the present and former pupils of the college. Dr. Ogilvie is one of a remarkable family of brothers, all of whom attained distinction in the teaching profession, and it is probably a unique circumstance that four of these brothers have had the honorary degree of LL.D. conferred on them. For over a quarter of a century the educational life of Aberdeen has been bound up with the history of Gordon's College. During that period the numbers in attendance have risen from 180 to 3,000. Of course it was only a change in the constitution of the school which made such an increase possible, but without the organising genius and remarkable foresight of Dr. Ogilvie this extraordinary development would have been impossible. Dr. Ogilvie was a pioneer in the field of technical education long before its value was recognised by the country generally. A systematic course of science, drawing and handicraft was then so much of a novelty that many doubted its utility. But Dr. Ogilvie has lived long enough to see his scheme justified by the results in his own institution and adopted as a model by all the great schools in the country.

IRISH.

THE Schoolmasters' Association, as a result of its annual meeting at the end of December, has drawn up two memorials, one of which is addressed to the Intermediate Board and to the Department of Agriculture and Technical Instruction, and the other to the Intermediate Board alone. The first asks that the four stages of the Department's programme may be made to correspond to the four grades of the Intermediate system; in other words, that the Department shall allow a student, if he so wishes, to pass twice in each stage just as the Intermediate Board allows a student to pass twice in each grade; it further asks the Department for more information as to the eligibility of students, the prompt issuing of the scheme for the third and fourth stages in science, and the separation in all stages above the first of science and drawing. The second memorial, among other things, asks for the publication of Pass Lists, with further and complete information as to the number and value of the exhibitions and prizes awarded, and puts forward a strong claim for the rectification of injustice done or likely to be done under present arrangements to Junior Grade exhibitors of 1901.

THE Intermediate Board, consequent upon the refusal of the Treasury to allow the appointment, at present, of permanent inspectors, have temporarily reappointed three of the six inspectors who were engaged last year. The appointment is at best but a makeshift. It was impossible for six men to do the work satisfactorily last year, and it will be still more impossible for three men to do it in any way except perfunctorily in less than half the time. In the few schools in Dublin which have been already inspected for the second time, the work has been very hurriedly done, and very little more seems contemplated than devoting some attention to the weak points discovered last year. May we add that we think an inspector should come with an open mind and prepared to accept as efficient methods which have not perhaps been his own?

THE Dublin and Central Irish Branch of the Teachers' Guild held a large and successful meeting in the Royal University on the 3rd of February, when the Chairman for the year, Mr. W. Haslett, Headmaster of St. Andrew's College, delivered an address on "The Outlook of Intermediate Education." He insisted that never had there been greater need for discussion of educational problems on broad and liberal lines. He proceeded to point out many difficulties in the way of developing the Intermediate system. While admitting the benefit of the general introduction of science teaching, he observed that it might have come before but for the aloofness of the Intermediate Board from the secondary teachers of the country. The many blunders of the Board were a conclusive proof of their amateurism, and the great need of the country at present was the establishment of a comprehensive Education Department to organise and co-ordinate all branches of education. At the same time, Irish secondary education required thorough reform; teachers must be registered and a minimum of requirements and salary insisted upon. For this additional money was necessary, as counting all contributions there was still required a sum of £3 per head to provide the schools with money sufficient for an adequate endowment. This granted, the staffs of the various schools could be made far more competent.

THE Dublin Educational Society held its inaugural meeting at the end of January in order to bring its rules before the public and to elect its officers. It hopes to combine into one large society primary and secondary teachers for the discussion of educational subjects. Its next meeting was held on the 18th of February, when a discussion took place on "What constitutes good school-discipline?"

THE Schoolmistresses' Association have created some stir by announcing that the Board of Trinity College has decided to apply for a King's letter to empower them to admit women. If this be granted, all the advantages of Dublin University will be open to women. There can be little doubt that the application will be successful, but no official statement can naturally be made until such time as His Majesty has replied to the request of the Board.

REGISTRATION in England was bound to be followed by renewed efforts in the same direction in Ireland. It is a pity that the Intermediate Board with public funds at its disposal has not long since effectively used registration as a lever to raise the standard of teaching in Irish schools. At present the Teaching Associations who have especially interested themselves in this question, particularly the Teachers' Guild and the Schoolmistresses' Association, are urging Irish teachers to insert the thin end of the wedge by becoming registered under the English Board of Education, and thereby showing in a practical manner that there is a real demand in Ireland for registration. The only difficulty lies in the question of recognising Irish schools, and this, it is understood, will be solved by an agreement between the Board of Education and the Department of Agriculture and Technical Instruction. Once the principle is admitted, it is hoped we may make rapid progress in raising the teaching profession and bringing about training for all Intermediate teachers.

WELSH.

LORD RENDEL is an adviser to whom Welshmen have good reason to pay attention. Speaking of the Education Act of 1902, he says: Its main effect is "the surrender to the nation of a share in the ownership of voluntary schools. The leaven of public ownership must in time leaven the entire Act. Every Welsh citizen is now a shareholder in every Welsh elementary

school. This share he should by all means take up, whatever the limitations attached to it. . . . Now that, in the partnership created by the Act, Wales finds half the plant and all the working capital, do you suppose that Wales on its own territory will be long or largely outvoted by Anglicanism? . . . I say, then, that it would be pusillanimous to run away from this Act. I trust that Wales will grasp it firmly, and thus capture it. Dual ownership is half-way surrender, and surrender to the rightful owner alone."

THE letter from which the above extracts are taken has not, of course, received the attention which Mr. Lloyd George's manifesto has obtained, but it is, nevertheless, well worthy consideration. For whatever views may be taken of the Education Act, 1902, it should be remembered that Wales is essentially Nonconformist; and although the extreme form of resistance which was threatened is likely now to break down, yet the religious differences are hiding points of great educational importance, which probably Wales will even yet recognise before England. For instance, Mr. Lloyd George suggests that there should be delegated from each County Council to the Welsh Central Board a portion at least of the powers given by the Act "as to making provision for the training of teachers, and as to inspection and general supervision of elementary as well as secondary schools and over all training colleges receiving grants from the Councils." Such a suggestion shows the great possibilities of this measure, when once the religious difficulty is passed over.

At a meeting of Rhyl and Holywell Teachers' Association, attention was drawn to the scale of teachers' salaries, and it was urged that a stand should be made for unifying them. "At present," it was said, "salaries paid to teachers in Flintshire and Denbighshire worked out at about £2 per child; in the Flintshire board-schools the average worked out at £2 1s. 3d. per child; in the voluntary schools at £1 14s. 6d. per child. Compared with this, the average for England and Wales worked out at £2 10s. per head, whilst in Scotland the average is £3 10s." It was urged that the remedy was a uniform scale for the whole country. Certainly such a problem would be a searching one for the Central Welsh Board, if Mr. Lloyd George's suggestion quoted above were carried into effect.

THE Flintshire County Governing Body has passed a resolution to make application for amendments in their scheme, so as to enable the Governors to pay out of their general fund the contributions required by the superannuation scheme of the Central Welsh Board, and also have decided that payments to the superannuation fund be, in the future, made a condition in connection with appointments of teachers in their county schools.

TEACHERS in Wales are quite alive to the importance of representation on the new Education Authorities. Mr. Wm. Lewis, headmaster of the Llanelly County School, has put the matter ably in an article in the *Western Mail*. He concludes: "The general purpose and policy of an education must be fashioned by the committee and must be the result of its collective wisdom. But wisdom can only come as the result of knowledge, and no one can supply the particular knowledge required, at first hand, like the expert.

MR. L. J. ROBERTS has drawn attention in the *Spectator* to the successes of Welsh boys trained in elementary schools at the universities. Of contemporary instances of success, Mr. Roberts gives one of a boy from a board school at Blaenau Festiniog—afterwards at Llandovery School—who took First Class in the Mathematical Final at Oxford, and eventually has won the Senior University Mathematical Scholarship. A second boy was at a

board school at Wrexham, afterwards at the County School, Wrexham, and won a mathematical scholarship at Balliol and was placed in First Class in Mathematical Moderations and has still to take the final school. A third boy—also from a Wrexham board-school and the Wrexham County School—won an open classical scholarship at University College, Oxford. Finally, Mr. Roberts says: "The number of Welshmen educated at elementary schools who have obtained first classes at Oxford or Cambridge is very large (I can think of between thirty and forty), and of those similarly educated who have obtained honours it would be easy to write a list far exceeding a hundred."

CURRENT HISTORY.

IN the first week of January, King Edward was solemnly proclaimed Emperor in India. For those who are more impressed with outward show than with the inner meanings of things, there was abundance, far more, indeed, than was displayed at Westminster last August. The East can easily out-rival the West in glitter. To those of us at a distance, however, there is much food for thought in the reports of the splendid ceremony and of many of its accessories. How impressive, for example, that review of the veterans of the Mutiny, an event now so long ago, as events move nowadays, that it is almost part of ancient history. If it had not been for these and their companions, there might have been no Durbar at all, no pax Britannica, no Emperorship. Perhaps Edward in India is an Emperor in reality, according to the original, mediæval meaning of the word, a king of kings. Great Britain rules in India as no other power has ever ruled there before. The Great Mogul's dominion was not so extensive even in its greatest days. Yet some powers in India are all but independent of us. We control their foreign policy and will not allow gross misconduct on their part. But they are supreme within their limits. We do not own India. Rather are we an Indian power. Edward is Emperor *in*, not *of*, India. There is much difference in these little words.

A RECENT too notorious criminal trial has set some of us thinking about the disadvantages of our boasted "trial by jury." The unanimous verdict of "twelve men in a box" has been regarded by Englishmen in general as the very palladium of our liberties. If we had been like ancient Greeks we should have regarded it as the very gift of the gods, an "image of Diana" fallen from the heavens for our special benefit. Not being so "religious" in our way of thinking, we attribute it vaguely to the wisdom of our early forefathers, and some of us know so little that we see no anachronism in the title of the famous picture, "Alfred Presiding over a British Jury." But what are the facts of the case in relation to the origin of this famous procedure? Our Norman conquerors first accustomed us to the use of "juries" as means of investigating facts such as the evidence for Domesday. Their Angevin successors introduced the "jury" into judicial processes, and the crude beginnings of our modern jury were developed when, owing to our temporal as well as spiritual subjection to the Pope, we were the first nation in Europe to set aside the ordeal in obedience to a decree of a Lateran Council (1216). It took nearly five hundred years to complete the process by which the transformation was completed. Not till the beginning of the eighteenth Century was the last decision given which shaped the jury as we have it to-day.

PERSIA is in a state of decay. She has two neighbours who are by no means in that condition, but, on the contrary, are advancing. In Persia, therefore, they are rivals. One bounds her territory to the north and is advancing, by means of commerce, loans, administration of customs, and the formation of

roads, towards a practical control of Persian administration which *may* end some day in annexation, after passing through the intermediate stage of a formal protectorate. The other bounds her territory to the south, holding, as it does, the peninsula of India, Beluchistan, and the control of the seas. The Indian power has long policed the Persian Gulf. It has put an end there to piracy, and controls, so far as that is possible from the decks of men-of-war, the policy of the petty potentates on both sides of the Gulf. Recent events, however, have reminded the suzerains, Turkish and Persian, of these petty powers that they have interests in this neighbourhood, and the sea power is beginning to regret that it has confined its efforts to salt water. What can a whale do to fight an elephant? We are reminded of the contest between Napoleon and Great Britain. He held the continent: we held the seas. But all our power would have availed nothing for our continental trade if we had not been able to smuggle, nor for our daily food if Napoleon had learnt a little elementary political economy.

THE Austro-Hungarian Empire is composed of many parts, and it has been found possible to keep them united under the Habsburgs only by means of allowing much local government. Specially is this the case with the two parts into which the Empire is divided, "Austria" and Hungary. The first includes all the parts which can by any possibility be called German. The second consists of the territory of the Magyars, a people neither German nor Slav, holding a peculiar geographical and political position in Europe. On them fell the brunt of the Turkish attack in the sixteenth and seventeenth centuries, just when the Habsburg was making good his dynastic claim to their kingship. They hated both. But their hatred was more for the Turk than the Habsburg, and therefore, perforce, they submitted to the Austrian, as the horse in the fable submitted to man. But the alliance has never been a hearty one, and since the Turk became feeble, quarrels have been chronic between the two parts of the Empire. Suddenly, however, an enemy has arisen on the other side. Not by janissaries, but, quite typical of the twentieth century, by the new Tariff Bill of the German Empire, are the interests of Hungary attacked, and the consequence is, as of old, that Habsburg and Magyar have forgotten their differences, settled the *ausgleich* and present a united fiscal front to the new enemy.

RECENT SCHOOL BOOKS AND APPARATUS.

Modern Languages.

A. de Musset, Pierre et Camille. Edited by W. J. Etheridge. viii+103 pp. (Blackie.) 1s.—Though this short story may prove interesting to the student of French literature, it is little suited for use in schools. There is not enough movement, and there is a prevailing note of sadness. The notes are good; many of those bearing on grammar seem superfluous, e.g., the notes on *son* for *sa* (*son âme*), *grand* in compounds. Numerous words which appear in the text are omitted in the vocabulary. Most of them are similar to English words (e.g., *beauté*, *oncle*). Others (e.g., *velours*, *roman*) should have been given.

French Words and Phrases. By J. G. Anderson and F. Storr. viii+114 pp. (Rice.) 1s.—We gladly draw the attention of our readers to the second edition of this useful classified vocabulary, in which French and English words are given in parallel columns. The principal additions are chapter xxiii. (Indoor Games), and chapter xxiv. (Illnesses). In the next

edition it might be a useful innovation to mark the more common words with an asterisk; it might then serve as a guide to teachers, showing which words are of real importance to the beginner.

French Commercial Correspondence. By C. Hauser and W. Mansfield Poole. xiv. + 287 pp. (Murray.) 4s. 6d.—This volume forms the conclusion of the course of "Commercial French" by Poole and Becker, and is in every sense worthy of its predecessor. It would be useless to praise at length these admirable books; no teacher of commercial French will fail to welcome them warmly. We wish we could be confident that they would have a large sale; it would mean another step forward for the "reformers," and would enable our clerks to compete more successfully with the foreigner.

A Primer of Old French. By G. H. Clarke and C. J. Murray. viii. + 109 pp. (Blackie.) 2s. 6d.—It may well be doubted whether this primer was wanted. Ten pages for old French literature and twelve for grammar is too scanty an allowance; metric is touched on here and there, but inadequately. The notes on the extracts are also insufficient. What, the student will ask, is a *rotouenge*? What is a *chanson de geste*? Who was *Boniface* (p. 63)? That the lines are not numbered is also a drawback. As a handbook of the Old French language and literature the book is not to be compared to the *Chrestomathie* of Paris and Langlois.

Naval and Military Episodes. By Aloys Weiss. viii. + 170 pp. (Bell.) 3s.—Dr. Weiss has made an excellent selection of passages dealing with English warfare by land and sea from the days of Marlborough to the Relief of Mafeking. He has compiled a very full and valuable English-German vocabulary, in which the notes are incorporated. The book is printed in clear type, but is not free from misprints (e.g., *verzüglich*, s.v. A1; *Wachsamkeit*, s.v. alertness).

Classics.

Apian Civil Wars. Book I. Edited, with notes and map, by J. L. Strachan-Davidson. vii. + 150 pp. (Clarendon Press.) 3s. 6d.—This book, compiled to meet a temporary want at Oxford, contains little that is new either in text or commentary. The notes are printed at the foot of the page; but, as they are mainly historical, the book could be used in schools. There is an appendix on that perennial problem, the crossing of the Alps.

Cornelius Nepos. Vol. II.: Greek Lives. By H. Wilkinson. xiii. + 134 pp. (Macmillan's Elementary Classics.) 1s. 6d.—Nepos is good reading for small boys, but the text ought to be simplified. This is an unpretending but serviceable little book, and contains all that is necessary.

Longman's Latin Course: Part I., up to and including the Regular Verb, Active and Passive. With copious exercises and vocabularies. 156 pp. (Longmans.) 1s. 6d.—This is a clear and simple book written on much the same plan as the older exercise books; it has the advantage over many of them in the fulness of its exercises. But, like all its tribe, this represents a method which, we believe, will soon be quite superseded, in favour of that which is embodied in Scott and Jones's excellent First Latin Book.

Scriptorum Classicorum Bibliotheca Oxoniensis P. Terentii Africi Comediae. Recognovit brevique adnotatione critica instruxit Robertus Yelverton Tyrrell. Not paged. Paper, 3s.—So much has been learnt of late years as to the Roman metric, that a complete recension of the dramatic literature has been necessary. Plautus has been admirably edited in the Teubner series, but until quite recently the Terence of that series has

presented a very inferior text. Fleckeisen's edition of 1898 is a great advance upon the old stereotyped edition, but there is room for the present volume, which is to be preferred to the Teubner. The useful *apparatus criticus* is placed at the foot of the page, and Prof. Tyrrell has included in it only those readings which are important. For Terence, the number is comparatively small, owing to the supreme excellence of one MS., the Bembinus. Select readings are included from the inferior MSS., and what is important from the commentary of Donatus. The lines are numbered continuously, the old numbering by act and scene finds a place at the top of the page. We can recommend this book.

A Persi Flacci et D. Junii Juvenalis Saturae. Cum additamentis Bodleianis recognovit brevique adnotatione critica instruxit S. G. Owen. Not paged. Paper, 2s. 6d., cloth, 3s., India paper, 4s.—We would also offer a welcome to the edition of the two Roman satirists in a handy volume. Scholars will find it advisable to purchase this because it includes the new fragments of Juvenal, discovered lately at Oxford, which are here placed after vi. 365. The introduction gives a succinct account of the MSS. and criticism of the authors. The plan followed is the same as in others of the same series. Indices of proper names are added. In Juv. vi. 132, the first letter of *tulit* has fallen out.

The Poems of Ovid: Selections. Edited by C. W. Bain. xiv. + 461 pp. Illustrated: with Vocabulary. (New York: the Macmillan Company.) 6s.—This is a useful book, and if it were less cumbersome might be cordially recommended for school use. But it weighs nearly 1½ lbs. Why not print it on thinner paper, and put the pictures on plates, if needs must? Why not omit the vocabulary, which seems to be a kind of fetish with transatlantic editors? We could also happily dispense with the marginal summary in ugly black type. The selection is made from the *Metamorphoses*, as well as the *Elegiacs*. Special features of the book are: (1) a series of passages for sight reading, in which most of the unfamiliar words are explained at the foot; and (2) lists of etymologically connected words. The book is a good reader for beginners.

Homer, Odyssey XIX.-XXIV. With Introduction, Notes, and Table of Homeric Forms. By W. W. Merry, D.D. 112 + 100 pp. (Clarendon Press.) 3s.—Dr. Merry as an editor of Homer needs no bush, and this little edition is admirable. It follows fittingly on the editor's larger work published two years ago. We should have liked a plan of the Homeric house, but if we lose that we are at least spared Reichel and his preposterous armour.

A First Greek Reader. By R. A. A. Beresford and R. N. Douglas. 134 pp. (Blackie.) 2s.—Besides the pictures, this book has little to recommend it. The sentences are too much at haphazard. Moreover, the editors do not know the difference between aorist and imperfect; thus: aor. for impf., Part I., xi. 1., xvi. 6, xix, 1, 2, etc.; impf. for aor., Part II., xii. 12, xxi. 4. They think the present tense represents perfected action, xvii. 2, 3, 4. Other choice flowers from this parterre are: *οὐ* for *μή*, pp. 32, 36; *οὐχ ἥσσον* for "no fewer," pp. 35, 42; impf. in obl. representing present in recta, pp. 36, 69; *ἐνόμισον αὐτὸν ὡς ἀποθάνοντα*, p. 38; *εἰ δυνήσεται* for *ἐάν δύνηται*, p. 38; *ἔρε* for *ἐπέε*, p. 38; *τῶν δυστυχῶν ἀνθρώπων*, p. 52, where there is no definition, but an implied statement.

Geography.

Stanford's Compendium of Geography and Travel. (New Issue.) *Europe, Vol. II., The North-West.* By G. G. Chisholm, M.A., B.Sc. 758 pp. Maps and Illustrations. (Stanford.) 15s.—This volume completes the new series of this

well-known work, and comprises chapters on the Low Countries, the British Isles, and Scandinavia. Needless to say, in the able hands of Mr. Chisholm it is well up to the level of the preceding volumes. To the teacher it is an indispensable book of reference; to the geographer it is an invaluable monograph on the European North-West; to the student who is preparing for,



Ben Nevis.

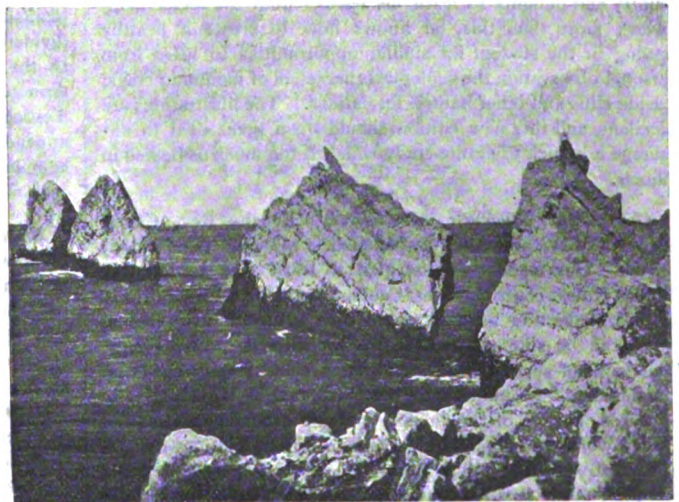
[G. W. Wilson, Photo.]

say, a scholarship at one of the universities, it is a perfect storehouse of material for up-to-date English essays or historical disquisitions. The aim of the book as avowed in the preface is "to show to some extent how geographical conditions have effected the course of history," and that this aim has been carried out may be surmised from those portions of the book dealing with the population of England, its agriculture, mining and smelting, manufactures, foreign commerce and shipping from *Domesday* to 1800. And although much of this is bound to be, and indeed is, history, it is history strongly tinged, as it ought to be, with geography, while the more geographical aspect is conspicuous under such subjects as physical conformation and features, climate, natural products, towns and industries. Accompanying the texts are 16 maps and 86 photo-illustrations. The maps are all good, and it is difficult to single out any as of special excellence. We would, however, refer the curious in matters cartographical to the intricate geological map of Great Britain on p. 74, with its accurate colour registers, the tell-tale density study of South Scotland and North England on p. 270, and the striking delineation of Norwegian fjords and skerries on p. 676. On the other hand, the illustrations—though in some cases works of art—are of variable quality and poor selection, nor do they always illustrate. In the two shown herewith, one, viz., the Needles, is *à propos* to its text, which is treating of chalk and the thin band that runs through the middle of the Isle of Wight; but the other, Ben Nevis, might be inserted just as appropriately in a dozen places other than the page it undeniably adorns. We feel that some direct reference in the text, or, better still, some explanatory sub-title, is needed to show why it is where it is. Moreover, the photographs are unequally reproduced. One of Bristol is "foggy" in the extreme; this might stand—we have known Bristol *foggy*—but there are quite a number of others rendered unpleasant to the eye by reason of curious skies, "faked" to look natural, but dismally failing therein. There is a touch of such a monstrosity in the view of the

Needles, p. 100; there is much more than a touch on pages 21, 241, 447, 456, and 687. Altogether we do not think that the illustrations are as good as they ought to be. They are not bad on the whole, but they do not attain the level of the text. And it is a high level that Mr. Chisholm sets in the text. Whether he is discoursing of gaps in the chalk or the causes of free trade, of Bielefeld "Irish" linen, or the abnormal increase of population in England from 1811-1821, of how the land question arose in Ireland, and how the trouble might be alleviated if not entirely removed, or of why England no longer makes wine when she might if she wished, his facts are always accurately and carefully set forth and his conclusions judicial in their impartiality. For these reasons, if for nothing else—if the pictures were bad, which they are not, and if there were no maps at all—we cordially recommend the book alike to the general reader and the professed geographer or historian.

Descriptive Geography from Original Sources. Africa. By F. D. and A. J. Herbertson. xl. + 264 pp. (Black.) 2s.—This series of geographical anthologies is efficiently well known and appreciated to need no more than a passing comment. We welcome the appearance of the present volume, which is in no way inferior to its predecessors.

Africa. By L. W. Lyde, M.A. 138 pp. (Black.) 1s. 4d.—One of the "Elementary Geography Reader" series. The authorship is in itself a testimony to the value of this book as a scientific exposition of the geography of the continent. It is copiously illustrated, and most of the pictures are excellent. One more favourable word: topics such as diamond-



The Needles.

cutting, wine-growing, and the like are excluded. This is as it should be: the sphere of geography needs restriction in this respect.

Science and Technology.

Light for Students. By Edwin Edser. 574 pp. (Macmillan.) 6s.—It is impossible to speak too highly of this new text-book on Light, which, as stated in the preface, has been written to meet the requirements of students who wish to obtain

an accurate and comprehensive knowledge of geometrical and physical optics. Although no knowledge of the calculus is required, the subject is treated in a complete manner, and the volume will fully meet the needs of students reading up to the standard of the Final B.Sc. of London University. The subject matter is well up to date; in several chapters the results of recent researches are described, and problems which have appeared difficult in earlier text-books are, in several cases, handled with novel simplicity. The first portion of the book is devoted to geometrical optics, in which photometry and intrinsic luminosity, lenses, and the eye receive particularly able treatment. This is followed by an extensive chapter on vibrations and waves, which forms the introduction to a complete development of the wave theory of light; in this portion of the book the treatment of polarisation is most attractive. The illustrations, 306 in number, are reproduced from diagrams and photographs; practically all of these are original and deserve unstinted praise both for their clearness and their explanatory power. About seventy experiments are described, most of which can readily be carried out with the simplest apparatus. We have no hesitation in predicting that this volume will at once become a recognised text-book on Light for all university and technical-school students.

Open-Air Studies in Geology. By Grenville A. J. Cole. xii. + 322 pp. (Griffin.) 8s. 6d.—We are glad to find that this delightful book has reached a second edition. Prof. Cole is widely known as an enthusiastic out-door geologist, and he possesses the secret of writing in a manner to impart his enthusiasm to his readers. The book throughout is convincing proof of the delights of practical study in the fresh air, and serves admirably to show how much more real is geological information gained by a direct appeal to nature than that which comes from the mere study of original memoirs. The fact is that Prof. Cole loves the country and delights to learn his lessons from the rocks themselves; more than this, he knows how to create a healthy craving in the student for similar opportunities to learn from personal observation the geological characters of mountain crags, seaside cliffs and other natural formations. The illustrations are excellent, and this new edition should do a great deal to encourage a branch of nature-study which is too much neglected in schools.

The Nature-Student's Note Book. By the Rev. Canon Steward, M.A., and Alice E. Mitchell. 152 pp. (Constable.) 2s. net.—Our readers will be glad to learn that the monthly Nature Notes, contributed by Canon Steward to THE SCHOOL WORLD, have now been reprinted in a compact little volume which can be slipped into the pocket without inconvenience. The value of such a *vade-mecum* on a country walk needs no emphasising. In addition to the "Notes" as they originally appeared, Part I. of the volume contains sections on farm and garden work, astronomical observations, lists of injurious insects, a summary of the Wild Birds' Protection Acts, and other features; while Part II. consists of useful tables for the classification of our native animals and plants. Alternate pages of Part I. are left blank for memoranda. The book may be cordially recommended to all nature students.

An Introduction to Celestial Mechanics. By F. R. Moulton, Ph.D. xv. + 384 pp. (New York: the Macmillan Company.) 14s. net.—The great gap which has hitherto existed between mathematical works on celestial mechanics and the popular books on astronomy has doubtless deterred many competent students from pursuing this fascinating branch of science. Happily, in this new work we have a text-book which gives the best possible introduction to the higher departments of celestial mechanics, and one, moreover, which is so comprehensive that

if the student goes no further he will have obtained an excellent grasp of the whole subject. Needless to say, the analytical treatment can only be followed by those who have had the necessary mathematical training, but the author has spared no effort to make the study as simple and interesting as possible. Beginning with a general account of the laws of motion, the student is led by easy stages to the consideration of central forces, the potential and attraction of bodies, the problems of two and three bodies, perturbations, and the theory of the determination of parabolic and elliptic orbits. The sequence of subjects is perfectly natural, and the reasoning is never wanting in clearness. The book gains much in interest by the brief historical notices, bibliographies, and exercises appended to each section, and by the introduction of a few pages on the maintenance of the sun's heat and the temperature of meteors. To those who may desire to get a sound knowledge of the methods of investigation employed in celestial mechanics we heartily recommend Dr. Moulton's book.

Life and Health: a Text-book on Physiology for High Schools, Academies and Normal Schools. By Albert F. Blaisdell, M.D. vi. + 346 pp. (Ginn.) 4s. 6d.—A notable feature of this book is the large number of simple experiments which are described. Most of these may easily be performed by elementary students. The structure and functions of the human body are clearly explained, and the application of physiological principles to personal health is well brought out. The volume is attractively printed, and the 170 illustrations are uniformly excellent. The book may be cordially recommended to the notice of teachers.

Electrical Problems for Engineering Students. By W. L. Hooper and R. T. Wells. 170 pp. (Ginn.) 6s.—This book will be extremely useful to advanced students in electrical engineering. The problems are of a highly practical character, and brief paragraphs, in which the various formulæ are explained, are frequently inserted in the text. The book is divided into twenty-six chapters, of which the later are devoted to the following subjects: Alternating Currents, Impedance, Armatures, Winding of Armatures, Reactions, Transformers, Testing of Dynamos, Transmission of Power, &c., &c. An appendix contains a Wire Table and the answers (including a complete set of the curves required in the problems involving such diagrams).

Elementary Manual on Steam and the Steam Engine. By Andrew Jamieson. xii. + 330 pp. (Griffin.) 3s. 6d.—As this is a ninth edition it is obvious that the book has been favourably received both by teachers and students. It is impossible to deal with such an important matter as steam boilers in the short space of nine pages, and, therefore, only the merest outline is given. With this exception, the opportunities afforded by various editions have been utilised to bring the subject-matter up to date. A large number of exercises is given, but the answers to these are in some cases misleading. Thus, on p. 319 a result given as 3,070,000, should be at least ten times greater.

Mathematics.

Elementary Geometry. By J. Elliott. xii. + 268 pp. (Swan Sonnenschein.) 4s.—The author of this book deserves hearty congratulations. It is no farrago hastily thrown together to catch the prevailing boom, but a carefully composed course, tested by five years' actual trial in the Cardiff Intermediate School, with the results repeatedly judged by independent examiners. Every line of Mr. Elliott's preface deserves to be studied by all who are interested in mathematical teaching; and the mark of a practical and experienced schoolmaster is on every page of the book. Its contents, which form a substitute for Euclid I.-IV., are arranged in sections, each fairly complete

in itself, so as to admit of a change of order, if desired. But the order could hardly be improved upon. Thus, after an introduction, we have: II., angles and parallels; III., triangles and parallelograms; IV., inequalities; V.-IX. circles; X.-XII. areas; XIII. polygons, and XIV. miscellaneous; followed by three useful appendices. The text is, with very slight exceptions, extremely clear and simple; and it may be specially noticed that Mr. Elliott has been led by his own experience to adopt, almost throughout, a detailed rhetorical style of demonstration, without any abbreviations. Most teachers, we fancy, will agree that, for schoolboys at any rate, this is the proper course. What seems to the adult mind cumbrous and wearisome detail is not so to the young beginner; thoroughness is the great thing at the commencement, and a boy soon learns how to shorten a proof, when once he has fully grasped it. Again, Mr. Elliott has wisely refrained from introducing certain types of proof, which, though brief and elegant, fail to appeal to the mind of the schoolboy, who either learns them by heart, or else, on trying to reproduce them, gives a vague and imperfect outline. The price of the book is high, and the typography not first-class; an improvement in both respects would be a benefit, for this is a true schoolbook, as the author intended it to be, suitable for boys as well as for their masters. It should be added that the exercises are numerous, and mostly quite easy.

Elementary Geometry. Books I.-IV. By W. M. Baker and A. A. Bourne. xxviii. + 272 pp. (Bell.) 3s.—This is written on the lines recommended by the Mathematical Association Committee, and will be useful in the hands of a skilled teacher. But considered as a class-book, or as a guide to an inexperienced master, it is not free from deficiencies. For example, there is no index; the term "secant" appears to be introduced without previous definition, while "reflex angle" is not sufficiently explained. Various unnecessary assumptions are tacitly made; for instance, that two circles, or a line and a circle, cannot meet in more than two points. Again, the style in which the demonstrations are expressed is more like that expected from university undergraduates than what is natural or even intelligible to young boys. The authors expressly say that the problems are intended to form a practical course; yet they hardly give a single construction as it would appear on a practical draughtsman's paper. Finally, the chapter on graphs is meagre in the extreme; there is only one figure, and this merely illustrates the definitions of "ordinate" and "abscissa." On the other hand, the exercises appear to have been carefully chosen, and the introductory chapter on experimental geometry is fairly satisfactory.

Geometrical Drawing and Design. Adapted to the requirements of the Board of Education. By J. H. Spanton. x. + 244 pp. (Macmillan.) 2s. 6d.—Pages 1-125 deal with problems of plane geometry; 126-182 with the elements of orthogonal projection; and the rest with design. The contents appear to be very well selected, the figures are numerous, and the explanations given are clear. On pages 33, 34, it should have been stated that the constructions there given are only approximate. Part II. is unusually good so far as it goes. It is so important in a book of this kind to have nothing but good examples of design that some of the weaker ones might be omitted with advantage (e.g., Figs. 332, 363, 381, and others). But most of them are good; and the plan of stating the origin of those derived from actual buildings, &c., is very commendable. Mr. Spanton's book thoroughly deserves a trial, and will, we think, prove an unqualified success.

Philips' New Unrivalled Table Book. 64 pp. (Philip.) 1d.—A cheap and useful compilation. It includes the tables of the metric system, practical electric units, and the mariner's compass.

Dynamics of Rotation. By A. M. Worthington, C.B., F.R.S. xvi. + 164 pp. Fourth Edition. (Longmans.) 4s. 6d.—It is almost superfluous to recommend a work which has reached its fourth edition in eleven years, but it is fair to take this opportunity of saying that Prof. Worthington's little book deserves its popularity. In an elementary way, and without unsoundness, he gives as much of the theory of angular momentum as can really be appreciated without advanced mathematical knowledge; even the mystery of centrifugal couples is elucidated, and the elementary theory of the gyroscope given in a form which is not misleading. More real dynamics can be learnt from this book than from many more pretentious treatises.

Miscellaneous.

The Encyclopædia Britannica. The Sixth of the New Volumes, being Vol. xxx. of the complete work. xv. + 845 pp. K-MOR. (*Black* and *The Times*.)—From the many important articles in this volume, which is of the same valuable character as previous volumes, we select for mention those on legal education, libraries, light, liquefaction of gases, limnology, logic, magic, magnetism, magneto-optics, malaria, mammalia, mathematical instruments, measuring instruments (electric), metallo-graphy, metal work (art), metaphysics, meteorology, and the moon. The biographies range from Count Kainsky, Australian statesman, to P. P. Morton, American politician, and among those which teachers may find interesting are Louis Kossuth, Lord Kelvin, Lord Leighton, M. de Lesseps, J. R. Lowell, President McKinley, Dr. Martineau, Count von Moltke, and William Morris. As we have remarked before, the geographical articles alone make the new volumes an essential addition to the library of every school where teachers are encouraged to consult standard works of reference rather than be limited by the horizon of the text-book. In the present volume, there are useful and trustworthy papers on Kafiristan, Kashmir, Korea, Liverpool, London, Madagascar, Madras Presidency, Malay Archipelago, Manchester, Mexico, and many other places, each of them full of detail capable of being used in the geography lesson. Mr. Augustus Birrell contributes an introductory essay on modern conditions of literary production, in which he takes an optimistic view of authors and readers as regards the influence and emoluments of the former, and the appreciation of thoughtful works by the latter. The large sale of the new volumes of the Encyclopædia indicates at least an interest in something better than ephemeral literature, and gives reason for believing that intellectual progress, though slow, is real. Teachers who can obtain the new volumes should do so, and the complete set should be regarded as essential to the equipment of a secondary school.

The Public Schools Year-Book, 1903. 526 pp. (Swan Sonnenschein.) 2s. 6d.—This well-known book of reference has reached its fourteenth year of publication and is more useful than ever. It contains, concisely expressed, all the information about the public schools of the country likely to be of interest to parents, schoolmasters, and boys. Having been again subjected to a careful revision, it may confidently be recommended as an indispensable book for those persons who are actively engaged in education.

The Education Act, 1902, with Notes. By Montague Barlow and H. Macan. viii. + 188 + (12) pp. (London: Butterworth.)—This book is conveniently divided into three parts: the first of these supplies a short summary of so much of the existing law as remains in force; the second explains briefly the provisions of the new Education Act, and offers useful suggestions as to what should be done during the transition period; the concluding part contains the text of the Act itself, together with the

schedules. Mr. Barlow is mainly responsible for the legal portion of the book, and Mr. Macan for the parts dealing with financial considerations and the suggestions for local authorities as to what exactly to do while the new Act is being put into working order. Mr. Macan's wide experience of English education will rightly inspire confidence, and we have no doubt his suggestions will prove very helpful. The book should have a wide circulation.

Local Education Manual for Borough and Urban Councils. By Charles E. Baker. xv. + 180 pp. (Black.) 5s. net.—The idea of this book is, by offering practical suggestions, to assist borough and district councils in the discharge of their new duties in connection with the new Act. Not only does the volume contain the Education Act, 1902—with notes on the various sections—but also the text of the Board of Education Act, 1899, and the various Education Acts from 1870 up to last year. The author's personal experience of educational administration should prove of assistance to school managers and others who come to his book for help.

Avenues to Health. By Eustace H. Miles, M.A. xx. + 432 pp. (Sonnenschein.) 4s. 6d.—“This book is intended to give a popular education on the easiest avenues to health, both physical and mental.” It consists mainly of the author's views of different health cures, and of his experiences in testing nearly all the methods advocated. Numerous authorities are quoted, and a vast amount of time and labour must have been expended in obtaining the valuable information. There are sixty-four chapters treating on every matter relating to health and exercise. The chapters on drugs, apparatus, mental basis, will and concentration, general exercise, muscular relaxation, and over-work and hurry, contain many points of great importance. Altogether this book is worthy of careful perusal by all who wish to study the physiology of health.

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 Use of Hard Pencils in Practical Geometry.

I OBSERVE in your February number a letter from Professor Bryan protesting against the use of hard pencils in examinations. May I be allowed to point out that there are many degrees of hardness, and also many different qualities of lead. The lines drawn with a hard pencil are not necessarily faint. I have by me a Faber's HH, which makes a perfectly visible line on ordinary white paper. It might be possible for the Cambridge Local Authorities to supply pencils of a suitable degree of hardness for use in their examinations.

From the teacher's point of view, the chief merit of the hard pencil is that it remains sharp for a long time in the hands of the average clumsy boy. Its chief defect is that its marks are not easily rubbed out. In the hands of a neat draughtsman a soft pencil may be preferable, particularly when the work has to be inked in afterwards; but for ordinary practical geometry, as distinct from geometrical drawing, and for work which has to be done entirely in pencil, I have no doubt as to the superiority of the hard pencil.

Eton.

W. D. EGGAR.

Current Criticisms of English Education.

As the recent criticism upon the educational equipment of our officers has led to numerous articles in the papers and elsewhere against English public-school education, I should like to call attention to one or two points which seem to be little understood by the ordinary parent. I believe quite nine out of ten parents who send their boys to public schools think that there will be no serious attempt made to educate them. “Of course,” they say, “we do not expect our boys at a public school to learn anything that will be useful to them afterwards,” and these parents have a vague idea that we in England stand quite alone in this matter, that the monkish fossils who control public-school education refuse to budge out of the groove that was ruled for them five hundred years ago. If their boy lived in France or Germany they think that it would be quite different, and that he would learn at school “something that would be useful to him afterwards.”

It is a thousand pities that journalists ever foster this notion; it does an immense amount of harm. We cannot expect our educational systems to move with the times unless the public understand the mere A, B, C, of the matter. The principles that underlie education are and must be always the same. The subjects chosen as a means for training a boy's faculties are not chosen with a view to his mastering and retaining a knowledge of those actual subjects; and thus, whether the teacher makes use of scientific or classical instruments of education, the end aimed at is precisely the same, the training of the faculties, not the mastering of subjects, the power of acquiring and using knowledge, not the accumulation of data. It cannot be too often driven into folks' heads that men of science far more than scholars are insistent on this principle. The worst form of education in a scientific man's eyes would be to let a boy loose before his faculties were trained to do practical experiments in a laboratory.

This is not a question of opinion, it is not a point on which experts are divided; but of course, when writers talk about “the uselessness of monkish Latin,” and so on, it is to this “commercial” idea of education that they are pandering. What parents have in their minds when they talk of the advantages of a modern over a classical education is that a boy should acquire at school some knowledge—of a foreign language, for instance—which of itself shall be of actual commercial value, which shall command a price in the market, if need be, the moment the boy leaves. French and German together, from this point of view, are worth nineteen shillings a week without board and lodging. Female labour competes here. A knowledge of bricklaying or carpentering is far more “useful” than either of them from this commercial standpoint.

“We may talk as we please, but we must not think foolishly,” as Dr. Johnson said when discussing this very question. If we only think for a moment, we shall see how utterly ridiculous this “commercial” idea of education is. In modern life, the different spheres in which money can be earned grow more innumerable and complex, and the work to be done in each of them grows more crystallised, specialised, and peculiar, every day. How can boys be collected and educated in a mass in such a manner as to fit each one of them into one of these many million pigeon-holes where money can be earned? It is obvious that the only thing that can give our services a commercial value in one of these pigeon-holes is experience in it, and the extent to which we profit by that experience can never depend on our special knowledge before we go into it, but on our innate powers and the way they have been developed.

T. PELLATT.

Dumford House, Langton-Matravers,
Wareham.

Co-Education.

COULD you oblige me with information as to books published on Co-education of girls and boys?

Our school will probably become a mixed one, and I am anxious to see other views before the final step is taken. Perhaps, if you cannot do this, some of your contributors could do so. I should prefer English experience if possible.

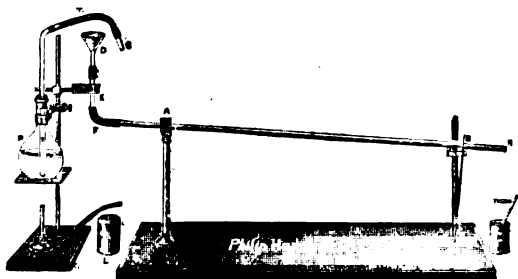
A REGULAR SUBSCRIBER.

"Co-education." A series of essays by various authors. Edited by Alice Woods. With an introduction by Michael E. Sadler. (Longmans.) 3s. net. Several papers have appeared in recent years; among them will be found useful: The Rev. Cecil Grant, Headmaster of Keswick School, contributes articles on the subject to the "Special Reports," edited by Mr. M. E. Sadler, and to *The Record of Technical and Secondary Education*, October, 1901. The Rev. Canon Rawnsley read a paper on the "National Import of Co-education," at the North of England Conference of Teachers, in Manchester, in January last. Dr. Cecil Reddie refers to the subject in his book, "Abbotsholme" (George Allen). Our correspondent will doubtless obtain useful guidance by communicating with the headmasters of the following schools, which are conducted upon co-education lines: Ashton-in-Makerfield Grammar School, Lancs.; Bakewell Grammar School; Bedales School, Petersfield; Cartmel Grammar School, Grange-over-Sands; Hinckley Grammar School; King Alfred's School, Hampstead; Upholland Grammar School, Wigan; The Friends' Schools at Wigton, Saffron Walden, Rawden, near Leeds, and Pénketh, near Warrington; West Heath School, Hampstead; Ruskin School, Hunstanton; Lady Barn School, Withington, Manchester; Chippenham County School: Winscombe School, Somerset; Lymm School, Cheshire; and Leek High School. The headmasters of the numerous higher-grade schools throughout the country would be able to supply valuable assistance.

If any of our readers can be of further assistance to our correspondent we should be glad.—EDITORS.

A Simple Extensometer and Thermal Diffusivity Apparatus.

IN common, I presume, with many other science teachers, I have felt for a long time the want of a good, cheap apparatus for measuring the coefficients of expansion of metals. I have at length succeeded in having manufactured, from my own designs, an instrument that I find to be in every respect satisfactory, and to give consistent and trustworthy results, even in the hands of first year's students; and a brief description of it may be of interest to the readers of THE SCHOOL WORLD.



The accompanying plate shows the apparatus ready for use. The metal tube A B is connected, by means of a piece of rubber tubing F, to a short length of glass tubing E, held in a clamp attached to a retort stand. Another short length of rubber, at the upper end of E, allows the insertion of the funnel D, or of the steam jet C, as may be required. F is an ordinary glass flask, with heat delivery tube, for the steam supply. Metal pins

pass through the expansible tube at A and B; the pin at A is rigidly held in the brass fork shown in the plate; and the pin at B presses against the shorter arm of the lever; so that any change of length in A B will be accompanied by a proportionate movement of the indicating needle along the scale.

In making an observation, the funnel D is inserted, and cold water is passed through the tube from the tin L to M; at the same time the thermometer is inserted in the open end H, and the temperature and scale reading are noted. D is then withdrawn and C is inserted, allowing a current of steam to pass through. After some time the steam will be seen issuing from H; the temperature and scale reading are then again recorded. When this has been done, C is removed, D inserted, cold water again passed through, and the temperature and scale reading once more recorded, so as to obtain the contraction coefficient.

The arms of the lever being respectively ten inches and one inch, and the length A B one metre, the calculation is always very simple.

EXAMPLE.

Observations with a brass tube:—

First scale reading	...	...	3.74 cms.
Temperature of cold water at H	...	...	14.4 C.
Temperature of steam at H	...	...	99.6 C.
Second scale reading	...	...	5.34 cms.
Temperature of cold water at H	...	...	16.8 C.
Third scale reading	...	...	3.78 cms.

Calculation:

Expansion of 100 cms. for 85.2 C. = $\frac{1}{10} \times 1.60$ cms.

„ „ 1 cm. for 1° C. = $\frac{.00160}{85.2} = .0000187$.

Contracting of 100 cms. for 82.8 C. = $\frac{1}{10} \times 1.56$ cms.

„ „ 1 cm. for 1° C. = $\frac{.00156}{82.8} = .0000188$.

Comparison of Calorific Diffusivities.—In using the apparatus as an extensometer, it will be observed that, with the same supply of heat to the steam generator, tubes of different materials require appreciably different times to elapse between inserting the jet C, and obtaining a visible delivery of steam at H. These differences are due to the different conducting powers and thermal capacities of the substances.

To examine the differences more minutely, pellets of wax are affixed to the tube at intervals of about 10 cms., between A and B, and the time of melting of the successive pellets is recorded; the times are then plotted as ordinates, the abscissæ being any convenient scale of equal parts. The tube A B is then replaced by another of different material, and a second set of numbers is obtained. As paraffin wax melts at about 50° C., these observations can be easily made while waiting for the steam to issue at H in the expansion experiment. A series of curves is thus obtained, and, when they are traced on a common sheet, the differences between them can be due only to differences in the thermal conductivities and capacities of the metals.

The apparatus is manufactured solely by Messrs. Philip Harris and Co., Birmingham and Dublin, and is sold, with one expansion tube, at £1 5s.; additional tubes of various metals can be supplied at market price.

JAMES COMERTON.

Christian Brothers' College, Cork.

Galvanometers for School Laboratories.

THERE is a statement in the article on the above subject to which it seems desirable to direct attention. The incandescent electric lamp is the most perfect illuminant for galvanometer work if one only knows how to use it, and no one who has had practical experience with it would recommend paraffin oil.

When in Taunton, I devised an inexpensive laboratory arrangement, taking ordinary 16-C.P. lamps, which gave the

"full moon" without the least trouble, and I have seen something very similar in many other laboratories.

I think that Mr. Hadley might also have dwelt more fully on the advantages of translucent over opaque screens.

C. J. LEAPER.

City of Galway Technical Institute.

I HAVE often regretted that the application of the electric incandescent lamp to galvanometer work has always appeared to be disappointing—quite recently I formed the same opinion in the case of the largest and most modern physical laboratory in this country. The usual method of application is to focus one of the filaments of the lamp on the screen, thus giving a narrow bright line, which is not nearly so conspicuous as a dark line across an illuminated circle. I have also seen an arrangement in which the galvanometer is permanently fixed below the bench, and the scale is translucent and fixed flush with the bench top; such a method may be convenient for senior students, but it has no teaching value in the case of junior students.

If Mr. Leaper would give details of the method which has proved satisfactory, the information would prove useful to many of your readers.

Kidderminster.

H. E. HADLEY.

PRIZE COMPETITION.

Result of No. 16.—Most Popular School-Books in English Grammar and Composition.

IN this competition we offered two prizes of books, one of the published value of a guinea, the other of half-a-guinea, for the two lists of six text-books of English grammar and composition now in use in schools, which were by those taking part in the competition considered to be the most popular. The following six books have received most votes, and it is interesting to remark that the seventh book on the list polled many fewer votes than the sixth.

FINAL LIST.

- (1) "Manual of English Grammar and Composition." By J. C. Nesfield. (Macmillan.) 2s. 6d.
- (2) "A New Grammar of the English Tongue." By J. M. D. Meiklejohn. (Holden.) 2s. 6d.
- (3) "The Elements of English Grammar." By A. S. West. (Cambridge University Press.) 2s. 6d.
- (4) "English Grammar, Past and Present." By J. C. Nesfield. (Macmillan.) 4s. 6d.
- (5) "The English Language: its Grammar, History, and Literature." By J. M. D. Meiklejohn. (Holden.) 4s. 6d.
- (6) "English Grammar, including Grammatical Analysis." By C. P. Mason. (Bell.) 3s. 6d.

Two books tied for the seventh place, viz., "The English Language: its History and Structure," by W. H. Low (Clive), 3s. 6d.; and "English Grammar Primer," by Rev. R. Morris (Macmillan), 1s. Two books also obtained the same number of votes for the eighth place, viz., "English Grammar and Analysis," by W. Davidson and J. C. Alcock (Allman), 2s.; and "The Oxford and Cambridge Grammar," by the Rev. C. Brooke (Gill), 1s. Forty books in all were named in the lists sent in.

The first prize is awarded to

W. H. Dann,
Kenilworth,
Ryde, I. W.,

for the following list containing four books occurring in the final selection arranged in an order which more nearly approaches that given above than any other list received.

- "Manual of English Grammar and Composition." By J. C. Nesfield. (Macmillan.) 2s. 6d.
 "Elements of English Grammar." By A. S. West. (Camb. Univ. Press.) 2s. 6d.

"The English Language: its Grammar, History, and Literature." By J. M. D. Meiklejohn. (Holden.) 4s. 6d.

"Elementary Lessons in Historical English." By Rev. R. Morris, revised by Bradley. (Macmillan.) 2s. 6d.

"English Grammar, including Grammatical Analysis." By C. P. Mason. (Bell.) 3s. 6d.

"The English Language: its History and Structure." By W. H. Low. (Clive.) 3s. 6d.

The second prize goes to

Arthur Ruddlesden,
City Technical School,
Bath,

who also named four of the most popular books, but the order in which they were named does not approximate so closely to the result of the voting as Mr. Dann's list.

Edith H. Haines, Priory of Our Lady of Good Counsel, Hayward's Heath; E. W. Hurst, Newbury House, Bishop's Stortford; Mary Shaw, Brixton Hill, S.W.; and J. Yates, School of Science, Kidderminster, each named four of the winning books, but their arrangement was not so near that of the final list as in the case of the prize winners.

No. 17.—Most Popular School-Books in Arithmetic.

Which six text-books of Arithmetic are most widely used in schools at the present time? Answers to this question are required in the competition for this month. Each competitor must send a list of the titles, &c., of six books on Arithmetic that he considers are the most popular ones now in use in schools.

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

We offer two prizes of books, one of the published value of a guinea, the other of half-a-guinea, to be selected from the catalogue of Messrs. Macmillan and Co., Limited. The prizes will be given for the two lists which most resemble that drawn up as a result of the voting of the competitors.

In naming a book, its title, author, publisher and price should be given. Each list of books sent in must be accompanied by a coupon printed on page v., though a reader may send in more than one list provided each has a coupon attached. Replies must reach the Editors of THE SCHOOL WORLD, St. Martin's Street, London, W.C., on or before Monday, March 16th, 1903. The decision of the Editors in this, as in all competitions, is final.

The result will be published in the April number, when the successful list will be published.

The School World.

A Monthly Magazine of Educational Work and Progress.

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. 52.

APRIL, 1903.

SIXPENCE.

THE EDUCATION ACT, 1902,

IN ITS RELATION TO SECONDARY SCHOOLS.

By R. P. SCOTT, LL.D.

Headmaster of Parmiter's School, Victoria Park, N.E.
Joint Hon. Sec. of the Incorporated Association of
Headmasters.

IN discussing the question, "How can public, proprietary, and private schools make the most of the new Act," it is assumed throughout the following remarks that, unless forbidden by the context, the word "school" denotes "secondary school" in one or other of its types.

For elementary schools ample and definite provision is made in the Act. These have, moreover, acquired during the past thirty years a known and important relation to the State and to local authorities. It is, therefore, with no idea of minimising the importance of these schools that the above limitation is adopted in the following considerations. A further reason for such restriction may be found in the fact that, while the Act is both definite and detailed as to the elementary school system, as regards secondary education a complete secondary system is not even contemplated, and the provisions bearing upon secondary schools are vague and cast in general terms. In fact, as regards secondary education, the Act is like an imperfectly inflated balloon of which we can just make out the lines indicating the divisions, and determine its dimensions. To the Board of Education and to local education committees conjointly has been committed by Parliament the task of inflating it, of giving the machine buoyancy and directing its course. Again, it is necessary for purposes of definiteness to state what is meant by the terms "public," "proprietary," and "private" respectively, in connection with secondary schools, since each of these divisions has many interests in common and at certain points seems to shade off into its neighbours.

By a "public secondary school" is meant a school which is administered under a definite form of public or corporate control, *i.e.*, it must be administered by a representative or other governing body of a public character, under a scheme of the Charity Commission, or under some other

special instrument of like effect, or under such conditions that the permanence of the school as a secondary school is practically assured; the Governing Body must, by its constitution, have the power both to appoint and to dismiss the headmaster, must have a substantial interest in the school, and be in a position to control the finances. Under this head fall in general the public schools, the grammar schools, and the secondary day-schools attached to technical institutes. Moreover, it seems proper to include also such proprietary schools as Marlborough, Clifton, Blackheath, &c., in which the proprietors receive no dividend; to these may be added the schools of the City Companies, Mercers', Grocers', Brewers', &c. The schools have no legal obligation towards their local education committees, their accounts cannot be called for by such committees; nor can the schools be compelled to submit to inspection, but as the committees will in the future be able to accord them either recognition or aid, it may be conjectured that this legal right to stand outside the system will not in general be widely exercised. With these preliminary assumptions we may proceed to consider:

(1) The powers and duties relating to secondary education appertaining to local education committees under the Education Act.

(2) The means which secondary schools of the various kinds named above must take if they are to benefit by the new Act.

It must at the outset be noted that not only are school boards superseded by the new local authorities, but also the Technical Instruction Acts, "stock, lock, and barrel," are swept away.

From an educational point of view, this means, if the new Act be wisely administered, the abolition of the wasteful overlapping which has existed in some county boroughs. A certain amount of overlapping must always exist, and is even beneficial; but when one local authority is responsible for all the schools of an area it is less likely to impoverish one type of school in order to encourage another. The Act expressly contemplates this abolition of unnecessary and wasteful rivalry, for almost the first duty of the authority is to "take such steps as may seem to them desirable, after consultation with the Board of Education, to promote the general co-ordination of all forms of education." [2, iii.]

It is, no doubt, largely with this special end in view that the Act prescribes in detail the components of the local education committees, which are to contain "persons of experience in education, and persons acquainted with the needs of the various kinds of schools in the area for which the council acts." [17 (3), b.]

Another duty cast upon the authority—and one which has not yet received the attention which its importance deserves—is, they "shall consider the educational needs of their area" [2 (1)], and the object of this "consideration" is set out in the following section, which enacts that "A council, in exercising their powers under this Part of the Act [*i.e.*, Part II., Higher Education], shall have regard to any existing supply of *efficient* schools or colleges, and to any steps already taken for the purposes of higher education under the Technical Instruction Acts, 1889 and 1891." [2 (2).]

It need hardly be said that the words in italics, "shall have regard," constitute an obligation enforceable at law, and the term "efficient" as here used will need a legal as well as an administrative interpretation. It is submitted that each local authority, in order to define its duties under the phrase, "have due regard," under this section, should begin its work by a survey, or general inspection, of all existing schools and colleges, whether public, proprietary, or private, within its area, and it can hardly be doubted that all schools and institutions which claim any substantial connection with the area would gladly submit to the survey in such manner as the authority might determine. Without such a survey the authority would find itself unable to devise any effective method of co-ordination of schools and institutions, unable to stop wasteful overlapping, and therefore unable to perform its duties under the Act to which it owes its existence.

An instance of the effect of a survey may be given. In 1892, the London County Council preceded the institution of a Technical Education Board by a survey of the educational provision of London for the purposes of the Technical Instruction Act. The matter was entrusted to Mr. Llewellyn Smith, who systematically and thoroughly surveyed (with consent) the institutions concerned. The good results far exceeded anything that could have been expected: forgotten trusts were brought to light, scholarship foundations which had fallen almost into desuetude were put once more into beneficent use; schools and institutions which were decaying through neglect and inadequate resources were, at no very great expense, invigorated and linked together in an intelligible system based upon a sense of unity. In a word, since Mr. Llewellyn Smith's survey, and largely as an outcome of it, the educational parochialism of London, which was overwhelming ten years ago, has disappeared almost entirely. It should be added that this Report, drawn up, as it was, by a master of the art of marshalling facts and statistics, contained further a reasoned plan upon which the higher education of London should

be developed. The document has served as a guide to the singularly able secretary, Dr. Garnett, and to its devoted one-time chairman, Mr. Sidney Webb; and the result is a striking testimony to the value of ascertaining the facts before taking action. If other local authorities are wise, they will follow this example; and if teachers are wide-awake, this is the first point which they will unite to force upon the attention of education committees.

There is a further reason for concentrating preliminary attention on a survey: none of the local authorities have sufficient funds at their disposal to launch out into lavish expenditure on secondary or higher education. In county boroughs, it is true, there is an unlimited power as to rating, but at a time when taxes are so high, it is unlikely that for such purposes there will be any heavy call upon the ratepayers. The county rate is limited to twopence in the pound, "or such higher rate as the county council, with the consent of the Local Government Board, may fix." [2, iii.] But as regards both counties and county boroughs the provision and maintenance of secondary and higher education is permissive merely, and with the increased rate necessitated by elementary education under the Act, it may be surmised that secondary education at first will not benefit greatly under the Act.

Turning, then, to the manner in which existing secondary schools of all kinds may make the most of opportunities which the wise working of the Act undoubtedly affords, we find it clear that the first step to be taken is for secondary teachers to endeavour, singly and collectively, by approaching the county or borough councils, to obtain a local education committee so constituted as to contain persons who know the conditions of the efficiency of a school, *e.g.*, persons who can interpret the report of an inspector, and can distinguish in such reports between matters which are of the greatest, and those which are of minor importance.

When this committee is once constituted, the next step for schools should be to place before its members the necessity and the use of a survey of the educational resources of the area. In this matter private schools seem specially concerned. The Act gives them a legal safeguard, but if the safeguard be not made effective, they will be the first to suffer in ill-considered action on the part of the committee.

It is obvious, however, that no school is safeguarded by the Act unless it is, in the words of the Act, "efficient," and this is a term which fortunately is easy of interpretation. Under the Board of Education Act, 1899, the Board is given the power to inspect such schools as may apply, and to give them a certificate of efficiency: this like privilege is extended by the same Act to such other inspecting bodies as the Board may approve, after taking the advice of its Consultative Committee. Thus, the means of securing a declaration as to efficiency is by way of inspection, and it would be wise for every school which desires to be safeguarded to apply for some approved form of in-

spection. It may be added that the cost of this is about 2s. per pupil, and application should be made to the Secretary, Board of Education, South Kensington; or to Dr. Keynes (Syndicate Buildings, Cambridge); or to Mr. H. T. Gerrans (Merton Street, Oxford); or to Dr. R. D. Roberts (University of London, South Kensington). The College of Preceptors (Bloomsbury Square) has also started a scheme of inspection, but its inspections have not yet the approval of the Board: the scheme is quite as thorough as any of the foregoing: its recognition is only a matter of time, and this scheme serves the useful purpose of showing the nature of an inspection conducted with less delay and with equal thoroughness. Inspection of a less thorough kind than the above is used by the Board of Education to determine whether a school shall be "recognised" for the purpose of the registration of teachers on Column B.

It will further become necessary for schools which desire to have their interests safeguarded by local authorities to employ "registered" teachers, teachers, that is, who are on Column B of the Register: for this purpose two qualifications are necessary, viz., first, that the teacher has for three years belonged to a recognised (*i.e.*, inspected) school, and secondly, that he possesses a certificate of sufficient attainment as set forth in the Order of Council for the Registration of Teachers (particulars as to such qualifications can be obtained from Mr. G. W. Rundall, Registrar, 49, Parliament Street, Westminster). It cannot be doubted that a local education committee will, as one of its first duties, compile for its area two lists which will be circulated throughout the area, and will soon begin seriously to affect those whose names do not appear thereon. The first list will be the list of local efficient schools; the second, the list of teachers registered on Column B.

The last thing, therefore, which remains to be done by governing bodies and by principals is to see that the school and as many of the teachers as possible appear on the local lists, since absence therefrom, whether in case of school or teacher, will presently come to be regarded as a token of inefficiency.

Holiday Courses in Modern Languages.—The Board of Education have just issued a list of eighteen holiday courses which will be held on the Continent at different times during the present year, but mostly in the summer months. Four of the courses are in Germany, viz., Greifswald, Jena, Kiel and Marburg; three in Switzerland, viz., Geneva, Lausanne, and Neuchatel; one is in Spain, viz., Santander; and the rest are in France, viz., Tours, Honfleur, Paris, Grenoble, Nancy, Villerville-sur-Mer, Caen, Lisieux and Douai. The paper issued by the Board of Education gives the date of each course, the fees, return fares from London, lowest cost of boarding, principal subjects of instruction, address of local secretary and other details of importance to intending students. Copies of the paper can be obtained free on application to the Board of Education Library, St. Stephen's House, Cannon Row, Whitehall, S.W.

GEOMETRY AT THE CAMBRIDGE LOCAL EXAMINATIONS, 1903.

THE PREPARATION OF CANDIDATES IN THE SUBJECTS OF THE NEW SYLLABUS.

By RUPERT DEAKIN, M.A.

Headmaster of King Edward's School, Stourbridge.

THE teaching of Euclid has for many years been viewed with growing disfavour in England. Teachers have found it difficult to get their pupils to understand Euclid's methods of reasoning. Pupils have shed bitter tears over learning propositions that were not understood, and practical men have grumbled because boys who had learnt geometry from Euclid's pages knew so little that was really useful to them. But although there was this large body of discontented people, schoolmasters were obliged to teach Euclid's Elements because their pupils were required to pass examinations in which a certain amount of geometry was prescribed and examined by Euclid's standards. According to Mr. Gerrans, examiners did not alter their syllabuses because they were afraid that teachers would not approve of the change. And thus Euclid remained in English schools long after it had been superseded in other countries.

The year 1902 will be remembered as that in which there was a general movement in England to reform the teaching of elementary geometry. Special committees of the Mathematical and British Associations presented reports urging certain alterations. The Incorporated Associations of Headmasters and of Assistant-masters both advocated similar reforms, and a committee appointed by the Cambridge University Syndicate for conducting examinations advised the alteration of the syllabuses for geometry in the preliminary and junior local examinations. The University of Oxford made geometry an optional subject in its junior local examinations, a student being able to pass in mathematics if he passes in arithmetic and algebra. Most teachers will think this a mistake, and Cambridge seems to have adopted the better plan. According to the regulations for the Cambridge local examinations for junior students, a candidate is still required to pass in both Euclid and algebra to satisfy in mathematics. He may, however, pass in either subject alone and count the marks gained in it; but in that case he is not considered to have passed in the mathematical section.

A detailed schedule for geometry as required in the Cambridge local preliminary and junior examinations has been issued,¹ as well as specimen papers.² This schedule divides each examination into two parts, and each part is again divided into practical geometry and theoretical geometry. Students can pass by doing sufficiently well in Part I.; but it is

¹ See THE SCHOOL WORLD, December, 1902.

² See THE SCHOOL WORLD, March, 1903.

to be noticed that they must take questions both in practical and in theoretical geometry. In the specimen papers no distinction is made between the questions; but at the head of the paper the practical questions are said to be 1-2 of Part I. and 7-8 of Part II. It will, therefore, be advisable for teachers to tell their pupils that they must attempt at least one of these four questions, or they will run a great risk of failing.

Turning to the practical geometry, it is to be noticed that "candidates are not expected to furnish proofs of the validity of the construction, but all lines required in the constructions must be shown clearly." A note in the schedule says: "For the practical geometry, teachers are recommended to make use of some work on geometrical drawing." There are many good books on geometrical drawing, but they have mostly been written with a view to the requirements of the examinations held by the Board of Education, or for Army and Navy candidates. The best text-book for the Cambridge locals, so far as I know, is "Practical Geometry," by J. Carroll (Burns & Oates, 1s. 6d.). It is well arranged, can be used with Euclid's theorems, and has a series of papers for home work. "Geometrical Drawing," by W. H. Blythe (Cambridge University Press, 2s. 6d.), is a good book, and well printed. All teachers who send in pupils for the Cambridge locals ought to see it, for it defines exactly how much knowledge is expected from preliminary and junior candidates in geometrical drawing.

Perhaps the most important change that will be brought about by the new methods of teaching geometry will be that the study of the subject will be begun by boys at a much earlier age. So long as Euclid remained the only acknowledged text-book, it was found that young pupils could not understand geometrical proofs, and most efforts to write books for beginners resulted in simplified editions of Euclid. Now that geometrical drawing is to be taught, instead of Euclid's problems, students can begin the study of geometry at a much earlier age. Several books written specially for young beginners have already appeared. Among these are the following:—A "Geometry for Beginners," by Prof. Minchin (Clarendon Press, 1s. 6d.). Prof. Minchin says he has used his book with boys of eight years of age with great success. The book is a good introduction for students who wish to lay a solid foundation for a sound mathematical study of geometry. The chief defect is that the propositions are usually printed in continuous paragraphs, little use being made of varieties of type. A "Geometry for Young Beginners," by F. W. Sanderson (Cambridge University Press, 1s. 4d.), is more modern in its treatment of the subject, and makes much use of geometrical drawing. Another good book is "A First Geometry Book," by Hamilton and Kettle (Arnold, 1s.). This contains a simple course of exercises based on experiment and discovery. I have used it as a text-book and find that it is easily understood by beginners. Schools which get young pupils and devote special attention to physics will find this

book very useful. On the other hand, "Inductive Geometry," by H. A. Nesbitt (Swan Sonnenschein, 1s. 6d.), is too explanatory. The book is intended for use in classes that are between the kindergarten and the geometry class of the upper school, and teachers of such classes will find many useful hints in it, but too little is left to the pupil.

Much of the work in the mathematical and drawing sections in geometrical drawing is the same, and any candidate who passes in mathematics may also easily pass in geometrical drawing in Section 14 of the preliminary examination and Section 15 of the junior examination. I have found by experience that one lesson of half-an-hour and one home-lesson of half-an-hour per week for three terms is sufficient preparation for the geometrical drawing of Section 15 in the junior examination.

Coming now to the theoretical geometry, I think that the idea that Euclid is no longer to be taught or used as a text-book for the Cambridge locals is quite erroneous. In the first place, the schedule distinctly says that the substance of certain theorems in Euclid must be known. Euclid's problems are replaced by geometrical drawing; but most of Euclid's theorems are retained, and more riders based on these theorems will probably be set. As a proof that Euclid is not to be abolished, the fact that the Pitt Press edition of Euclid is recommended by the Cambridge authorities as a text-book may be mentioned. Teachers may rely on the Pitt Press Euclid, together with a book on geometrical drawing, as providing excellent preparation for the examinations. Again, in the specimen papers recently published, no less than five of Euclid's theorems are set both in the preliminary and in the junior paper. With regard to the omission of Euclid's problems, it is noticeable that the junior paper of 1901 contained none of Euclid's problems. The intention seems to be not so much to abolish Euclid as to ensure that Euclid shall be taught in a more intelligent and practical way.

The specimen papers also do away with the former division of the questions into two parts, the latter part containing riders only. The riders are now distributed throughout, and a rider generally follows the proposition on which it is based. There will in future be no collection of the answers to the first part of the paper after an hour and a half's work. Students whose knowledge of geometry is limited to the subjects in Part I. will be able to spend the whole time on those questions. The examiners have for several years said that the solution of riders can be easily and satisfactorily taught by capable masters, and the new syllabus will apparently attach more importance than ever to riders. There is certainly no intention on the part of the Cambridge authorities to allow the candidates to shirk the difficulty of understanding a strict geometrical proof.

From the foregoing remarks it will be gathered that I think an edition of Euclid containing only Euclid's theorems, with, in some cases, modern

proofs and a larger number of riders, would be the best to use with pupils. A book of this kind is "Elementary Geometry," by Baker and Bourne (George Bell, 1s. 6d., 2s. 6d., 3s. and 4s. 6d.). This is written on the lines recommended by the Committee of the Mathematical Association. The theorems are separated from the problems, but proofs are given of both kinds of propositions. Solutions of the specimen papers in geometry have been published, worked from this book, to show that pupils can be satisfactorily prepared by using this text-book only. The authors did not write this book specially for the Cambridge examinations, and it contains much that is not required for these examinations. Another good book is "A New Geometry for Beginners," by Roberts (Blackie, 1s. 6d.). This is rather a difficult book for a beginner, but it is stimulating and encourages thought.

"Elementary Geometry," by J. Elliott (Swan Sonnenschein, 4s.), is evidently the work of an excellent teacher. It has been used instead of Euclid I.-IV., and is not a book hastily written for the Cambridge local examinations. The preface and the appendices are full of practical hints for teachers.

The "Elements of Geometry," by Lachlan and Fletcher (Arnold, 2s. 6d.), is rather hard for beginners. It is not merely a new edition of Lachlan's "Euclid"; it contains 100 short propositions, having often modern proofs and also numerous exercises and riders. "Elementary Geometry," by W. C. Fletcher (Arnold, 1s. 6d.), is a capital summary of results with hints for proofs.

Two new books on geometry have lately been written by assistant-masters at Eton College. "Practical Exercises in Geometry," by W. D. Eggar (Macmillan, 2s. 6d.), provides a very good experimental course which may be used with any book on theoretical geometry. It includes a large amount of geometrical drawing, with chapters on the metric system, volume, surfaces, mensuration, formulæ, and graphs. It is better suited for candidates preparing for Army and Navy examinations than for the locals. "Theoretical Geometry for Beginners," by C. H. Allcock (Macmillan, 1s. 6d.), contains the substance of the first book of Euclid. It is the work of a good mathematical teacher. The author has acted upon the suggestions of the Mathematical Association in many cases; but he is evidently in favour of retaining Euclid so far as possible. Another new book is "Geometry," by S. O. Andrew (Murray, 2s.). It contains numerous exercises and a large amount of geometrical information.

English teachers might derive much benefit by consulting American books on geometry, many of which have been issued during the last few years. I may mention the books by Phillips and Fisher (American Book Company), that by G. A. Wentworth (Ginn, 5s. 6d.), and that by Professor Holgate (Macmillan, 6s.). These should be in every school library. After consulting all these books I still think that there is room for a better

book. Many teachers in England have been working out courses of geometry for their own classes. To all such I would say, "Do not change your system for the Cambridge locals or any other examinations. Modify and improve your teaching by reading these new books in order to get new ideas. Reformation, not revolution, is needed; a good teacher can appreciate good methods, and should be ready to adopt them even when he himself does not originate them."

ANOTHER CHAPTER ON VERY ELEMENTARY ARITHMETIC.

By SIR OLIVER LODGE, F.R.S.

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SIMPLIFICATION OF FRACTIONS.

VULGAR fractions are much harder to deal with than decimals, but, as sometimes several have to be added together, it is desirable to know how to do it. Besides, the exercise so afforded is of a right and wholesome kind.

Consider the following addition:—

$$\frac{1}{2} + \frac{1}{4}$$

Small children can see (by experiment on an apple) that the result is $\frac{3}{4}$, and they can also be taught to regard it as $\frac{2}{4} + \frac{1}{4} = \frac{3}{4}$, which should be read in words—two quarters added to one quarter make three quarters.

Thus it can be realised that, when the denominators are all the same, addition of fractions becomes simple addition of the numerators.

For just as 5 oranges + 6 oranges = 11 oranges, so $\frac{5}{17} + \frac{6}{17} = \frac{11}{17}$, reading "seventeenth" instead of "oranges."

When denominations differ, therefore, the first thing to do is to make them the same.

Thus, for instance, 3 apples + 4 oranges is an addition which can only be performed by finding some denomination which includes both, say "pieces of fruit."

So, also, 7 horses + 3 pigs = 10 quadrupeds.

5 copies of Robinson Crusoe + 3 copies of Ivanhoe = 8 prize-books, perhaps.

This cannot always be done when denominations are anything whatever, except by using the vague terms "objects" or "things"; but with numerical denominators it can always be done, and the method of doing it has to be learnt.

$\frac{2}{4} + \frac{5}{4} = \frac{7}{4}$, and such like, are easy examples. $\frac{1}{2} + \frac{1}{3} = \frac{5}{6}$ is a slightly harder one. It is done by saying $\frac{3}{6} + \frac{2}{6} = \frac{5}{6}$.

So, also, $\frac{1}{2} + \frac{1}{6}$ equals $\frac{2}{3}$, being equal to $\frac{4}{6}$.

A harder example is $\frac{1}{2} + \frac{1}{3}$, which can be written $\frac{3}{6} + \frac{2}{6} = \frac{5}{6}$.

In the decimal notation this would appear thus:—

$$3.5 + 1.666 \dots = 5.1666 \dots$$

A still harder example can be worked out thus:—

$$\frac{9}{8} + \frac{5}{7} = \frac{63}{56} + \frac{40}{56} = \frac{103}{56} = 1\frac{47}{56},$$

though the final step is one that need not always be made.

Now it is evident, or at least it will gradually be found true, that in a mechanical process of this kind there is always some simple rule by which the result can be obtained without thought. What is that rule? If the child can find it out for himself, by experimenting on lots of pairs of fractions, so much the better. A week is none too much to give him to try, for if he finds it out himself he will not forget it.

The rule is cross-multiply for the numerators, and multiply the denominators.

$$\frac{1}{2} + \frac{1}{6} = \frac{6+2}{12} = \frac{8}{12} = \frac{2}{3}.$$

$$\frac{1}{a} + \frac{1}{b} = \frac{b+a}{ab}.$$

$$\frac{3}{7} + \frac{4}{9} = \frac{27+28}{63} = \frac{55}{63}.$$

$$\frac{a}{b} + \frac{c}{d} = \frac{ad+bc}{bd}.$$

but it would be a great pity to spoil this by premature telling.

The fact that the sum of two reciprocals is the sum of the numbers divided by their product is worth illustrating fully and remembering—remembering, that is, by growing thoroughly accustomed to it, not exactly learning by heart. There is no need to learn easy things like that by heart.

$$\frac{1}{3} + \frac{1}{4} = \frac{7}{12} \text{ that is, the } \frac{\text{sum}}{\text{product}}.$$

$$\frac{1}{a} + \frac{1}{b} = \frac{a+b}{ab}.$$

$$\frac{1}{23} + \frac{1}{5} = \frac{28}{115}.$$

$$\frac{1}{2} + \frac{1}{49} = \frac{51}{98} \left[\approx \frac{52}{100} = 0.52; \right]$$

the symbol \approx meaning “approximately equals.” The approximation is seen to be true because adding 1 to 50 makes the same proportional difference as adding 2 to 100. If this is too hard it can be postponed. It is unimportant, but represents a kind of thing which is handy to do in practice].

But this rule of cross-multiplication hardly serves for the addition of three or more fractions, at least not without modification. Take an example:—

$$\frac{1}{6} + \frac{2}{3} + \frac{7}{2} = \frac{1}{6} + \frac{4}{6} + \frac{21}{6} = \frac{26}{6} = 4\frac{1}{3}.$$

Again, $\frac{1}{2} + \frac{1}{4} + \frac{1}{8} = \frac{4+2+1}{8} = \frac{7}{8},$

where the three fractions, $\frac{4}{8}, \frac{2}{8},$ and $\frac{1}{8},$ all having the same denominator, are written all together, with the addition of the numerators indicated, and subsequently performed.

$$\frac{1}{3} + \frac{1}{2} + \frac{1}{9} = \frac{3+4\frac{1}{2}+1}{9} = \frac{8\frac{1}{2}}{9} = \frac{17}{18}.$$

This might hardly be considered a legitimate procedure, but there is nothing the matter with it. You might, instead, proceed thus:—

$$\frac{1}{3} + \frac{1}{2} + \frac{1}{9} = \frac{18}{54} + \frac{27}{54} + \frac{6}{54} = \frac{51}{54} = \frac{17}{18},$$

and that is equally a correct method.

But neither of these plans is quite the grown-up plan. Let a better plan be found; but first let the above plans be formulated and expressed. Is it not plain that the numerator of each particular fraction is found by multiplying two of the denominators together, while the common denominator of all the fractions is found by multiplying all the denominators together?

Apply this rule:—

$$\frac{1}{6} + \frac{1}{5} + \frac{1}{4} = \frac{20+24+30}{120} = \frac{74}{120} = \frac{37}{60}.$$

For instance, a sixth of an hour + a fifth of an hour + a quarter of an hour = 37 minutes: a minute being the sixtieth of an hour. Now a sixth of an hour is 10 minutes, a fifth is 12 minutes, and a quarter of an hour is 15 minutes, consequently the neatest way of doing the above sum would be:

$$\frac{1}{6} + \frac{1}{5} + \frac{1}{4} = \frac{10+12+15}{60} = \frac{37}{60}.$$

Again, $\frac{1}{12} + \frac{1}{60} + \frac{1}{3} = \frac{180+36+720}{720 \times 3};$

but here every term in numerator and denominator can be divided by 3 and by 12, so that the above may be written:—

$$\frac{5+1+20}{60} = \frac{26}{60} = \frac{13}{30} = 0.4\bar{3}.$$

And it would have been neater to write it so at first—neater but not essential, and sometimes not even the most rapid plan.

To illustrate the above example:—

$\frac{1}{12}$ th of a day is 2 hours.

$\frac{1}{60}$ th of a day is 24 minutes.

$\frac{1}{3}$ rd of a day is 8 hours.

Consequently the sum of these fractions of a day is 10 hours and 24 minutes, which is $10\frac{24}{60}$ of an hour [= $10\frac{2}{5}$ = 10.4 hours] or $\frac{10}{24} + \frac{1}{60}$ of a day, which again may be written $\frac{5}{12} + \frac{1}{60} = \frac{26}{60} = \frac{13}{30}$ ths. as before.

The form of the general rule, then, is given by $\frac{1}{a} + \frac{1}{b} + \frac{1}{c} = \frac{bc+ca+ab}{abc}$; but in practice it is possible to abbreviate this in some cases, when one of the denominators contains the others as factors, or when some simple relation of the kind exists between them.

This is what was made use of in the early simple cases such as $\frac{1}{12} + \frac{1}{24}$. We did not proceed to write $\frac{24+60}{288}$ and then simplify it, but we wrote at once $\frac{2}{24} + \frac{5}{24} = \frac{7}{24}$; that is to say, we perceived that 24 would do for the new denominator, and we adjusted the numerators accordingly.

Perhaps we had better display this algebraically. Let each denominator contain a common factor, say n , so that the reciprocals to be added are

$$\frac{1}{na} + \frac{1}{nb} + \frac{1}{nc}$$

then, if we applied the mere general rule, we should write $\frac{n^2bc + n^2ca + n^2ab}{n^3abc}$,

but the repetition of the powers of n is manifestly

needless, since they cancel out, and what we ought to write for the new denominator would contain the n only once, thus: $\frac{bc + ca + ab}{nbc}$. The denominator so obtained is called the least common multiple of the three denominators, and it is frequently in examination papers denoted by the letters L.C.M. It is not an important idea at all. Sums can be done quite well without it, but its introduction affords some scope for neatness and ingenuity. Easy processes can be given for finding it, but they are hardly worth while, as in real practice they are never used.

Add together $\frac{1}{2} + \frac{1}{4} + \frac{5}{8} + \frac{3}{16} + \frac{7}{32}$.

Here 32 is evidently the L.C.M. of the denominators; that is, it contains all the others as factors. So that will serve as the simplest common or combined denominator. The first numerator accordingly will be 16, the second 8, the third 4 but taken 5 times and therefore 20, the next 2 taken 3 times, and the last 1 taken 7 times.

Consequently the sum is written as follows:—

$$\frac{1}{2} + \frac{1}{4} + \frac{5}{8} + \frac{3}{16} + \frac{7}{32} = \frac{16+8+20+6+7}{32} = \frac{57}{32}$$

Take another example of addition:—

$$\frac{1}{7} + \frac{1}{56} + \frac{1}{9} + \frac{1}{63} = \frac{72+9+56+8}{504} = \frac{145}{504}$$

Here 7 is plainly a factor of both the larger denominators, and 8 and 9 are the other factors, so the least common denominator will only contain 7 and 9 once, and will equal $7 \times 8 \times 9 = 504$; and this being the smallest common multiple possible, no further simplification can be effected, beyond, of course, expressing it as a decimal if we so choose.

To express it as a decimal we must effect the division indicated as well as we can, providing the numerator 145.0000 with as many ciphers, either written or understood, as we may think necessary to give the required amount of accuracy in the quotient. It happens to equal 0.2877 almost exactly.

It is worth noticing that the series of powers of $\frac{1}{2}$, viz., $\frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \frac{1}{16} + \frac{1}{32} + \frac{1}{64} + \dots$ add up very nearly to 1; and the more nearly the more terms of the series are taken.

It can be shown, not by trial indeed but by simple reasoning, that if an infinite sequence of this series are added together, the result is exactly 1. Thus the first term constitutes half of the whole quantity, say a loaf, the second term added to it gives us three-quarters, the third term gives us $\frac{7}{8}$ th more, and we only need another eighth to get the whole. The next term gives us half of the deficiency, and now we need the other sixteenth to make the whole. We do not get it, however; we get half of it in the next term, and thus still fall short, but this time only by $\frac{1}{32}$ nd, and so at the end of the above series, as far as written, our deficiency is $\frac{1}{64}$ th. Each term, therefore, itself indicates the outstanding deficiency; and as the terms get rapidly smaller and smaller, so does the deficiency below 1 get rapidly diminished till it is imperceptible.

It is convenient to plot these fractions as lengths,

(setting them up at equal distances along a horizontal line); say half a foot, then a quarter, then an eighth, and so on. Then joining their tops we get a curve which has the remarkable property of



always approaching a straight line, but never actually meeting it, or at least not meeting it till infinity; when, at length, it has become quite straight.

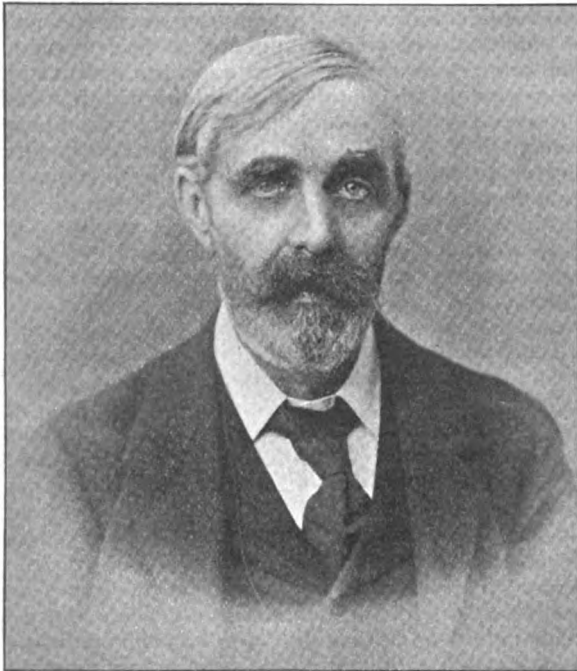
There are many curves with such a property, but this may be the first a child has met. It can, of course, continue the curve in the other direction, the direction of whole numbers, or powers of 2; and observe how rapidly it tilts upward; but there is no straight line in this direction to which it tends to approach; it proceeds to infinity in both directions, not only in one, though far more rapidly in the vertical direction: and this end of it never becomes straight.

THE INCORPORATED ASSOCIATION OF ASSISTANT-MASTERS.

A DESCRIPTION of the constitution and aims of the Association of Assistant-masters must naturally first take account of the difficulties with which its founder, Mr. Montgomery, and those who worked with him, were confronted. First came the necessity for including in the Association assistant-masters from all types of secondary schools, from the highest "conference" school to the lowest private school; and the danger of want of continuity from the promotion of the leading members of the Association to head-masterships and other educational posts.

Then the very numbers constituted a difficulty in the way of organisation, a difficulty that was increased by the caste spirit, the low salaries, the fact that comparatively few assistant-masters could command rooms in which even committee meetings could be held, and the circumstance that time nominally private was so frequently absorbed in the interests of school sports, &c. It, in addition, it is remembered that too many assistant-masters have few interests outside the class room, or the playing field, some idea will be obtained of the difficulty always experienced in arranging for meetings to discuss educational questions or to do the routine work of the association. Without such meetings, organisation was of course impossible. Still, many of these difficulties have been overcome, and the Association can now fairly claim that progress, which seemed almost impossible in 1891, has been made.

In that year a Select Committee of the House of Commons was appointed to report on two rival Bills for the registration of teachers, but the views of assistant-masters could not be ascertained because they had made no attempt to form an association to represent their views. It would have been strange if, after this, some attempt had not been made to organise assistant-masters, and in June two circulars were issued, each announcing a preliminary meeting. The first of these meetings took place on July 11th, in the dining room at Parmiter's School, Victoria Park, N.E., and was attended only by *bona fide* assistant-masters, mostly from schools of the same type, viz., London day-schools with a leaving age of 16. This was the beginning of what is now the In-



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corporated Association of Assistant-masters, and it has always jealously maintained the essential principle that it should consist solely of, and be governed entirely by, *bona fide* assistant-masters in secondary schools.

The second circular, dated from Piccadilly, summoned a meeting at St. James's Hall to form a "National Association of Secondary Teachers." Its first officers included Sir John Lubbock, Mr. Mundella, Dr. Napier, Mr. Oscar Browning and a solicitor. Its offices were in Piccadilly, London, and for a time at least it seemed as if the more modest association, holding its meetings after school hours in class rooms, and having no well-known names to recommend it, must be crushed out. Many men who received both circulars refused to join either association for a time. But it soon appeared, that no one however eminent,

could really represent assistant-masters if he was not one himself. The "National Association" had scattered its prospectus broadcast, yet it soon ceased to exist; but it was years before the ill effect of the double appeal and of the inevitable dispute as to which body was really first in the field was altogether eliminated. The existence of the more ambitious society checked progress, but it is the less pretentious one that still lives. Attempts at amalgamation were made, but these were bound to be abortive because of the outside element in the management of the "National Association." While the A.M.A. has always recognised that the heads of the profession must be its mouthpiece, it has always refused to recognise that there is so much difference between the successful candidate and the second at the election to a headmastership as to make the one man of necessity more fit to speak for the profession than the other, still less does it acknowledge that men can adequately represent it who are not school-masters. A similar attitude seems to be taken just now by the Association with regard to the Education Committees being formed under the Education Act of 1902. While it is recognised that the best men should speak for the profession, it is difficult to understand how assistants can be represented except by members of their own body.

As soon as the continued existence of the A.M.A. was assured, efforts were made to secure members from private schools, on the one hand, and from the great public schools on the other. Private schoolmasters soon came in; but it was not until 1896 that members joined from Eton, Rugby, Winchester, Cheltenham, and even then only seven in all. Progress, so far as membership was concerned, was rapid from this time onwards, and during 1900 and 1901—when Mr. Rouse was Honorary Secretary—there was a large increase also in the numbers from the great public schools. The number of members at the present time is just under 1,600.

The Association has, of necessity, repeatedly altered its rules and constitution with its continuous growth. It has been said that too much time is spent in debating questions of rules and management; but no one who was present at either the luncheon or the dinner during the annual meeting in January last and noticed the free and friendly intercourse of men from all types of secondary schools would say that the time spent on organisation was wasted, when such a result has followed.

From its inception, the Association has worked hard to improve the position of assistant-masters. When only a month or two old, it made an arrangement to circulate, without commission, lists of vacant posts among its members. This work before long developed into the present Joint Agency.

At the same time the Headmasters' Pension Scheme was discussed. As the result of a joint conference with one of the Charity Commissioners on the subject of the powers of governors in connection with pensions for assistant-masters, it was

made clear that governors of endowed schools would be permitted to pay money towards pension premiums.

Tenure of office is another question that has been a matter of care to the Association. Again and again has the attention of the Charity Commissioners been drawn to the words used in 1872 by their predecessors, viz.: "They propose henceforth in all schemes which give the headmaster the power of dismissing assistant-masters to make such dismissal subject to an appeal to the governors." There has never been the slightest effort apparently to carry out this proposal. In the Grantham case, in 1899, the assistant-masters were defended by counsel instructed by the A.M.A. The enquiry practically turned on two points: (1) Were assistants *ipso facto* dismissed on the resignation of the headmaster who appointed them; (2) what was the custom of the profession with regard to notice? The Commissioners answered the first in the negative. Dr. Scott and Dr. Gow gave, as answer to the second, "a term's notice."

But perhaps the Association's most useful work has been the legal advice and help it has given to its members. Assistant-masters are frequently unjustly treated, and among the cases that come under the notice of the Legal Sub-committee the following types occur: (1) When a man joins a school, say in September, and leaves it at the end of the summer term, frequently he is paid only for eleven months instead of twelve; (2) difficulties are placed in a master's way when he tries to get a new post, such, for example, as refusal to give a testimonial until after he has actually left the school; (3) loss of salary on the bankruptcy of a private schoolmaster because the assistant is not considered a preferred creditor; (4) dismissals on the ground of a re-arrangement of work, which is not subsequently carried out. Of course, these cases mostly occur in small schools shielded by their seclusion in the country; but similar cases of hardship have occurred even in schools of high reputation, large numbers, and controlled by influential boards of governors. The mere fact that the assistant has been supported by the Legal Sub-committee of the Association has often been sufficient to prevent the proposed wrong.

Evidence was given before the Royal Commission of 1896, especially on the following points: (1) the average salaries of headmasters and assistants; (2) the average cost per head for education in a number of schools; (3) the need for public and more explicit financial statements from all endowed schools; (4) the qualifications needed for the registration of teachers.

In addition, the Association has been represented on the Jebb Committee, on the Joint Committee on Training, and at various educational conferences. One of its members was co-opted on the Registration Council of the Board of Education.

The Association now consists of 22 branches and a body of unattached members. A member

may belong to any branch. Each branch in proportion to its numbers elects members to the Council, and from the Council an Executive Committee is chosen. A branch with 50 members may elect its own representative on the Executive Committee and smaller branches may combine for this purpose. For 150 members a second representative may be elected, but no branch may have more than two. The representatives need not be members of the branches electing them.

The policy of the Association is entirely controlled by the Council. All members of the Council, the Executive Committee, and all officers except the Chairman may be re-elected year after year. The Chairman holds office for one year only. The work of the Association is subdivided by reference to seven sub-committees elected at the beginning of each year. A limited number of members who cease to be assistant-masters may be elected for a limited time as Associates, if they do not become headmasters. Honorary members may also be elected, but without any power of voting.

The annual meetings are held in January, at one of the large London schools. An autumn meeting is held in September, and this may take place either in London or in the provinces.

This article would be altogether incomplete without a recognition of the kindly courtesies and friendly assistance the I.A.A.M. has received from headmasters both individually and as a corporate body.

FOOD FOR SCHOOLBOYS.

By JOSIAH OLDFIELD, M.R.C.S., D.C.L., &c.

A SEAL has been set to the value of athletics in schools. The proud laurels of the athlete rank side by side with academic honours in the competition for good scholastic posts. And this is what is in the mind of most men when they hear that trite old proverb about *mens sana in corpore sano* brought out at the annual prize-day.

The "healthy body" has, during the last fifty years, grown up in men's minds to mean "the athletic body"—and nothing more. Now, I am not for a moment underrating the inestimable advantage which accrues to a boy's constitution by getting him out for hours a day, exercising freely in the open air, regardless of cold or heat, storm or sunshine. I am not for a moment underestimating the improvement which takes place in nerve plasm and muscle tissue by teaching the boy to judge time and force in kicking the football or hitting out straight with the bat or racquet. All these things in their right place and in due proportion, and commensurately with the capacity of the boy, are an immense improvement upon the old scheme of developing the mental gymnast at the sacrifice of everything else.

I am, however, anxious to point out that physical health depends as much upon right physical food as upon physical exercise.

It is not enough for a boy to have exercise for his brain unless his master provides for him a mental pabulum that he can assimilate. In the same way, it is not enough for a boy's physical development to centre all the attention upon sports, gymnastics, and similar physical exercises. The rôle of the caterer is as important as that of the gymnastic instructor. In a great many schools, I do not hesitate to say that very little thought is devoted to the science of the daily meal; it frequently indeed devolves upon the headmaster's wife in the smaller schools, and upon old tradition in most schools, to determine what the daily dietary shall be. In some cases, too, where profits are calculated to be made from the housekeeping in order to eke out the salaries obtained by teaching, the question of cost of food forms a too obtrusive element in determining the dietary.

I am not, however, at all of opinion that an expensive dietary is necessarily a good dietary, or that foods that cost less money contain less nutriment. In the suggestions, therefore, that I make from my medical experience as to the needs of growing boys and girls, I do not think that it will be found that I am suggesting increased expenditure.

I will lay down as a primary axiom that, for growing boys and girls who are adding daily to their actual body weight of bone, muscle and nerve, plenty of food and a fair range of variety are necessary, so as to secure a full complement of all the various elements that the body needs. While I say this, I add to it an equally important corollary—that plain food is better than rich or highly spiced foods. I quite agree that, as a general rule, those eminent authorities are right who point out that milk and vegetables, and butter and eggs, and farinaceous foods, are far better for growing boys and girls than is flesh food, and that, while in some exceptional cases a considerable amount of meat may be necessary, in the majority of cases the less that is found in the school dietary the better.

I was immensely struck in my inspection of schools and colleges in India with the keenness of intellect, the clearness of perception, and the general alertness which was visible in classes that were held shortly after meals which were purely fruitarian in character; and I found but little of that dulness and sleepiness which characterises the afternoon lessons in England when these have been preceded by a heavy, meaty meal.

For breakfast I do not think that the old Scotch dish of porridge, or the Irish dish of stirabout, can be beaten; it may be made of rolled oats, of crushed wheat, of pearled wheat or barley, of fine maize meal, or of buckwheat, or wheat meal; and either skimmed milk, or syrup, or honey, or Demerara sugar may be eaten with it. To prevent too rapid bolting without due mastication it is always wise to eat either bread (especially the outer crust), or toast, or rusks with it. A dish of this sort may be looked upon as a staple food of the greater portion

of the human race, and its value has been tested so long and so extensively that it needs no words of mine to remind those who are purveying for the young that herein lies one of the best forms of food which can be used.

I specially said *skimmed* milk because I want to emphasise that the chief value of milk lies in its proteid constituents, and of these skimmed milk contains as much as new, while the price is less than half. Porridge, bread-and-butter and cocoa will form an ample breakfast in any school. If I had to leave any of these out, I should prefer to omit the bread-and-butter and cocoa, so long as every boy got his bowl of porridge and milk.

For dinner I do not think that either enough vegetables are provided, or that sufficient care is taken in their cooking. A standing dish of potatoes, not always guiltless of being watery, or waxy, and the slab of cabbage too often yellow and stringy, make one smile when one hears masters say that "boys don't like vegetables." In cooking most vegetables, care should be taken not to boil them in water and to throw away the water, but rather to steam them and to conserve the salines which constitute their value as nerve foods.

I am never tired of reminding my medical pupils of the historical case of the English soldiers and Indian soldiers, besieged together and short of provisions, how the Indians begged to be allowed to give all their rice to the English if only they might have the water in which the whole was boiled, and how when they were reduced to little else but this food, the English soldiers rapidly lost strength while the Indians retained their vigour. For the same reason I consider that vegetable soups and stews are not nearly enough used in school dietaries.

If fish were substituted for meat twice a week, and a poached or fried egg given once a week, and such a dish as macaroni *au gratin*, or Irish vegetable stew, given once a week in place of meat, it would be a distinct improvement to the usual routine of roast, boiled and cold.

Where possible, some plain currant cake or salads should be added to the tea meal, and whole-meal bread should be always provided for those who will eat it as an occasional alternative to white. For supper, bread and cheese, or bread-and-butter, with a glass of milk and occasional spring salads, is ample.

Home hampers should in an ordinary way be entirely forbidden. A present of a single cake or a packet of fruit is good but when this degenerates into large hampers of all sorts of meats and pastries, which have to be eaten in excess to prevent them going bad—to say nothing of other and many attendant evils connected with the practice—it is much wiser to have a strict rule that no foods at all should be sent to boys, excepting perhaps in mid-term week, or on birthdays, when a cake of a limited weight, and a limited amount of dried fruits, as figs or dates, might be permitted.

I know that in many places fruit is an expensive commodity, but I none the less consider that every day, a small quantity at least, should be provided, either an apple or an orange or some stewed fruit

at dinner, or fruit pie, or some figs, dates or raisins. Lastly, I would remind teachers that fat is an essential nerve-food, and a sufficient quantity should always be provided; whereas boys generally dislike fat meat, they usually do not dislike hot bacon-fat, or the fat of meat that has been chopped into small pieces and fried crisp, and better still is the Indian method of providing a small jug of boiling oil, and having a little poured over the vegetables. If high-class oil like the "Sunlight," olive, or even the cheap "Sunlight" nut oil were used, it would be found that generally speaking the flavour is not objectionable, and the liking for it soon grows.

One word more. Every master should remember that when a boy is "off his food" for more than a day he needs some medical supervision.

SCHOOL FURNITURE AND EQUIPMENT IN SECONDARY SCHOOLS FOR GIRLS.

By CAROLINE TURNER.

Joint-Principal of S. Catherine's School for Girls, Hove, Brighton; formerly Headmistress of Exeter High School.

III.

CLOAK-ROOMS.—One of the most important questions in connection with the equipment of a secondary school for girls is the fitting up of the cloak-rooms. In many schools these rooms are in an awkward position with regard to the main building. They should, of course, be near the pupils' entrance, and yet not be too prominent. If they are some distance away from the entrance, wet cloaks, dripping umbrellas, and muddy boots leave their traces on the corridors. At the same time, these rooms should not be placed, as is sometimes the case, at the end of narrow passages, or in corners surrounded by other buildings. The windows should have frosted glass, or should be placed high. A heating apparatus, so arranged that cloaks, boots, &c., can be dried without removing them from the stands, is a necessity in all large schools, and just as much care should be exercised about the ventilation of the cloak-rooms as about the class-rooms. The floors should always be tiled, and should if possible be washed every day.

Each pupil should have a numbered peg, place for boots, and stand for umbrella. The most convenient arrangement is to have a place for boots and umbrella under each pupil's peg. Some firms provide stands with open wooden lockers for boots, but I consider those in which the boots stand on wire netting the most satisfactory; they are more easily kept clean, and damp boots are more easily dried, as the air can pass freely underneath them. If wooden lockers are used, these should be ventilated. A simple arrangement of narrow board fastened to the stand for pegs, with a notch for

the umbrella, and a movable narrow zinc tray, enables each pupil's umbrella to be placed directly under her peg.

The top of the boot lockers is often arranged so as to provide seats for the pupils when changing their boots. A convenient stand for a small cloak-room (Fig. 1) is made by the Educational Supply

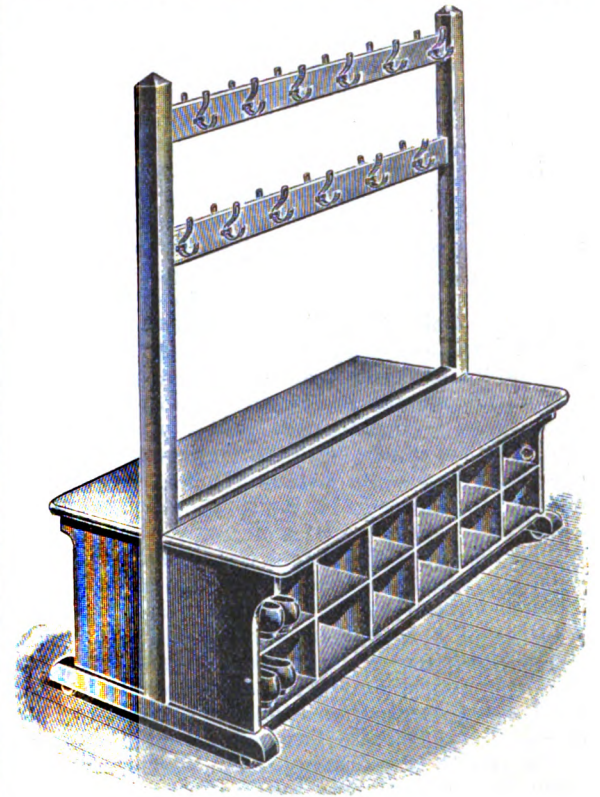


FIG. 1.

Association. I have used it and find it most satisfactory.

This form of stand does not, however, provide for umbrellas, which have to be placed in a separate stand. With small numbers, or where separate cloak-rooms are provided for each form, as is the case in some large schools, this is not a serious difficulty, but in cloak-rooms arranged for large numbers each pupil has a separate stand for her umbrella. There is often confusion on wet days, or umbrellas are damaged by being carelessly placed in crowded stands. The proper arrangement of a cloak-room is of considerable importance in the discipline of a school. Inadequate or crowded arrangements lead to disorder. If the girls leave the cloak-rooms for the class-rooms or for home, in confusion, the whole discipline of the school is affected.

Small cloak-rooms, or cloak-rooms divided into separate compartments, seem the most suitable. Some that I have seen lately in a new building have the walls lined with white glazed tiles. Tiled walls and floors are the best from the point of view of cleanliness, and in the event of infection the most easily purified.

PREPARATORY DEPARTMENT.

The fittings in preparatory departments differ in different schools, according to whether the rooms are arranged for carrying out the kindergarten system pure and simple, or for a preparatory department on kindergarten lines. If the former, the furniture and apparatus should be chosen to suit the requirements of the system. The leading firms manufacture a suitable selection of both. If, as appears more general, this department is arranged more on the lines of a preparatory division worked on a modified kindergarten system, and generally under the direction of a trained kindergarten teacher, there is a wide choice of furniture. I strongly recommend the use of separate chairs, tables or desks, and foot-rests where necessary, for each child, as in the classrooms for older pupils, care being taken that these are graduated to suit the height and length of limb of each child. The small chairs¹ and tables are very suitable and convenient. The tables could be made by any carpenter, but the chairs should be carefully chosen. Where economy is a consideration, tables to seat two or four children can be used, but separate chairs are desirable, and seats without backs, often shown among kindergarten fittings, should always be avoided.

The aspect of the rooms used for the younger children should be chosen so as to give the largest amount of sunshine. Plenty of healthy growing plants, and a sea-water or fresh-water aquarium, (both if possible) seem to me the best decoration for these rooms, but these should all be kept in good order, and the attention of the children should be constantly directed to them. I have watched with very great pleasure lately the interest taken by some children, from five to eight years of age, in rooms arranged on these lines, but in this case the animals and plants have received constant attention out of school from the teacher, and have been kept in a thoroughly healthy condition.

The preparatory department should be well supplied with blackboards, placed so that they can be freely used by the children, and for this purpose the sliding blackboards seem the best. They can be easily brought down to the level of the children and pushed up when not in use. In choosing furniture for a preparatory department I would again emphasise the importance of light and portable furniture. Indeed, this is even of greater importance in this department than in higher forms. The need for constant change of position is imperative in the case of young children, and the desks to seat four or six children, so often to be seen in preparatory schoolrooms, are not as a rule satisfactory. The best arrangements are separate tables or desks, and separate chairs. If, as is sometimes the case, the schoolroom has to be used for free play or games, the tables are somewhat awkward to clear. Folding desks are, in this case, most satisfactory.² These can be made in small

sizes, or with flat tops, where tables are required for kindergarten purposes. If, however, a separate room is available for free play, light small tables are on the whole the best. If a more economical arrangement is necessary, the Charterhouse desks, which are made in two sizes for infants, are suitable. The only difference between these and those used in higher forms is that the top is not hinged, and this for use with young children is an advantage, as they frequently trap their fingers, or hurt their companions with a hinged desk. The cost of these desks in pitch pine works out at 7s. 4½d. per child.

An experienced kindergarten teacher tells me that she finds long, narrow, light deal tables very useful in a preparatory school; the top is made to open and form a locker for books; this locker closes with a lock and key and is intended for the teacher. These tables can be used in different positions and take up little space when placed round the sides of the room. Placed together, they form one large table, and are made quite firm by a system of bolts. They are made by a local carpenter, and are inexpensive and satisfactory. The cost per child, including seats, is about 10s. 6d.

In most preparatory schools, modelling in clay or plasticine forms a regular part of the school course, and some receptacle must be provided for the clay. Wooden troughs with zinc trays are sold by some school furnishers, but the ordinary bread-crock looks better in a room and answers very well. Care should be taken in handling the covers of these crocks, as if these are broken the crock must be covered with a cloth, and at once becomes unsightly. For small quantities of clay or plasticine French cooking-pots, now to be found in many china-shops, are pretty and useful, but these are not cheap, and should be carefully handled.

Cupboards are absolutely necessary in the preparatory schoolroom. The children are not old enough to take care of their own books and work, and unless ample and suitable cupboards are provided, time is often wasted. These cupboards need not be expensive or elaborate, but they should be somewhat different from those in ordinary classrooms. One should have glass doors if possible, and is then suitable for illustrations of nature lessons, &c. Another should be provided with compartments for books belonging to different divisions, and a third with a large number of movable shelves for the many diagrams, &c., necessary for lessons and for the children's brushwork and design. These cupboards can be made by any carpenter, and the simpler the arrangement of sliding shelves the better.

A piece of apparatus which will be found most useful is a large sand-tray for teaching geography. The one here was made by a local carpenter from directions given to him, and is quite satisfactory. It is made of deal, and measures 3½ feet by 4½ feet, with a depth of 2 inches; to prevent warping it is clamped at the back with three battens, and the corners are clamped with tin. The bottom of this tray is covered inside with light blue American cloth, which makes a good background for the sand map

¹ See the illustration in THE SCHOOL WORLD for February, 1903, p. 57.

² See my article in THE SCHOOL WORLD, February, 1903.

and enables the tray to be thoroughly and easily cleaned with a damp sponge. This tray is large enough to take a sand map on the scale of a large wall map. "The World" on Mercator's projection (Stanford) has been modelled on it lately by a class, and it admits of a number of children working on it at once. The sand-tray can be used on the floor, on trestles, or on an ordinary table. When not in use it can be kept on the floor, or placed against a wall. It also forms a good background for objects used in drawing lessons. The advantage of this large sand-tray, round which a number of children can stand, over the small tray used for demonstration by the teacher, which is the kind most often seen, is very great. The tray can also be used for history lessons, and indeed for any lesson that can be illustrated by modelling in damp sand.

I have not, except incidentally, mentioned the furniture and equipment of the part of the school building in which brushwork, design, and drawing are taught—partly because I think every part of the school should be adapted for the teaching of these subjects, as being among the most educative and far-reaching in their effects on character and taste in the whole curriculum; partly also because the subject of art teaching has been specially dealt with in the February number of *THE SCHOOL WORLD*.

GENERAL CONSIDERATIONS.

With regard to the whole question of school furniture and equipment, the following general considerations should be borne in mind:—

(1) The best school furniture is that by which the health, comfort, and best working conditions for pupil and teacher are secured; at the same time, it should be pleasant to the eye.

(2) The healthiest and most educative decorations for schoolrooms are:—

(a) Good pictures, especially those which have a bearing, direct or indirect, on world history and literature.

(b) Those which illustrate intelligent nature-study, viz., growing plants and living animals, kept in healthy surroundings.

This last condition can only be secured by constant care on the part of the teacher out of school; but the work is surely infinitely more refreshing and stimulating, and therefore more educative and altogether better, for teachers and pupils, than the correction of exercises and examination papers which has hitherto occupied so large a part of their leisure time.

THE superintendent of the public schools of Kokomo, Indiana, finds, as the result of an investigation, that cigarette-smoking boys are two years behind the non-smokers of their own age in their studies. The general conduct of the smokers is also far below the average; some reports say of them, "Self-control poor, inattentive, not trustworthy; bad memory, careless, excitable, and nervous; lazy, sleepy, and slow to move; heavy eyes and frequently sick; no energy, naturally bright, but no power of concentration; vacant stare, gloomy and listless."

LEVELS AND CONTOUR-LINES.

By A. MORLEY DAVIES, B.Sc.(Lond.), A.R.C.Sc.(Lond.)

II.

WE must now turn to account in the in-door study of maps the knowledge gained in our out-door work. Our first task will be to draw a profile of the actual slope we have levelled over, and the first step in this is to prepare a scale of feet. Near the left-hand upper corner of a sheet of drawing-paper we rule a vertical line, and measure off on it distances of an inch and $1\frac{1}{4}$ inches from the same point at its lower end. Each of these divisions is then divided into eleven equal parts by the well-known parallel-line construction. The larger divisions then stand for 100 feet, the smaller (of which only the lowest need be drawn) for 80 feet. By means of spring-bow dividers divide the latter into four equal parts, and we then have a scale reading to 20 feet.

Rule a horizontal line two or three inches from the top of the paper to represent the sea-level. This we call our base-line (why we leave so much room below it will presently appear). Taking a convenient point on this as the starting point, measure off from the map the distance from this to each point on the traverse-line the height of which is exactly known, and transfer these distances to the base-line. In doing this we assume our traverse-line to be a straight one, as it very nearly is in the chosen example. If it is not, we must rule on the map a straight line following its general direction, and measure along this.

From every datum-point on the base-line erect a perpendicular, and measure off on it by the scale its proper height above sea-level. From each point so obtained then rule a straight line to the next point, and thus obtain an approximately accurate profile for the surface of the ground. It is true that the ground does not slope uniformly from one datum-point to the next and then suddenly change, but the minimum risk of error is run in representing it so, at least to begin with.

We are soon struck by the insignificance of the ups and downs of the ground in comparison with its horizontal extent. On the scale of six inches to a mile, the starting point is a trifle more than $\frac{3}{8}$ inch above the base-line, the summit a trifle under $\frac{5}{8}$ inch, while our "eye-height" unit is imperceptible, being about $\frac{1}{250}$ inch. It will be a good thing to measure the gradient from point to point, as well as its average from start to summit, and the following equation may be useful:—

$$x \text{ feet in a mile} = 1 \text{ in } \frac{5280}{x} = \tan^{-1} \frac{x}{5280}$$

In our actual example the steepest gradient is about 1 in 13, or an angle of between 4° and 5° .

When we see how small is the angle made with the horizontal by the profile of what seemed to us a moderately steep hill, and how difficult accurate delineation of slight differences of height is, even on so large a scale as that of the six-inch map, we

shall realise the justification for exaggerated vertical scales, especially when any smaller horizontal scale is in use. It will be well, then, to accustom ourselves at once to exaggerated slopes, by drawing on the same sheet, below our first true profile, two others, with the heights exaggerated, in the one 5 times, in the other 10.

We next turn to the one-inch map of the district that includes our traverse-line, and identify our positions there and our contour-lines. For this purpose the edition of the one-inch map printed in black, without hill shading, will be the best, for although the contour-lines are much more easily seen on the colour-printed edition, they are slightly less accurate. It will be a good plan to set every student to work at his own copy of the one-inch sheet, tracing out the contour-lines carefully from point to point, and marking them in with indelible red ink.¹ Careful tracing in this way will be valuable in impressing the characters of contour-lines on the mind in a way which mere inspection cannot. But if time does not allow of this, the colour-printed edition may be used. In any case, the particular contour-lines which came under observation during field work should be traced to a considerable distance, special note being taken of their variations in curvature—sometimes straight, more often curved, now toward this direction, now towards that, throwing out loops around spurs of higher ground and doubling back in acute V's where they cross a valley. Incidentally we shall come across isolated more or less circular contours, which always mark hills, never valleys.

No less important is it to note the varying distance apart of the contour-lines. It will be well to take two lines, and tracing them for some distance measure every *maximum* and *minimum* distance between them, and determine the gradient in each case. In doing this it will quickly be realised that at each maximum and minimum the two lines are momentarily parallel, and that the measurement must be made at right angles to them, a fact which has an important application,

as we shall see very shortly. The following formula serves to connect distance apart of contour-lines at intervals of 100 feet, on a one-inch map, with gradients:—

$$y \text{ inches distance} = \frac{100}{y} \text{ feet in a mile} = 1 \text{ in } 52.8y.$$

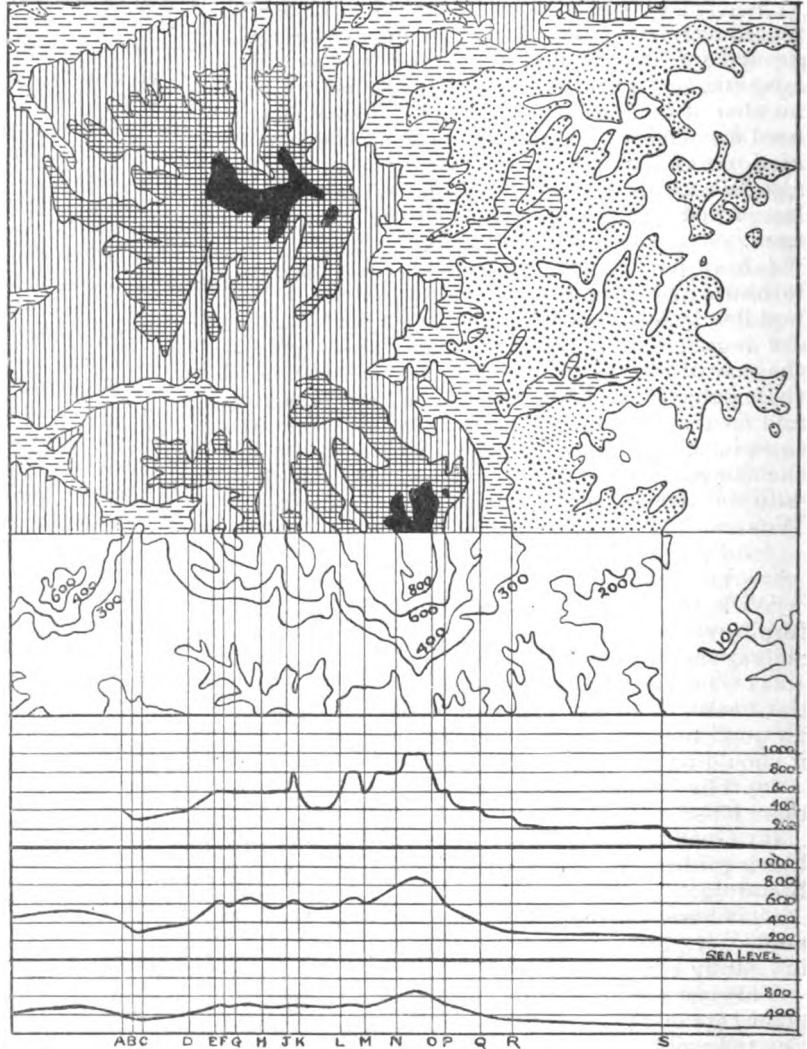


FIG. 1.—Contoured map of the Hindhead district, Surrey.

Scale: 1 inch = 2 miles. Contour lines at intervals of 100 feet up to 400 feet, then at intervals of 200 feet. Below are three profile-sections, taken along the line at which the contour-shading ceases. The uppermost illustrates some of the mistakes commonly made in drawing sections. It and the next one have the heights exaggerated 5.28 times; the lowest one has an exaggeration of only 2.64 times. The horizontal lines are $\frac{1}{16}$ inch apart.

In this way the form and grouping of contour-lines will gradually come to have a concrete meaning for the student, and this result will be further helped by the construction of profile sections.

If we make up our minds to work on an exaggerated vertical scale, the making of sections will be greatly simplified by the use of squared paper, such as is now so generally employed in elementary practical science. Taking paper ruled in inches and tenths, we find the most convenient vertical scale to be—1 inch = 1000 feet—an exaggeration

¹ Higgins's Indelible Inks (Charing Cross Road, W.C.) are good for this purpose. Ordinary red ink will be fatal to the subsequent use of the map in the field in case of rain.

of 5.28 times as compared with the horizontal scale. For the sort of profiles met with in the south-east of England this scale is very suitable; but for very hilly districts, such as Wales or the Pennines, a less exaggeration may be better—say, 1 inch = 2000 feet.

The first section drawn should be along a line continuing the original traverse line in both directions. Others can be chosen to cross well-known hills and valleys. A pencil-line being ruled across the chosen part of the map, the distances at which it crosses successive contour-lines should be measured by dividers and transferred to a horizontal line which shall stand for the sea-level on the squared paper. Each of these points is then projected up to the appropriate height, which will always be that of one of the ruled lines, since they are at a distance apart representing 100 feet. By joining up the points so obtained the surface-profile is drawn. In doing this the following facts will soon be apparent to the intelligent student, and, with a little stimulus from the teacher, to all the class:

(1) Every contour-line must be crossed in its proper order, *e.g.*, you cannot cross 200 and 400 without 300.

(2) In passing from any hill-top to any valley-bottom or *vice versa*, each contour-line must be crossed an *odd* number of times.

(3) If a contour-line of the same altitude is crossed twice in succession, the direction of the slope of the ground must have altered between. Thus, in Fig. 1, the 300-foot contour is crossed at B and C, the 400-foot contour preceding and following at A and D. Evidently, somewhere between B and C there is a *minimum*-point, a point of change of gradient-direction, or, in simpler words, a valley-bottom. Similarly, between E and F there must be a *maximum*-point or summit. The contour-lines fail to indicate the height of any such valley-bottom or ridge-top crossed by the section, except in the rare cases where a contour-line is touched tangentially by the line of section, as at M. As a rule, we must make an estimate of the probable height of such points, by noting how far off they are from the contour-lines along a line at right angles to the line of section, or, in the case of a valley, along the valley-line. Thus, we cannot suppose the ground to fall much below 300 feet between B and C, if we notice on the map what a long way off the 200-foot contour is.

(4) The gradients shown on a profile-section are almost always (after allowing for the exaggeration of scale) *less* than the true gradients, because, as we have already seen, these must be measured at right angles to the contours, and the chances are against a line of section cutting any particular contour at right angles. In this respect the section in the figure is more fortunate than most.

Some common mistakes in drawing profiles may be noticed here. They are illustrated by the uppermost of the three sections in Fig. 1. The "step" notion of contours is shown in the right-hand part, from J to S. Although in this crude form its absurdity is easily made manifest, it is a

subtle error difficult to eradicate wholly even when one is most on guard against it: it will be found present in a much milder form in the second of the three sections, in the neighbourhood of S. An error of the opposite kind is the rectilinear profile, seen in the upper section from A to J. Of the two this is the less serious error, and indeed rigidly straight lines are far preferable to the horrible wavy or shaky lines which introduce impossible peaks and valleys everywhere. But best of all is the steady curve from point to point which practice enables one to draw, and with which the difficulty of maximum and minimum heights seems to settle itself.

Although it is well to spend a little time in this way on the 1-inch map, work of the kind described is more quickly done on maps which show the relief by means of colour. Of such the most suitable are Bartholomew's cycling maps on the scale of 2 inches to a mile. In these, the intervals between successive contour-lines are coloured in a series of tints ranging from dark green (sea level to 100 feet), through pale green and brown to dark brown. The publishers have a limited stock of copies from which all names and other black printing are omitted, which they are willing to supply to teachers, and this will be found the most convenient form to use in class-work. It should be noted that up to 400 feet the contour-lines are at 100-foot intervals, but above that at 200-foot intervals only.¹ This is quite justifiable, because the higher we rise above sea-level the steeper does the average gradient become, and the less frequently need contour-lines be drawn to exhibit the forms of the land. (On the one-inch Ordnance Map, above 1,000 feet, contour-lines are drawn at 250 feet intervals only.) The only objection to this method is that it may in some cases make high-level plateaux seem flatter than they really are. It must, of course, always be borne in mind in dealing with this map.

Several sheets of this map should be provided—the local one, of course, and in addition others illustrating different types of country. The London sheets (25 and 30) illustrate well the "escarpment" type of hill country (the Chilterns and North Downs) as well as a great river valley with its tributaries; while the Pennine sheets are good for a more mountainous type of country.

On these the following kinds of problems can be worked:—

(1) Estimate gradients by relative crowding or spacing out of contour-lines.

(2) Draw profile-sections on squared paper.

(3) Trace lines of watershed, and determine their relation to contour-lines. Each is a *locus* of maximum height, but its actual height varies irregularly from point to point, in marked contrast to valley-lines (*loci* of minimum height), which have a steady slope in a constant direction. Thus hills are not inverted valleys. If a mould of any land-surface were taken and inverted, it would show a surface

¹ This applies to the colours only; on the ordinary edition of the map the intermediate contour-lines are dotted in black.

unlike anything in nature: the hills would all be unbroken ridges, branching out and sinking steadily in one direction, while the low ground would be full of hollows that would act as lake-basins, but would have no regular drainage-system.

(4) Simple engineering problems, *e.g.*, find the best route for a railway between two given points in different river-basins; which is, of course, the problem of finding the lowest point on the intervening watershed, and the easiest route up to it from either side. Such problems will especially appeal to boys, and will be an excellent test of their ability to form a clear idea of the meaning of land-forms. Reference to an ordinary map will show how the actual railway lines run, and thus the imaginary routes can be brought to the test.

From this it is an easy step to still smaller scale maps coloured on the same principle, not only for England but for Europe and the other continents, such as the excellent little hand-maps published by the Diagram Company, or those in Philip's or Arnold-Forster's recent school atlases. Similar problems to those just suggested, though of course of a much more general kind, can be worked.

Such work, besides its immediate value in teaching geography, has several indirect advantages. The tracing of profiles, both true and exaggerated, on squared paper should be a good introduction to the general use of curves similarly traced, in physics, in meteorology and in statistics. The mental realisation of such relatively concrete things as contour-lines makes it easier to understand their more abstract analogues, such as isotherms and isobars. The understanding of geological maps is greatly facilitated by an acquaintance with the appearance of contour-lines. Lastly, the construction of profiles affords good practice in freehand drawing of a useful kind. As in many other cases, the complaint of an overcrowded curriculum, which may be raised against the kind of work we have been suggesting, is only formidable as long as we regard each subject as ring-fenced, and until we see that better methods of teaching in one part of the curriculum must almost certainly save time and trouble somewhere else.

There are ten grammar-schools in Queensland—six for boys and four for girls. Each school is governed by a board of seven trustees appointed by the Government, and of these four are nominated by the Governor-in-Council, and the others by a majority of the subscribers to the funds. The trustees hold office for three years, and are eligible for re-election. They are empowered to make regulations for the filling up of all vacancies that may occur in their number for the unexpired portion of the term of office, for the determination of fees to be paid by the scholars, for the salaries to be paid to the teachers, and generally for the management, good government, and discipline of the school. All such regulations are subject to the approval of the Governor-in-Council. Endowment at the rate of £1,000 per annum is paid by the State to each grammar school. On the 31st December, 1900, the aid granted by the State from the first institution of grammar schools reached a total of £266,535 9s. 11d. A short Act amending the Grammar Schools Amendment Act was assented to during the year, which makes provision for the State inspection of grammar schools.

SCHOOL MUSEUMS.

By J. H. LEONARD, B.Sc.

There is now, happily, no need to insist on the importance of science teaching in schools—whether this be regarded as part of a general education or be viewed as the preliminary to more serious scientific or technical work in after life. Yet, while there is general agreement that no school curriculum is complete without its science lessons, it still appears incumbent upon those who have at heart the interests of science teaching to reiterate that the practical and the experimental constitute the only methods which result either in an adequate scientific training or lead to any true knowledge of nature. It is from this point of view that the school museum is here regarded; for the writer feels that a properly kept museum may be made a valuable factor in the heuristic teaching of science in the school possessing it.

In the establishment and maintenance of a school museum two fundamental principles would appear to exist. (1) The exhibits should be in a position to be readily and often inspected by the pupils; and (2) these exhibits should, in their nature and arrangement, have an educational value.

Let us consider the first point, *viz.*, that the exhibits should be so located as to be readily and frequently seen. We most of us know that type of school museum having its local habitation in a carefully locked room, jealously guarded by the curator, who—if not otherwise engaged—would permit inspection of its sacred contents under his personal supervision. To have such a room at all times open constitutes a considerable improvement; but even then, there is the fatal objection that only a small proportion of the pupils become acquainted with its contents with any lasting benefit to themselves.

Why should not the cases of the school museum be distributed all over the school? While fulfilling the above principle, such an arrangement would certainly economise space, and would present no difficulty in being worked out practically on some plan like the following.

The cases used could be about eighteen inches long, twelve inches broad, and two or three inches deep. Such cases with glass fronts are procurable from any dealer in natural-history appliances, and the cost would be about five or six shillings each. The size indicated would be sufficiently large for most objects. One or two larger cases could, of course, be used, while many botanical specimens could be mounted and admirably exhibited in ordinary oak picture-frames. The especial point to be noticed with respect to any form of case is that it should be as far as possible dust-tight.

Cases such as these could be fixed to the walls of the class-rooms, and the pupils would thus get thoroughly familiarised with their contents. If necessary, the cases might be shifted at intervals from room to room—a point to be considered when a given class does most of its work in one room.

Should a still larger case be required, a cupboard provided with glass doors above and drawers below might be placed across a corner of the "big school-room." It would cost comparatively little, and would certainly be a great acquisition; but the bulkier specimens could be shown above, while the drawers would be used for duplicates or for objects of minor interest or importance.

The second point now claims attention, viz., the nature and arrangement of the objects exhibited. As a general rule, only common objects should be admitted to the school science-collections; mere curiosities, as such, should be rigidly excluded. It is of some importance to have as many exhibits as possible contributed by the pupils themselves. The latter condition will, of course, not be possible under all circumstances; but it should be kept in view, as it leads all to take an interest in the museum. Objects so contributed should bear the name of the donor on the label.

Everything exhibited should, if possible, be of such a size as to facilitate future recognition of another specimen. Especially does this remark refer to minerals and rocks; mere chips of these are of no value. Moreover, every object should be shown from the point of view of its scientific interest or importance, and also—where possible—from that of its use in arts or manufactures. The exhibits will thus tend to assist the acquisition of both scientific and technical knowledge.

Among the objects displayed in a school museum should be the commoner varieties of minerals and rocks; and their utility for ornament or for building purposes should be indicated. A most instructive series would be one to show the effects of weathering on a rock—the formation of angular pieces through the action of frost, the wearing down of these to form gravel, sand, or mud. A few of the commonest fossils would, if well arranged, give a glimpse of stratigraphy which would be certain to interest. Specimens of the common metals—iron, copper, tin, lead, and zinc—with a few of their principal ores, would form another series; while the different stages in the manufacture of a nail or a pin would bring home to the young observers the technical importance of such substances.

On the botanical side, wild flowers would claim a share of attention; and examples of the foliage and fruit of the most useful British trees, with samples of their timber, &c., would prove an important series; as also would specimens of the cotton-plant and cotton. On the animal side, the commoner genera and species of shells might be shown; and the commoner insects, with special exhibits having reference to the honey bee and the silkworm. A series of birds' eggs would be certain to meet with great favour.

It may be mentioned here that a most interesting section of the museum may be kept working, at least during the summer term, by having a rack with a series of test-tubes or boiling-tubes containing water in which fresh wild flowers are kept—a new series being placed there each week or so. A dried collection of the wild plants of the neighbourhood, if the school happen to be situated in

the country, would form a valuable additional feature.

The arrangement and labelling of the contents of a school museum is a matter of the utmost importance. A well-arranged and properly labelled collection, even of the commonest objects, will be of infinitely greater service than a costly series of exhibits bearing only name labels with the specimens having little relation to one another. In short, a series of specimens should be definitely connected with one another, while the labels should constitute a condensed and simple account of the subject, the exhibits taking the place, as far as may be, of the illustrations in a book. An occasional drawing may be here and there interposed with advantage, although it is better, if possible, to obviate this by exhibits bearing "flag-labels" or "pointer-labels" to the different parts.

If anyone desires an object-lesson as to how to arrange the exhibits in a school museum, he cannot do better than visit the Natural History Museum in London. In the Mineral Gallery he will find a series of specimens arranged so as to form an introduction to the study of minerals. Half-an-hour spent at these cases will indicate to him more clearly than mere description how entertaining and instructive any collection can be made even to a person who up to that moment may know nothing of either subject or objects. And if such a one will inspect the cases in the entrance-hall of the Natural History Museum, he will see to what a fine art the proper labelling of museum specimens can be carried, so as to make them tell their own story and be easily understood. If such considerations hold good with respect to adult visitors to our national collections, how much more weighty must they appear when we consider the tender intelligences of children and the educational importance of their school museum!

Is it too much to hope that in the future no school will be considered as properly equipped which does not possess a museum of its own? The more it is considered the more important and varied does its scope appear. Its usefulness in the teaching of science—chemistry, botany, geology—is too patent to call for detailed notice. Its resources, slender though they be, can be occasionally drawn upon in the teaching of geography—and even of history, if the collection be fortunate enough to possess one or two flint flakes or implements. And the thought cannot help occurring to the mind that if, as indicated above, some technical objects were present, the information conveyed would not only be valuable in itself, but that—who knows?—the school museum might come to have a more serious import if it set young brains a-thinking at a period of life when the world seems still new.

A few words may be added respecting the curatorship of such school collections as we have been considering. While a master or mistress is naturally best qualified to hold such a position, the dignity of the scheme is vastly enhanced by the appointment of sub-curators, each interested in his own special department. These would together

form the museum committee. The sub-curators should be allowed to do their share of work in arranging, labelling, procuring fresh exhibits, &c., &c., and generally in furthering the interests of the museum. That there will be no lack of helpers is a matter of the writer's personal experience wherever any scientific work is going forward—from bottle-washing upwards. Moreover, the research entailed in museum work is good from every point of view; no less because it encourages perseverance in a quest for further information and in hunting up authorities than because it fosters a community of interests between teacher and taught in out-of-school work.

THE HISTORY OF EDUCATIONAL OPINION.

PROFESSOR LAURIE occupies one of the first chairs of Education established in the United Kingdom. Under the provisions of Dr. Andrew Bell's will, his trustees in 1872 devoted a portion of the funds arising from his estate to the institution of two professorships of the Art, History, and Theory of Education, the one in Edinburgh, and the other in St. Andrews. Since that time Professor Laurie has amply justified the choice of the trustees by publishing in succession lectures and articles on the "Training of Teachers," on "Linguistic Method," on the "Institutes of Education," and on the "Life and Educational Writings of Comenius." He has succeeded not only in leavening the teacher's profession and in raising the educational ideal in Scotland, but also in establishing a precedent which has since been followed at Oxford and Cambridge and London, at the colleges of the Welsh University, and in the great provincial institutions of university rank which have lately been created in Manchester, Birmingham, and other industrial centres in England.

The present volume appears to us to be the most important contribution Mr. Laurie has yet made to educational science. It consists of a series of historical and critical monographs descriptive of the educational writings of da Feltre, Sturm, Neander, the Jesuit Fathers, Montaigne, Rabelais, Bacon, Ascham, Comenius, Milton, Locke, and Herbert Spencer. It is no disparagement to the excellent work which Mr. Quick and Mr. Oscar Browning have already done in the same field to say that Mr. Laurie's survey of the history of thought and speculation on educational subjects takes a high rank in the same category, and in many respects supplements in a fresh and striking way what those authors have said.

In particular the author furnishes copious and

characteristic extracts from some little-known books, such as Sir Thomas Elyot's "Governour," and Rabelais' "Life of the Great Gargantua," and explains with fulness the *ratio studiorum* and *ratio docendi et discendi* of the Jesuits. He also gives a particularly thorough and judicious estimate of Ascham's teaching. His final judgment on the tendency and outcome of the work of various authors is generally just and careful, and is often happily and epigrammatically expressed. For example, he says of Montaigne: "Few writers say so many wise things, and no one appears so little solicitous about convincing others that his sayings are wise. His intellectual philosophy is essentially sophistical and sceptical, his morality conventional, and his moral philosophy epicurean."

The largest space devoted to any one writer is occupied with a detailed criticism of Locke, whom Mr. Laurie regards as the "greatest of all educational writers, in spite of his attitude to language and literature and his encyclopædism." Herbert Spencer, whom he designates the *modern sense realist*, is the subject of a polemical chapter, in which Mr. Laurie argues with great clearness and force to show the inadequacy of that writer's moral ideal, and criticises his well-known *dicta* on the relative values of different kinds of knowledge. This chapter might be usefully compared with Mr. Quick's well-known analysis of Spencer in "Educational Reformers."

We have not space to discuss the other contents of this important and suggestive volume. It must suffice to say that Mr. Laurie puts into every page proofs of careful research, wide knowledge, and keen insight into the heart of educational problems. We may honestly commend the book to the serious study of all teachers who wish to make themselves acquainted with the history of their profession, and with some of the best things which have been said and thought about it.

SENECA'S SATIRE ON CLAUDIUS.¹

CONSIDERING the importance of Seneca to the historian, the philosopher, and the literary critic, it is surprising that so little attention has been paid to the Satire on Claudius. As a record of the aspect presented by the pedant emperor to his contemporaries it has indeed been used fully enough; but the wit and humour of the piece, and its merciless satire, should give it a place in the classical student's library. And yet, if we may judge from the fact that this appears to be the first separate edition of the piece in English, and that we have met with no translation of it published in this country, it must be

¹ "Studies in the History of Educational Opinion from the Renaissance." By S. T. Laurie, A.M., LL.D., Professor of the Institutes and History of Education, University of Edinburgh. (Cambridge University Press.)

¹ Columbia University: Studies in Classical Philology. "The Satire of Seneca on the Apotheosis of Claudius, commonly called the 'Αποκολοκύντωσις.'" A Study by Allan Perley Ball. vi. + 256 pp. (Macmillan.) 6s.

unknown to the majority of those who can read Latin.

As a human document, too, it has a considerable value. It is so unlike the rest of Seneca's works; it is so far removed from the Stoic calm that there is some excuse for the doubts which have been freely cast on its authorship. Rightly regarded, however, it is not inconsistent with Seneca at all. It may not suit this or that conception of Seneca, but even a Stoic may have had human weaknesses; and it brings Seneca much nearer to us if we regard him neither as a philosopher unmoved by good fortune or ill, nor as a consummate hypocrite who had no sincere feelings at all, but as a man capable of just resentment and, even when sorely tried, of vindictiveness in expressing it. We will not form a theory about Seneca from his works excluding the Satire, and then declare that the Satire is impossible for the person we have created. Mr. Ball states the evidence for and against quite fairly, and comes to the conclusion that, while the Satire cannot be proved to be his, the balance of probability is in its favour; this we will accept, as preferable to ascribing so clever a work to an unknown author, or to some mediæval forger.

The portraiture of Claudius is cruel, and has the tone we might expect from a high-spirited man who had been long compelled to swallow and hide personal humiliations and to see without comment the monstrous tragi-comedy of imperial Rome. The wit is as undeniable as the bitterness. All the unlovely peculiarities of the poor misbegotten creature, his dulness and callousness, his clumsy learning, are brought clearly before us with unerring touch; if his better qualities are not shown, that is natural in a satire. Equally clever and more enjoyable, because less malicious, are the numerous hits at contemporary Rome; the sham of imperial deification is exposed, the solemn muddle of law business in such an age, and there is a delightful parody of senatorial procedure in the heavenly debate, where, by the way, the characters of the gods are distinguished with a nicety which we seek in vain in Seneca's tragedies. The picture of the popular rejoicing at Claudius's death is vivid; pleaders whose occupation has been so long gone creep out of their holes and corners half dazed, and the procession of singers and revellers chant the emperor's dirge in terms which delight Claudius himself, who takes their sarcasm in earnest. But we have no space to indicate the literary merits of the piece; it must speak for itself, and we hope this edition may make many new friends for it.

Mr. Ball's introduction is exhaustive, dealing with all the aspects of the work; its historical and literary importance, the authorship, the Menippean satire, the manuscripts and editions, and the bibliography. The notes are also good, and give very full commentary and illustrations to the form and matter of the text. In the text itself, Mr. Ball follows Bücheler's small edition, from which he has rarely departed. There still remains much to be done on the text, and we wish Mr. Ball had given more attention to this side of his

work. For example: in ch. ii. he reads, "nimis rustice" inquires: "sunt omnes poetae non contenti ortus et occasus describere, ut etiam medium diem inquietent," which is just what they do not. They are all asleep at midday, consequently do not describe it, and Seneca fills the gap. The MS. *adquiescunt* is much better, and with a single transposition we get the required sense with "omnes poetae, contenti ortus et occasus describere, ut non etiam medium diem inquietent." *Timuerit* in ch. v., the MS. reading, is suspicious, and the sense Mr. Ball gets out of the passage is forced if not impossible. He has no convincing solution of the *crux criticorum* in ch. x., "si sormea graece nescit"; and there are many other passages still to solve. In his commentary on ch. vii., when he says the proverb *mures ferrum rodunt* does not occur elsewhere, he overlooks Herondas iii. 76, οὐδ' ἔκου χάρις οἱ μὴ δμοίως τὸν σίδηρον πρῶγουσιν, and it is perhaps the complement of the equally mysterious *mures molas lingunt* in ch. viii. The translation is close and generally correct, but its style lacks the neatness of the original. In offering these criticisms we do not suggest a condemnation of the book, but we would show how it may be improved. We hope Mr. Ball will continue his researches upon it, and give to scholars a fuller edition some day.

A MODERN TEXT-BOOK OF PHYSICS.

A TEXT-BOOK of physics, containing a succinct account of the physical properties of matter, brought up to date, and divested of all unnecessary mathematical difficulties, would be welcomed by teachers and students alike, throughout the British Isles. The two volumes before us constitute a first instalment of such a text-book, and being written by two physicists of the highest standing, they are sure to be widely circulated. The general get-up of the volumes leaves little to be desired; the illustrations might possibly have been rendered more interesting, and suggestive exercises or questions appended to each chapter would have proved useful to most students; otherwise the requirements mentioned above are amply fulfilled.

The first volume, on the Properties of Matter, is particularly interesting. The methods of determining g , the acceleration due to the earth's gravity, and G , the Newtonian constant of gravitation, are clearly and ably discussed, while the subject of elasticity is treated in a fresh and interesting manner. Problems on impact are commonly relegated to books on mechanics, but the method often employed is so exclusively mathematical in character that the short chapter on the subject in the present volume, where attention is directed

¹ "A Text-book of Physics." By J. H. Poynting, F.R.S., and J. J. Thomson, F.R.S. (Griffin.) Vol. I. Properties of Matter. vi.+228 pp. 10s. 6d. Vol. II. Sound. Second edition. xii. x+163 pp. 8s. 6d.

toward the physical aspect of the subject, will prove valuable to the student. Other subjects treated in the volume are the compressibility of liquids, capillarity, diffusion, and viscosity. The proof that, in a gas, the viscosity is independent of the pressure, within wide limits, should be welcome to students.

The science of Sound is largely composed of the study of the mechanics of vibration and vibrating systems. The second of the volumes before us has already acquired considerable popularity as an exposition of this branch of physics. In addition to the investigations usually met with in text-books on sound, accounts are given of musical sand, singing flames, and sensitive water-jets. The volume closes with a chapter on the theory of discord, in which an account of modern investigations on combination tones is included.

A NEW SCHOOL SONG-BOOK.¹

AMONG recollections of school life in after years probably few are more vivid and moving than the memory of times spent in the free and informal enjoyment of school singing—singing in which art was a secondary consideration or no consideration at all, but which aimed at the promotion of enthusiastic fellow-feeling by the employment of simple words and simple tunes, expressing elementary ideas and emotions which all the singers could feel in common and all could enjoy.

The apostle of this custom in England was the late John Farmer, whose vigorous personality gave it an impetus at Harrow and at Oxford which has caused it to spread widely throughout the country. The result has been a demand for suitable books of song, a demand which has been met by a liberal supply.

The book now before us is another effort in the direction of affording this needed supply, and, on the whole, a decidedly useful effort. Mr. Sharp's book includes no words or tunes which have not received the *imprimatur* of time. He has ransacked other collections for songs which have hitherto been less accessible, and has included many admirable specimens of national song which have almost been elbowed out of favour by the cheap trivialities of the music-hall. The book is published in two forms; a large edition with piano accompaniments and historical and explanatory notes, and a small cheap edition containing words and melodies only.

It is unfortunate that the editor should have undertaken to correct the universal taste of the British race with regard to the words and tune of the National Anthem. It is a pity also that he should have missed the opportunity of printing the

correct hexatonic-scale version of "Loch Lomond." But, in spite of these and several similar blunders, he has compiled a useful book and one which deserves to be considered seriously by school music-masters.

SCIENCE WORKSHOPS FOR SCHOOLS AND COLLEGES.¹

By Prof. HENRY E. ARMSTRONG, LL.D., Ph.D., F.R.S.

THE importance of experimental studies carried on with the object of affording training in scientific method as a necessary part of the ordinary course in schools generally, whatever their grade, is already so widely recognised that ere long every school will certainly need its *workshops* as well as its *class-rooms*. It is therefore desirable that the general character of the requirements should be understood, in order that buildings may be properly designed to accommodate all necessary fittings and appurtenances—and more particularly to afford the necessary working space.

In preparing such a statement, it is well to look ahead and to foreshadow the policy of the future, as the whole question of school design may assume a very different aspect in years to come; indeed, the architect may play a by no means unimportant part in helping on reforms which many think to be very necessary if practical work is to take its proper place in the ordinary curriculum of every school.

I propose to illustrate my arguments largely by reference to the new buildings at Horsham for Christ's Hospital School, which have been erected from the designs of your President and Mr. Ingress Bell to accommodate 820 boys. The position and size of the Science Block, with reference to the other school buildings, shows obviously that extraordinary importance will be attached to experimental studies in this school. The Science Block occupies practically one side of the quadrangle; the opposite side is occupied by the chapel, the class-rooms and school-hall filling the third, the dining hall the fourth side. The floor area of the ordinary class-rooms is 15,482 square feet, that of the rooms in the Science Block is 10,326 square feet, the area of the four large rooms—the science class-rooms proper—in which the boys usually work being about 8,200 square feet.

But the provision which will be made at Horsham for work such as I am contemplating will not be confined to the Science Block. At no distant date, I trust, there will be distinct workshops for manual training in wood and metal; and the engineering appliances generally will afford opportunities for the instruction of the more advanced boys in the use of machinery. Moreover, surveying and map making will be practised in the country round, and there will be abundant opportunity for other out-of-door studies; besides school gardens, a set of experimental plots are now being laid down on the lines of those at the Rothamsted Agricultural Station which have so world-wide a renown.

Christ's Hospital School, in fact, ere many years are past, should be a model school; and it is because the buildings illustrate so many important points that I propose to refer particularly to them. I am the more inclined to do so as the Christ's Hospital buildings mark an extraordinary advance—far greater than most of those who are connected with them have realised, I think.

¹ "A Book of British Song for Home and School." Edited by Cecil J. Sharp, B.A. (Murray.) 7s. 6d. net. Also small crown 8vo. edition with words and airs only. Cloth, 2s.; paper, 1s. 6d.

¹ From a Paper read before the Royal Institute of British Architects, January 19th, 1903.

In the past it has been customary to teach some branch of science—usually either chemistry or physics or both—and laboratories have been required for this purpose; in fact, the word

character, it is obvious that the fittings must be planned and arranged accordingly.

In the past, as a rule, subjects have been taught in watertight compartments; but there is a growing tendency to co-ordinate much of the teaching, especially in the junior classes. Thus, mathematics has been taught in the class-room as a desk subject, whilst elementary physical measurements which have been neither more nor less than practical mathematical exercises have been carried on in the laboratory under the science teacher. It is urged—and with force—that the teacher of mathematics must adopt practical methods and relieve the teacher of science of much that now falls to his share. Clearly, one of two courses must be adopted—either the necessary provision must be made in the mathematics class-room for the practical study of the subject or a large part of the mathematical teaching must be transferred to the science workshop. A good deal of drawing is now done incidentally in the course of the science lessons; and gradually we are also recognising that the science work has a literary side. Everything points, in fact, to a time when class rooms such as are now provided will be of subordinate

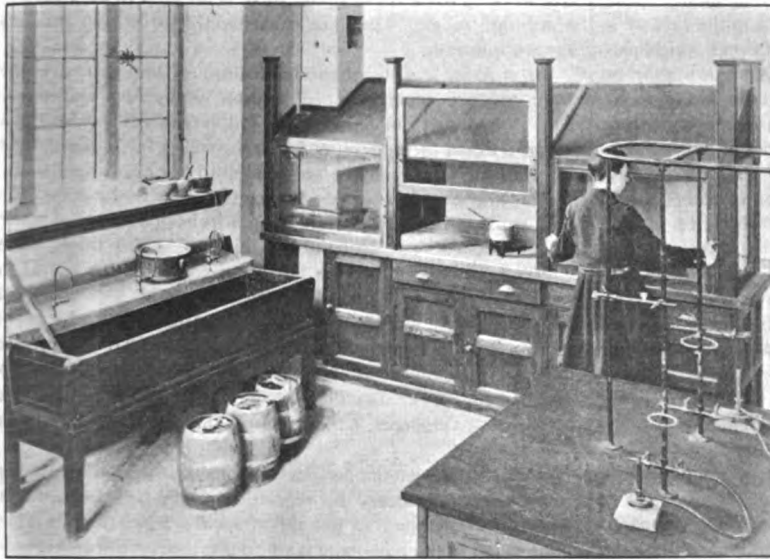


Fig. 1.—Large sink, ventilation hood, and end of working bench, in Dalton workshop.

laboratory has a specific connotation in connection with the teaching or practice of some branch of experimental or observational science. Unfortunately, in introducing experimental science into schools, the mistake has been made of merely transferring red-hot embers from the university or college and then proceeding to keep the fire burning on the professional lines followed in the technical school. We are being led gradually to see that this mistake must be rectified: that it is not the province of schools to teach any branch of science technically or even specifically. We desire, in fact, to get rid of formal science and to give broad training in scientific method—to subject the young scholars to the practical discipline to be derived from experimental studies; we do not wish to make specialists of them. A step is gained by substituting the word "workshop" for "laboratory": by so doing we not only make use of a word which is familiar to English ears but gain an enlarged and more definite conception of the kind of work to be done. Everyone thinks of work done in the class-room as different from that done in the workshop. It is material to my argument that in the workshop the onus is cast on the worker rather than on the director: one of the chief objects of introducing experimental studies into schools is to train boys and girls to be self-helpful.

At Christ's Hospital the four chief rooms in the Science Block are called Science Workshops and are distinguished by the names of Cavendish, Dalton, Davy and Faraday—all classic names in the history of English science.

If the work done in the school workshops is to be of a general

nate importance in our English educational system—to a time when we shall justify our contention that we are a practical people.

To summarise my recommendations, I would say that in designing science workshops the architect and his technical

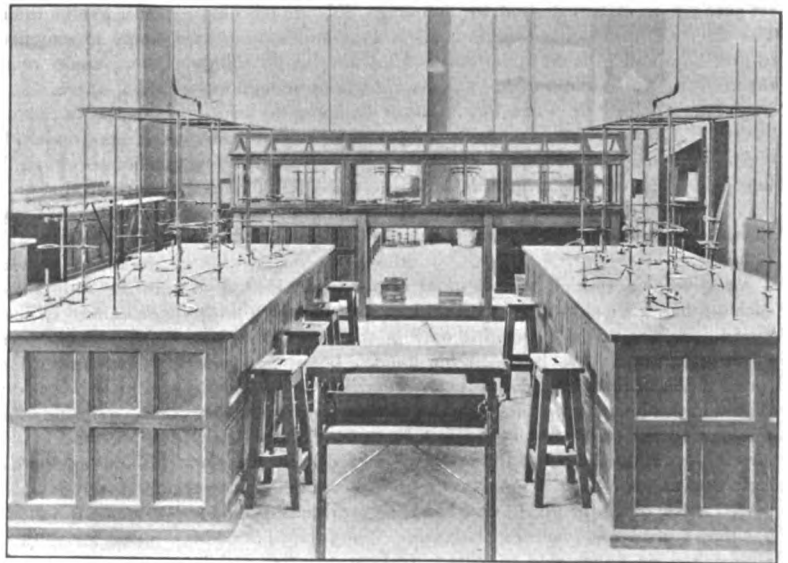


Fig. 2.—Two benches in Dalton workshop with gas-standard supports. Balance bench in background.

advisers should have three S's in mind—*Sense, Simplicity and Space*. There should be due knowledge and understanding of the requirements to be met; mere copying should be impossible. The provision made should be of the simplest character possible—because simplicity of provision conduces to simplicity

of practice; and the space should be ample—for almost anything may be done, given sufficient space; and to grant proper space is to show proper respect.

It is not my province to consider external design or general architectural effect, but I will venture to urge that money spent on judicious ornamentation is always well spent in the case of a school. We give far too little heed to the influence which surroundings exercise on young people; and if we are ever to recover the sense of artistic feeling, we must do far more to make our schools attractive. The disregard of property which seems to be so characteristic of boys at the present day—which leads them to kick open doors, to wipe their feet on the railway carriage seats, &c.—is probably a consequence of the fact that at school they are not placed under conditions which would lead them to be mindful of their surroundings. It is astonishing that the example set by Thring at Uppingham has met with so few followers hitherto: "thinking in shape," such as he advocated, is one of the most powerful means of stimulating the imagination and of developing æsthetic tastes; and it is so easy to carry out his idea in these days, as magnificent photographic reproductions of the masterpieces of Nature and of Art are to be had at comparatively small cost. The moral of these remarks is that neither class-room nor corridor should be without its picture rail. I would also plead for a more liberal use of colour and of line decoration in our schools.

Before describing the science workshops at Christ's Hospital, I should say that the fittings were not thought of until long after the building was designed. Of course, to secure the best result, "the punishment should fit the crime"—the building should be designed to the fittings, not *vice versa*.

The workshops differ in an important manner from the laboratories hitherto provided for schools. There are four main rooms—about 30 feet by 60 feet—in which classes are held; and to each of these are attached a number of subsidiary rooms. (Plans accompany the paper.)

No lecture room is provided; the omission has been made of set purpose, as it was desired to discourage didactic teaching. The object of introducing experimental science into schools is to give boys and girls an opportunity of learning to do things themselves; the time devoted to such work is brief enough and they cannot afford to waste any of it in listening to formal lectures. Full provision is made in each room for such didactic teaching as may be necessary by providing a demonstration bench in front of which there is sufficient space left free for seats in two of the rooms, whilst in the others uprights are fixed, provided with small desk-tops, at which the class can stand and take notes.

Moreover, no special balance-room is provided; instead of such a room, a novel fitting—a balance bench—has been introduced. At first this was provided only in the two of the four workshops which were intended for juniors, but it has been found so useful that a third has been ordered, which is to be placed in the Faraday workshop. The balance bench is merely a long narrow table (2 feet by 12 feet by 3 feet 6 inches high) covered by a glazed case for the protection of the balances. In fact, instead of having a number of balances within separate glazed cases, one large glazed case has been provided to contain a number of separate uncased balances. The balance table is approached on either side from the working benches and is arranged at right angles to these. Four boys can work at either side and one at each end. The glazed fronts are hinged at the bottom to the table top and drop down. Holes are made in the table top wherever desirable underneath the balance pans, so that objects may be suspended from the balance pan and weighed, for example, in a pail of water underneath the table. The arrangement has the great advantage that the teacher has the scholars under complete control and is able to see whether

they are weighing properly. The balances placed in such a case are those required for all ordinary work. There is no difficulty in dealing with the more delicate balances required for advanced work: these are always provided with a case; and as the sensitive working parts are of agate, there is no need to keep them in a separate room. They are conveniently placed on brackets against the wall.

Store Room.—A third special feature of importance is the store or stock room attached to each of the four workshops. This is intended not only for the ordinary stores but also as a room in which the apparatus for experiments left unfinished at the end of a lesson may be set aside until the next attendance.

Working Benches.—These are of two kinds—those for ordinary work and those at which work involving the use of water may be done. The distinction is fundamental, I think. The former have teak tops; the latter are covered with lead. In days gone by, when the only science taught was analytical chemistry, there was much washing out of test tubes to be done: consequently numerous sinks were provided. To the present day, the regulations of the science branch of the Education Department specify that there should be a water-tap and sink for every two students, but fortunately the rule is qualified by an "if possible."

If only to prevent the general but inexcusable habit of wasting water from growing up, this regulation should be abolished. It is the more necessary to get rid of such a regulation, as it has done much in the past—and is still doing much—towards retarding the proper teaching of science in schools, on account of the expense involved in carrying it into execution; and it has given rise to numerous disputes, sensible people seeing that such provision is quite unnecessary. Besides the intolerable waste of water, the presence of sinks on the benches involves the constant wetting of the bench near the sink. Fortunately, the class of work now advocated for schools requires the use of water but seldom, so that there is no longer any excuse for providing sinks except in special places. But I would warn architects that they must harden their hearts on this point—as they will meet with many unimaginative teachers who will hanker after what has been, whilst others will think it so convenient to have sinks here, there and everywhere, if they do not object to allow scholars to move a few feet towards a convenience. There is no more reason, however, why sinks should be everywhere in a laboratory than there is to have one in every room in a dwelling house so that all washing up may be done on the spot. I need scarcely point out that the economy involved in localising the water supply, sinks and drains is very great. At Horsham, in the rooms on the upper floor, all sinks have been placed near to the walls; the waste is carried down to the floor below in pipes fixed in chases in the walls. On the basement floor, cross channels have been avoided as much as possible.

The conventional top hamper which is erected on the bench in most laboratories has been got rid of; in three of the rooms an arrangement has been substituted which provides both a gas service and upright supports to which the rings, &c., required to hold apparatus can be clamped. Uprights made of quarter-inch iron gas-barrel have been bolted to the table top 1 foot 6 inches from the outer edge, at intervals of about 3 feet. A few inches above the top these are fitted with crosses into each of which two eighth-inch bore gas-taps (Baird and Tatlock's) are screwed. At the top, these uprights are connected together by half-inch barrel. These cross-connections form a complete circuit, which in turn is connected with the gas main brought down from the ceiling. By bridging the interval at the top by pieces of board, shelves are formed on which, for example, a vessel to be used as a reservoir may be placed; or pulleys, &c., may be hung from the cross-pipes, which form a gallows along the whole length of the table. If bottles are needed these can be arranged

inside the uprights along the middle of the bench. If it be desired to produce a decorative effect and to protect the wood against acids, white glazed tiles having pieces of indiarubber glued to the underside by bicycle cement may be arranged within the line of uprights. What is wanted on a school bench is working space; shelves only serve to obstruct the view and to carry bottles which are rarely used.

The arrangement which I am here advocating has been carried out in a slightly different way at the Christ's Hospital Girls' School, Hertford, in the new science room designed by Mr. Stenning. Four parallel benches about 20 feet long are arranged along the length of the room. That at the windows is suitable for senior work. The remaining three are so placed that girls may work facing the light, standing against the inside edge of the two outer benches, which have wooden tops and are provided with gas but not with water; the middle bench is covered with lead and there are three sinks in it and a larger sink at either end. The girls can turn from the *working bench* to the *water bench* whenever necessary, the one water-bench serving for the common use of the two sets of girls. The sinks in this bench are mainly for use as pneumatic troughs: two are 1 foot 6 inches and one is 2 feet 6 inches long. I venture to think some such arrangement as this is about the simplest and most common-sense plan that can well be adopted. The tops of the working benches overlap the cupboards six inches, so that the girls may sit and write at them. The gas standards are fixed six inches from the outer edge and are tied by the overhead mains which run along the benches and across the room.

(To be continued.)

THE TEACHING OF GEOMETRY.

By W. D. EGGAR, M.A.
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THERE is a difference of opinion amongst teachers as to the need of a course of strictly demonstrative geometry for all students. I do not intend to go into this question, but I will confine my remarks to the practical geometry, which we are unanimous in regarding as necessary, whether to precede and accompany Euclid or to stand alone. To quote from the preface to Kitchener's Geometrical Notebook: "Beginners in geometry are met with two main difficulties, the one of grasping geometrical ideas, and the other of seeing the force of geometrical reasoning. These two giant difficulties are usually attached together, and many boys are so encumbered with the double combat that they do not slay either of the giants. . . . It is a safe guide in all teaching to make your pupils familiar with things before you give your theories." Now these words and the Notebook which they preface were published in 1868, and, if they had been properly attended to, there would be no occasion for people like myself to get up and utter platitudes. But our wonderful examination system has grown and spread till its branches overshadow the nursery windows. A course of practical geometry takes time. Children are often clumsy in using ruler and compasses, but many sharp children of ten can learn Euclid so as to deceive the very elect; and I suppose it has been found profitable for examination purposes to set the modern child to learn Euclid so soon as he should be able to draw something that a sympathetic teacher may regard as a triangle.

¹ An Address given to the Conference of Science Teachers at Chelsea, on January 9th, 1903.

It was not ever thus. Newton did not read Euclid till he went to Trinity, and Sir Henry Savile, then nearly seventy, concluded his lectures to the University of Oxford with these words: "Gentlemen, I have by God's grace done what I promised; I have redeemed my pledge; I have expounded to the best of my power the definitions, postulates, axioms and the first eight propositions of Euclid's Elements. *'Hic, annis fessus, cyclos artemque repono.'*"

If teachers, or rather examiners (for teachers are and must be bound by examinations), are going to insist on a considerable amount of accurate drawing and measurement as a preliminary to Euclid (and by Euclid I mean any course of demonstrative geometry), then they must be content to postpone Euclid to a much later stage in the child's career. I should like to give reasons for this statement. The experimental work to be of any use must be accurate. It is no good to regard two straight lines as practically equal if they differ by $\frac{1}{4}$ inch. We must insist on the utmost accuracy attainable with the ordinary instruments used, and lengths ought to be correct to $\frac{1}{100}$ inch, angles at least to the nearest degree. Anything short of this is not only unsatisfactory to the learner, but positively harmful. It fails to impress him with the absolute truth of the law he is discovering, and it tends to lower his own standard. One of our difficulties in the elementary physics laboratory is to overcome the tendency of pupil (and teacher too) to become content with less than the utmost attainable accuracy.

Well, if you exact this, it can only be from children who have at least learned to write decently. Again, if your course is to be really experimental, each child must go his own pace. The teacher must not go in front with a spade to smooth the way, but rather come along behind to give a very occasional leg-up. Anybody who has had to do this kind of work must know how very helpless boys are at first, and what full instructions are necessary. So we must give the child the fullest details of the experiment he is to perform, and we must expect him to be able to read and understand English. If he can do this and can write a fair hand, and knows his arithmetic as far as decimals, he is fit to begin a course of experimental geometry; but he is probably not much under eleven years of age.

One very important thing is to make pupils work from written or printed instructions; to be able to use their books intelligently. However full or explicit they may be, it is probable that several of the students will fear to launch away until the guide comes round. In time, the feeling of helplessness disappears, but it is very marked at first. We will suppose, then, that each beginner is provided with complete written or printed instructions. Next, for the experiments themselves. All things are not expedient. Some experiments, such as finding the volume of a solid by displacement of water, are inconvenient for a class-room, though suitable enough for a laboratory; so that in the choice of experiments teachers must be guided by their individual circumstances. But at least the first object to be attained is to instil the notions of lines, points, angles, areas, volumes. In my opinion, this is best accomplished by simple measurement. Measurement of length, of course, comes first. Give a boy plenty of practice in measuring lengths in inches, tenths and hundredths, and in centimetres and millimetres, making him estimate the second place of decimals. This at once clears his ideas on the decimal system, and gives him a notion of the degree of accuracy which is obtainable and ought to be demanded. Similarly the difficulty that some people have in realising what an angle is does not long survive a course of measurement of various angles with the protractor. I have been told of a prominent novelist who at school could not, and for all I know cannot now, grasp the notion of an angle. I have heard of a former Chancellor of the Exchequer who refused to look at any figures in which occurred the decimal point, which

he stigmatised as "that dashed dot." If these gentlemen had begun their geometry by measurements of the kind I have mentioned, I do not think their deficiencies would have become notorious.

Measurement of area is, I believe, best begun by counting the squares in an irregular figure drawn on squared paper. This and the measurement of volume ought to follow the measurement of angles and to precede the course of geometrical constructions. For volumes, inch and centimetre cubes are very useful, and can be obtained quite cheaply. Blocks and models of various solid figures should be handled, their surfaces and edges and corners counted, so as to clear the ideas on the subjects of points, lines, surfaces, and solids, before the course of geometrical constructions is started.

When this begins, let the ordinary constructions be illustrated by paper folding. It is a very simple matter to make the student obtain, by paper folding—

A straight line,

The right bisector of a straight line,

The bisector of an angle,

The perpendicular to a straight line,

The incentre, circumcentre, and orthocentre of a paper triangle.

Tracing paper is most useful in the testing by superposition of the equality of angles. In all these experiments the student must be given full instructions what to do; but no help until he has proved himself helpless.

There is a little pamphlet by Mrs. Boole, published by Messrs. Benham, of Colchester, on the "Cultivation of the Mathematical Imagination." This ought to be studied by teachers engaged on this kind of work, and studied sympathetically with a view to adapt its suggestions to their own particular circumstances. One very important remark contained in it is to the effect that "no attempt should be made to quicken the child's perceptions by any magnetic stimulation from the teacher, whose personality and influence should be kept as much as possible in the background." Now this is a counsel of perfection, and in class-teaching it is impossible to carry it out fully with all the members of the class; but, at any rate, it should be followed in the case of the more able students, and the more stupid ones should receive not more magnetic stimulation than is necessary to keep them within measurable distance of the others. Mrs. Boole's remarks on the introduction of the child to Euclid I. 47 are perhaps more suited to the kindergarten stage; but they are worthy of attention, since so many of our pupils have not had the advantages of a good early training in mathematical notions.

One word as to instruments. First, as to dividers: the ordinary cheap pair of dividers with stiff joints is useless for accurate measurement of lengths. One either pulls the points too far out or not far enough. If you want to measure to hundredths of an inch you must have a screw adjustment in one of the legs. This adds to the cost; but without it dividers are not worth getting. Parallel rulers are also useless things. Parallels and perpendiculars should be drawn with set squares, which should be introduced at a very early stage. A ruler divided in inches and tenths, and in centimetres and millimetres, is necessary. A bevelled edge has advantages, but, on the other hand, it is unsuitable for putting against a set square. The 60° set square should have a mark on the longest edge, so that it can be used after the manner of marquisse scales, the slope being, of course, one in two instead of one in three. The protractor is an important instrument, and I am inclined to prefer the rectangular shape, as easier to obtain accurate results with. The beginner has no difficulty in understanding the way in which it is obtained from the graduated semicircle, if this is once explained to him. I have with me two specimen boxes, supplied by Messrs. Aston and Mander, containing instruments suitable for

the kind of work. A hard pencil with a chisel edge and a pair of pencil compasses are, of course, necessary. I would recommend that the work be done in books, not on loose paper, though this is wanted for the paper folding, and so, by the way, are scissors.

The students should be encouraged to make a list of the geometrical facts which they encounter, and a separate collection of geometrical constructions. Accuracy and neatness are of the utmost importance. These are often conspicuously lacking in boys of great mathematical ability, and for such boys a course of this kind is chiefly valuable as a training in these virtues. I have had much difficulty in convincing a clever pupil that a picture of an amœba is not satisfactory as representing a section of the human eye. And in this connection I should like to say that the freehand drawing of straight lines, perpendiculars, bisectors, circles, and triangles of various kinds is worthy of being practised.

I have been speaking thus far of the earlier stages of this practical geometry, in which the substance of Euclid Book I. and parts of Books II. and IV. are dealt with. I must now touch briefly on the order in which we should take the remaining parts of the work. And here I speak with more confidence, as I have had for a good many years to teach geometrical drawing as an Army subject to boys whose knowledge of Euclid did not extend further than Book I.; so that I had always to explain most of the constructions in a practical way. The subject of proportionals, for instance, had to be attacked by means of the boys' arithmetical notions of proportion, and there was never any difficulty in approaching it by this road. On the contrary, it is a far easier route than by Euclid's definition of proportion, which very few boys are capable of grasping. I wish it to be understood that I have the greatest reverence for Euclid, and I think that his modern detractors do not realise sufficiently the conditions for which he wrote. Imagine yourself writing a practical treatise for the use of students whose knowledge of arithmetic is limited to simple addition and subtraction—for, of course, multiplication and division in Greek or Roman numerals would be beyond all but the cleverest mathematicians. Imagine also that the apparatus and instruments consist of the floor, a piece of chalk or charcoal, and a bit of string; and if you improve on Euclid's treatise without standing on his shoulders you will be a wonderful man. But, once again, imagine Euclid himself and his pupils all provided with paper, pencils, compasses, and set squares, and better still, with Arabic numerals and the decimal point; and do you suppose that Euclid will follow his old treatment of parallels, of areas, of proportion, and of arithmetic, as dealt with in Books VII., VIII., and IX.? If so, you will believe that Hannibal, in possession of both ends of the St. Gothard tunnel and all the Italian railways' rolling stock, yet insists on ordering a consignment of vinegar and taking his army and elephants over the pass. I maintain that a course of practical geometry is bound to adapt itself to modern conditions, and to follow the order which agrees best with drawing-office methods; in fact, it should be a course of geometrical drawing taught, not merely as a collection of rules, but by a series of experiments following one another in logical order. That order cannot be the same as Euclid's order. The nearest approach to Euclid's order appears to be to take the substance of Euclid Book I., then III. 1-34, IV., VI. and II., III. 35-37.

Can such a course stand alone, or must it always be accompanied by a course of strictly demonstrative geometry? On this, as I said, I am not prepared to dogmatise. But I am certain that practical geometry must be taught in close conjunction with arithmetic and the beginnings of algebra. Algebra naturally begins in line with the substance of Book VI. and Book II., which should be extended so as to bring in mensu-

ration of solids as well as areas. Graphs, of course, have come to stay, and the solution of quadratic equations ought to be accompanied by a geometrical solution depending on Euc. III. 35, 36.

In conclusion, I must ask you to forgive me for saying over again what has been said already many times. The forbearance with which you have listened is one more proof that the present time is one favourable to reform. All change is not reform; but we cannot be wrong in recognising this very old truth, wrapped up in the disused books of Euclid's Elements like the wheat in the mummy, that geometry and arithmetic are one.

THE CARNEGIE TRUST AND THE SCOTTISH UNIVERSITIES.

THE Carnegie Trust, in conformity with powers conferred on them by their charter, have issued a scheme of Research Fellowships and Post-Graduate Scholarships at the Scottish Universities or allied institutions. The Executive Committee have decided that it was not desirable to allocate definite sums or to offer separate endowments to individual universities. They have, therefore, established a common scheme, the administration of which they have retained in their own hands. As they had no means of determining the probable number of applicants for the various scholarships and fellowships, they have purposely refrained from stating the precise number of each to be awarded annually. Should, however, the funds at their disposal prove inadequate to meet all deserving applications, they may hereafter delimit more precisely the amount of grants for each class. The Committee very wisely insist that a Scholar or Fellow should not be allowed during the tenure of his scholarship or fellowship to engage in other work that would interfere with the progress of his research. The value of these scholarships and fellowships may not appear very tempting to English graduates accustomed to the munificence of the Rhodes and other scholarships. But in Scotland, where the tradition still lingers that plain living and high thinking go together, they will suffice to attract the very best class of men,—those who have a genuine interest in and a special capacity for higher study and research.

The following are the main provisions of the scheme:—

Scholarships in Science and Medicine.—A Scholar must be a graduate of a Scottish University who desires to devote himself to higher study and research in some department of science or medicine.

A scholarship shall be of the annual value of £100, payable by half-yearly instalments in advance, the second instalment being payable on the receipt of a satisfactory report by the scholar and certificate from the authority under whose supervision the scholar has been working.

A Scholar shall ordinarily be expected to devote his whole time to the purpose for which the scholarship is awarded.

A scholarship shall ordinarily be tenable for one year; but it may be renewed for a second year if the executive committee deem this expedient.

By accepting a scholarship a scholar comes under an obligation to submit such reports on the progress of his work as the executive committee may require.

Fellowships in Science and Medicine.—A Fellow must be a graduate of a Scottish University who has given evidence, preferably by work already published, of capability to advance science or medicine by original research, and who desires to devote himself further to this work.

A fellowship shall be of the annual value of £150, exclusive of such special expenses in connection with his research as the executive committee may allow.

A fellowship shall ordinarily be tenable for two years.

Scholarships in History, Economics, and Modern Languages and Literature.—A Scholar must be a graduate of a Scottish

University, preferably with honours in at least one of the groups—history, economic science, English, modern languages and literature—who desires at home or abroad to devote himself to higher study and investigation within the scope of these groups of study.

A scholarship shall be of the annual value of £100.

Fellowships in History, Economics, and Modern Languages and Literature.—A Fellow must be a graduate of a Scottish University, preferably with honours in at least one of the groups—history, economic science, English, modern languages, and literature—who desires to investigate at first-hand, at home or abroad, some historical, social, economic, or educational problem or factor of modern civilisation, and who can give evidence by his previous career and general culture, and also preferably by work already published, of capability to advance knowledge by his proposed investigation.

A fellowship shall be of the annual value of £150.

Carnegie Grants in Aid of Research.—An applicant for a research grant must be a professor, lecturer, or assistant in a Scottish University, a teacher in Scotland recognised for the purpose of graduation by a Scottish University, or a Scottish University graduate resident in Scotland.

An applicant must furnish the executive committee with information regarding his experience in research, the nature of the research in which he desires to engage, &c. The publication, in some form, of an account of the results of the research will be expected in all cases.

Instruments of permanent value purchased by means of the grant shall be placed under the care and at the disposal of the institution in which the research has been conducted.

Date of Application.—Nominations for scholarships and applications for fellowships and grants must be lodged with the secretary not later than 1st May in any year. The final award of the executive committee will be announced in due course, and all scholarships, fellowships, and grants awarded in any year shall date from October 1st, unless expressly stated otherwise.

ITEMS OF INTEREST.

GENERAL.

REPRESENTATIVES of the Incorporated Association of Headmasters, the Association of Technical Institutes, the Headmistresses' Association, the Assistant-masters' Association, the College of Preceptors, and the Teachers' Guild, formed a deputation to the President of the Board of Education on March 17th to make representations on the subject of the proposed education authority for London. Dr. Scott urged the desirability of following the analogy of the Act of last year, since it made a single rating authority for each area, and enabled all education to be properly co-ordinated. The deputation maintained that an *ad hoc* authority was not best fitted to organise education in London, but that the County Council of London was a body which had been tried and had been successful in its work. Miss Connolly pointed out the importance of the inclusion of women on the new education board. Lord Londonderry promised that careful attention should be given to the views expressed by the deputation, but regretted his inability to give definite information as to the intentions of the Government. He called the attention of the deputation to the fact that if the course recommended by them were carried out the borough councils would be completely ignored on the central board for education.

THE action which the Government propose to take as a result of the recommendations of the Committee on Military Education was outlined in Mr. Brodrick's speech in the House of Commons on March 9th. The Director-General of Military Education is, for all purposes connected with the examination of candidates before they enter the Army, and with their training

before they are commissioned, to have a board consisting of the four heads of the military colleges—Woolwich, Sandhurst, the Staff College, and the Ordnance College—and be assisted by two representatives of the Universities, one selected by the Headmasters' Conference, one selected by the Incorporated Association of Headmasters, and one by the Royal Society, so that it may be ensured that scientific attainments are not forgotten. Further, there are to be two members nominated by the Secretary of State, as was recommended by the Committee. It is proposed to leave in the hands of the new Board the settlement of the syllabus of examination. The whole examination for Woolwich and Sandhurst, for the Army and for the Militia, is to be held if possible in one examination, and the higher the candidate gets the wider is to be his choice of selection as to the branch of the Army he wishes to join. Two years' training at Sandhurst will be required, as is at present the case at Woolwich.

In order to secure for the Army men who have had a public school and university career, and to enable them to enter the Army on equal terms with the men who have not, it is proposed that a boy shall complete his period at the public school, and that before he is 20 he shall pass Moderations at Oxford, or some equivalent examination at another University. Before the age of 20 the intending officer must have not only passed this test examination, but must have done six weeks' training with a Line battalion or Regular unit. Having done this, the candidate will be given a provisional commission at the age of 20; and, although he may return to the University, he will rank in the Army from the age of 20, instead of waiting till the end of his University career. He will be required to take honours at the University; and the Universities are to be asked to include in the honours examination two or three military subjects—tactics, military topography, and military history—and to provide proper lectures on those subjects. Any candidate who may pass with honours, and who has done another six weeks of military training, will be allowed to enter the Army, provided that he enters it before the age of 22, as having been commissioned from the age of 20. It is proposed within the next few weeks to hold a conference between the War Office authorities and the Universities as to the establishment of the new system.

THE new scheme for educating officers of the Navy will involve the creation of a large Naval College at Osborne. The boys will remain there for four years—from thirteen to seventeen; and it is important that the tuition should be of the best. A deputation from the Modern Language Association was interviewed by the First Lord of the Admiralty and Mr. Arnold-Forster last month. The deputation consisted of Messrs. F. Storr, A. A. Somerville, E. R. Edwards, and de V. Payen-Payne, and it was introduced by the President of the Association for 1903—Sir Arthur Rücker. The chief points laid before the First Lord were:—The importance of laying stress on the teaching of the mother tongue, without which all modern-language teaching is made very difficult; the nature of the entrance examination, which should consist chiefly of dictation, reading, and test the power of understanding the language when spoken; the importance of making the modern-language teaching at the College colloquial and literary, and leaving naval technicalities to a later stage; and, lastly, that, in view of the special requirements of the naval officer to be able to speak foreign languages rather than to write them, that a great deal of the teaching should be of an oral character. We trust that both French and German will be made compulsory at the College, and not alternative as in military colleges; for, seeing the vigour with which the Germans are pushing their Navy, they will no doubt create a huge literature on this subject as they have on others, with which it will be necessary for the Naval Officer to be acquainted.

A MEMORANDUM has been circulated amongst members of Parliament stating the views of the London headmasters of secondary schools as to the principles which should be embodied in the Education Bill for London. It is submitted that the London County Council should have sole control in all financial matters, and that the new Education Board should be supreme in all educational matters. In connection with the constitution of the board, the headmasters suggest 65 members as a suitable total, 33 to be members of the London County Council, and 32 non-members. Of the 33 members 29 should be chosen by the Council so that one member would represent each of the 29 metropolitan borough areas, including the City, whilst the other four would be selected without regard to the representation of borough areas. The remaining 32 members should be selected by co-optation, nomination, or recommendation, under a scheme to be drawn up by the Council and approved by the Board of Education. It is also suggested that borough committees should consist of 15 members each, eight appointed by the borough council from among its own members and seven in pursuance of a scheme, variable according to local circumstances (but in all cases providing for the appointment of at least one member by the board), to be drawn up by the London Education Board with the approval of the Board of Education.

THE Incorporated Association of Assistant-masters, too, has circulated a memorandum stating its views in regard to the forthcoming London Education Bill. In its opinion, the measure should provide for the establishment of a single authority charged with the supervision of all educational institutions not of university rank within the area, such authority to exercise all powers concerning education other than elementary which are secured to the local authorities set up by the Education Act, 1902, and to control all expenditure of rates and taxes on education within the area. The Association suggests that the London County Council should be the education authority, and should act through a statutory committee, provision being made for the appointment on the committee of members of the present School Board and of representatives of recognised educational associations.

THE Association of Headmasters of Preparatory Schools resolved, at a recent special meeting in connection with the new proposals for entry into the Navy, an article on which appeared in our issue for last February, "that in the opinion of this conference it would be in the interests of the boys, and therefore of the Navy and of the nation, if the age for entry to the Royal Navy were fixed at 13-14 instead of 12-13 as in the new scheme." Among the reasons given for the resolution were the following: In the memorandum presented by the Admiralty to Parliament in December, 1902, it is stated that "the age of 12-13 corresponds to the age at which boys leave private schools, and therefore to a natural period in the system of education which obtains in this country." This is an obvious error. Comparatively few boys leave preparatory schools for their public schools before 13, and the conference voted unanimously that 13½ is the best age for boys to enter public schools. The last year of a boy's life at a preparatory school is rightly regarded as of the utmost importance in his moral, mental, and physical development. If the higher age—*i.e.*, 13-14—is adopted, preparatory-school masters will cordially co-operate with the scheme; but if the lower age is adhered to the tendency will be to discourage the best preparatory schools from taking boys for the Navy. The early age now proposed for the examination will involve a strain on boys from the age of 9-12 which is highly to be deprecated.

AT the general meeting of the Nature-Study Exhibition Association held on March 6th, the report of the Executive Committee was adopted. The report was highly satisfactory and showed

a balance in hand of sixty pounds. Though the association has been, for the present, dissolved, we are glad to learn that numerous local associations of a similar character have been formed and arrangements are being made to hold exhibitions in different parts of the country. Towards the end of May, an exhibition, on lines corresponding to those on which the exhibition at Regent's Park was conducted last July, will be held at Bristol in connection with the Bath and West and Southern Counties Society, and a conference of teachers will take place at University College, Bristol.

THE President of the Board of Education has appointed Mr. H. M. Lindsell to be Principal Assistant-Secretary for elementary education in succession to Mr. John White, who retires in April. Mr. Cyril Jackson succeeds Mr. T. King as Senior Chief Inspector of Elementary Schools.

A SMALL temporary committee of investigation into the education and training of urban and rural pupil-teachers has been appointed. It will consist of Messrs. Legard, Buckmaster, Airy, R. F. Curry, and Mr. Grindrod as Secretary and Organising Inspector. Miss Hale, Principal of the Edge Hill Training College, Liverpool, will also insist in the investigation. The duties of the Committee will be (a) to inspect the different methods that have been adopted in recent years, especially since the Report of the Departmental Committee in 1898, in certain urban and rural districts for organising the training and instruction of pupil teachers; (b) to confer with the Inspectors in each district, and to suggest to the new local authorities means of initiating or improving such methods; and (c) to advise the Board of Education as to the changes that may best be made in the existing regulations of the Board, and possibly in the arrangements of grants, in order to facilitate the improvement and co-ordination of this part of our educational system.

THE annual report of the Teachers' Training Syndicate of the University of Cambridge shows that during 1902 two examinations were held in the theory, history and practice of education. The June examination was held at London, Cambridge, Cheltenham, Liverpool, Edinburgh and Cardiff, when 76 candidates presented themselves, of whom two were placed in the first class, 34 in the second, 29 in the third, and eleven failed to satisfy the examiners. The December examination was held at London, Cambridge and Cheltenham, when 69 candidates were examined, and of these seven were placed in the first class, 45 in the second, eleven in the third, and six failed to satisfy the examiners. This makes a total of 145 candidates examined this year as against 189 in 1901. For the certificate of practical efficiency 126 candidates presented themselves, of whom 46 were placed in the first class, 66 in the second and 14 in the third, none of them failing.

ST. KENTIGERN'S Hostel for women students of the University of St. Andrews is moving at the end of this session from its old quarters in North Street to a larger and more convenient house near the Links, within five minutes' walk of the University. The chief object of St. Kentigern's Hostel is to provide a place of residence for those women students who desire a home life and surroundings, together with assistance in preparation for the University classes, and supplementary instruction for the preliminary and degree examinations. The Hostel is conducted on Church lines, but students of all denominations are received. The inclusive fees for board, lodging, and tuition by the Hostel teaching staff are £46 a year. There are several scholarships connected with the Hostel, for information concerning which application should be made to the Principal, Miss Tate, St. Kentigern's Hostel, St. Andrews, N.B.

THE *Westminster Review* for March contains two articles likely to interest those engaged in educational work. The first, by Mr. P. S. Burrell, entitled "Too much Education," is a little pessimistic in its tone, but contains one or two useful suggestions. Reviewing the result of the educational efforts of the last thirty years, Mr. Burrell is by no means satisfied; he says: "When men are casting up the balance, they find, if anything, less contentment; that the progress in virtue is nothing to boast about; that advance in genuine refinement is, at least, questionable; and that foreign competition is more menacing than ever." Mr. Burrell comes to the conclusion that the great present need is such a re-organisation of our education as will secure "the thorough teaching of a few well-selected subjects, encourage the habit of doing and learning things for oneself, and provide a reasonable amount of leisure for both teacher and taught."

THE second article is concerned rather with the physical well-being of our children. Mr. J. H. Vines is concerned with the physique of the public-school boy, and he comes to the conclusion that there has been a distinct improvement therein, notwithstanding the educational activity of the last quarter of a century. For instance, the article shows that "a boy of thirteen at Marlborough College to-day weighs, on an average, five and a-half pounds more than a boy of the same age weighed there in 1874, and he is also two inches taller. A boy of eighteen at Marlborough to-day is four and a-half pounds heavier, and nine-tenths of an inch taller than his father (now aged forty-seven) was, supposing that the latter had been at Marlborough twenty-nine years ago." "Boys of thirteen, fourteen, fifteen, and sixteen, at Rugby School to-day are . . . both taller and heavier than they were twenty-two years ago, while boys of seventeen average nine-tenths of an inch taller, but are one pound less in weight."

A VERY interesting paper on "Education in the Netherlands" was read at the general meeting of the Society of Arts on March 4th, by Mr. J. C. Medd, who recently visited Holland to report on the education of that country for the Board of Education. The paper is printed in full in the issue of March 6th of the *Journal* of the Society.

DR. KIMMINS contributes to the *University Extension Journal* a short article showing how the new Education Act may be utilised to extend and broaden university extension work. With the repeal of the Technical Instruction Acts, there is no longer any need to exclude lectures on history and literature from aid from public funds. Local authorities in attempting "the general co-ordination of all forms of education" need not now confine their support to lectures dealing with branches of technical education. All such difficulties have been removed by the new Act; and local authorities will have, says Dr. Kimmins, great difficulty in evading the judicious and persistent applications of local secretaries for the support of university extension lectures.

REPEATING her plan of last year, Miss Edna Walter will this year, if a sufficient number of names are received by an early date, take a party of schoolgirls to the Bernese Oberland, where Wengen has been chosen as a centre. The cost of a fortnight's holiday will be about ten guineas, and the tickets will be available for twenty-five days by those who care to prolong their visit. The outward journey will be *via* Dover, Calais, Laon, and Interlaken; the homeward journey will be *via* Interlaken, Brunig, the Brunig Pass, Lucerne and Paris. Further particulars can be obtained from Miss Walter, 38, Woodberry Grove, Finsbury Park, N.

THE current number of the *Record of Technical and Secondary Education* contains an article on the administration of the Education Act, 1902, which provides an explanatory and helpful review likely to be of great assistance to local authorities.

THE sixteenth issue of *The School Calendar*—which is a year-book of scholarships and examinations at public schools, colleges, and universities for the current year—published by Messrs. Whittaker and Co., is as complete as ever. It is an indispensable reference book for schoolmasters.

THE Civil Service Commissioners announce that an open competition for not fewer than thirty situations as Assistant of Excise in the Inland Revenue Department will be held in London and various provincial centres, commencing on the 12th May, 1903. The limits of age for the situations are 19 and 22 on the 1st May, 1903. The examination will be in the following subjects, viz.:—Handwriting; English composition, including orthography; arithmetic (to vulgar and decimal fractions); higher arithmetic, including mensuration, square and cube root, &c., and geography. Application forms must be sent in so as to reach the Secretary, Civil Service Commission, Burlington Gardens, W., not later than 23rd April. Assistants of Excise receive salary commencing at £50 per annum, and rising by annual increments of £5 to £80. They also receive an officiating allowance of 2s. per diem when actively employed. They are eligible for promotion to higher rank.

SCOTTISH.

LORD BALFOUR on a recent occasion invited discussion in Scotland on the educational problems that he will seek to solve in the forthcoming Education Bill. The response to his invitation has been most gratifying, if also somewhat embarrassing. In a multitude of councillors there must be wisdom, but it is difficult to find it if they all speak with different voices, and Lord Balfour has no easy task before him in seeking to crystallise into a workable measure the heterogeneous mass of opinion pouring in upon him. Probably owing to the imminence of the school-board elections, the representatives of these bodies have been the most voluminous, if not the most luminous, contributors to the discussion. When members of school boards ask that school boards be retained as the authority for all kinds of education, it cannot be forgotten that through their want of interest in higher education the provisions of the admirable Technical Schools' Act have never been enforced, and that the higher-class schools which were under their control were under-staffed and starved till the Education Department came to their rescue within recent years by imperial grants. Further, it is a fact that popular interest in School Boards, as at present constituted, is on the wane, as is evidenced by the fact that at last elections only about 20 per cent. of the electors took the trouble to record their votes. Whatever be the body finally chosen to administer local education, it must be one which will awaken popular interest and command respect.

THE following resolutions in regard to the proposed Education Bill for Scotland have been drawn up by the committee of the Association of Secondary Teachers:—(1) That the control of education should be exercised through a single central authority, namely, a Government department acting with the advice of an independent council and in co-operation with the local authorities. (2) That the local authority be the County Council, acting through education committees; or, alternatively, that the local authority be school boards of enlarged areas. (3) That this authority have control of all kinds of education,

and of the appointment and dismissal of teachers. (4) That the local authority be empowered to grant pensions to aged or disabled teachers. (5) That the local authority should have unrestricted power of rating for all educational purposes. (6) That a standard of qualification for teachers in all schools, public or private, should be fixed by the central authority.

CIRCULAR 374 of the Scotch Education Department (a large part of which was reprinted in last month's issue) cannot fail to have far-reaching effects on the school system of Scotland. The abolition of the Merit Certificate as the passport into a higher-grade school, or advanced department, is universally approved. It has all along been a fatal weakness of that certificate that it had to serve the twofold functions of "the leaving certificate of the elementary school" and "the passport into the secondary school." For the former object it was desirable that the standard set for it should be such as could be attained only by scholars of average ability at the age of fourteen, while for the latter purpose it should be attainable by pupils at about twelve years of age, if they were to derive full benefit from a course of secondary education. The special courses mapped out for pupils of the elementary school who intend leaving school at fourteen seem, on the whole, to be framed on most sensible lines. These courses have been subjected to a great deal of criticism on the ground that they encourage premature and immature specialisation. But though the names attached to the various courses give some ground for such criticism, a careful study of the subject-matter will show that nothing more is demanded of the pupil than is at present possessed by intelligent and well trained pupils of about fourteen years of age. All that the circular demands is that the teaching should be so organised and systematised as to give all pupils the advantages already possessed by those more fortunately situated as regards schools and teachers.

THE Leaving Certificate written examinations will begin this year on Wednesday, June 17th. Attention is directed to a modification in the present form of the higher Greek paper. In order to encourage the teaching of continuous prose composition, short sentences will no longer rank as an alternative to the easy passage of English set for translation into Greek. Continuous prose will thus be compulsory. As at the last examination, the first Honours paper, which will consist mainly of composition, will be entirely separate from that set for the Higher Grade. The Department also state that they have under consideration the advisability of introducing the same change into the English papers, but do not propose to carry the regulation into effect till June, 1904. In mathematics the only modification worthy of note is that which requires candidates to bring with them to the examination room simple mathematical instruments.

AN interesting decision has just been given by a full bench of the Court of Session as to whether a child in a public school is bound to take part in the physical exercises prescribed by the Code. The Court, by a majority of five to two, decided that the managers of a school were entitled to regulate such matters as physical exercises, especially as they were enjoined to do so by the Public Department which had authority over them. Parents who sent their children to public schools must conform to the regulations of such schools unless satisfactory reasons could be brought forward against them. It is well for the peace and comfort of teachers that the decision has been in favour of the school board, otherwise there was opened up an endless prospect of parental interference in the work of the schools. The wishes and inclinations of reasonable parents will be met none the less because of this decision, but it keeps a rod in pickle for the unreasonable one who now and then turns up.

IRISH.

IN addressing the fourth and last meeting of the first Council of Agriculture created by the Act of 1899 the Vice-President, Mr. Horace Plunkett, gave some figures relative to the progress of science teaching in secondary schools during the academic year 1902-3. This is only the second year during which the Department of Agriculture and Technical Instruction have had their scheme in operation in intermediate schools, and the progress cannot but be considered highly satisfactory. The number of schools working under the scheme in the year 1901-2 was 155; in 1902-3 it rose to 192; the number of pupils attending the courses of experimental science and drawing was 6,412 in 1901-2 and 8,706 in 1902-3, an increase of 37 in the number of schools and 3,294 in the number of pupils. In manual instruction and domestic economy the number of pupils was respectively 461 and 8 in 1901-2, and 1,144 and 112 in 1902-3. In each of the 192 schools a laboratory has been provided, in many cases new buildings being specially erected, and the estimated cost of the laboratories has been over £30,000. Further, 276 teachers attended summer courses in 1901 with a view to preparation for the work of the session 1901-2; and in 1902, 455 teachers attended similar courses to prepare for the session of 1902-3. Mr. Plunkett also quoted equally striking figures as to the progress of the educational work in purely technical schools. The first Council may therefore congratulate itself upon having very successfully initiated a forward educational movement for which there was ample room in Ireland. It now gives way to a new Council, two-thirds of the members of which will be appointed by the County Councils.

ANOTHER interesting departure has also been initiated by the Department. On February 17th the first meeting took place, at the offices of the Department, of the Committee of Heads of Secondary Schools, recently appointed to confer with the Department with reference to the extended programmes and regulations for science and art instruction. The Committee consisted of representatives appointed by various educational bodies, including the Roman Catholic Headmasters' Association, the Protestant Schoolmasters' Association, the community of Christian Brothers, the Convent Schools Committee, the Central Schoolmistresses' Association, and the Teachers' Guild. The programmes related to the work of the third and fourth years of the experimental science and drawing courses, which will come into operation during the years 1903-4, 1904-5. The Department was represented by the Vice-President (Mr. Plunkett), the Secretary (Mr. T. P. Gill), the Assistant-Secretary (Mr. R. Blair), and the Senior Inspector (Mr. G. Fletcher).

IN view of the inadequate endowment of Intermediate education, the various associations representing Intermediate teachers of all denominations were invited by the Central Association of Irish Schoolmistresses to send delegates to a Conference, which was held at Alexandra College on February 16th, to consider the question of petitioning the Chief Secretary to allocate part of the equivalent grant of over £140,000 now due to Irish education to secondary schools. It was unanimously resolved to ask the Chief Secretary to give the larger part of the sum to secondary education, that part of Irish education being the least adequately endowed. It was further suggested that schemes for its distribution might be drawn up by the Board of Intermediate Education after consultation with the schools, and the Chief Secretary was asked to receive a deputation to urge the claims of secondary education.

MEANWHILE the Intermediate Board has been making enquiries of managers of schools as to the qualifications and salaries of the

teachers, and there is little doubt that it is in this direction that most good can be done for Irish education. The Protestant schools would naturally like to fall in line with the development of English education, and to see the money spent in connection with a scheme of registration and training, and there can be little doubt that sooner or later such a scheme must come; but the Roman Catholic schools, in the absence of a University which satisfies their claims, have always been opposed to registration as demanding qualifications which at present they cannot possess or obtain. The existence, too, of a large number of Catholic teaching-orders greatly differentiates Protestant and Catholic education.

THE Irish Association of Women Graduates and Candidate Graduates has held its first annual meeting and adopted its annual report, in which it is pointed out how large an amount of work the Association has been able to do for women's education since its inauguration, drawing attention to the fact that in the first Blue Book of the Royal University Commission women's interests had received little attention, but that in the third a remarkable change was seen; their case had been heard and their views presented by two delegates of the Association and by subsequent witnesses.

TWO interesting papers have been read in Dublin; one on March 10th, in the Alexandra College, under the auspices of the Schoolmistresses' Association, by Prof. Mackinder, of Oxford, on "The Teaching of Geography," and the other on March 12th, in the Royal University, in connection with the Teachers' Guild, by Mr. J. Thompson, on "The Pronunciation of Latin."

THE Report of the Royal Commission on University Education in Ireland has at last been published. We shall not dwell upon it in this column, as it will be dealt with more fully in our next issue.

WELSH.

MR. JENKYN THOMAS, the hon. secretary of the Welsh County Schools Headmasters' Association, has written to Mr. Lloyd George a letter on the question of representation of school teachers on the new education authorities. He pointed out that, if the county councils refuse to allow outside bodies to nominate members of the education committee unless such bodies have themselves been elected by the people, then this policy would involve the exclusion of all primary and secondary teachers from the education committees. Mr. Lloyd George in reply considers that it would be a great misfortune so to exclude teachers. County councils, in Mr. Lloyd George's view, will invite teachers, both primary and secondary, to become members of the committee, "but they will be men whom they choose themselves."

THE Holywell County School Governors have obtained from the Board of Education the official interpretation of the words, "reached the fifth standard." This is stated to be that the pupil must have passed the examinations in respect of that standard. The County Governing Body, therefore, have now decided that, before pupils are admitted from the elementary to the county schools, they must produce certificates of having passed the examinations of Standard V.

THE headmasters of the Intermediate schools in Flintshire have passed the following resolution:—"That, considering the great importance as well as the difficulty of English grammar, as compared with the rest of the optional subjects in the Entrance Scholarship examination, and that it is the foundation of all progress in language study, this Association is unanimously of opinion that 50 per cent. more marks should be attached to it than to the other optional subjects."

THE Llandrindod Conference of the Local Educational Authorities of Wales to decide on a policy in view of the new Education Act passed the following resolution:—"That this Conference, while conceding absolute freedom to any educational authority in regard to making local arrangements for inspection, examination, and training of teachers, strongly urges upon each local educational authority in Wales and Monmouthshire to make provision in its scheme for the constitution—under the powers conferred by the Education Act, 1902, section 17, sub-section 5; section 23, sub-section 2; and the Local Government Act, 1888, section 81—of a joint education committee for Wales and Monmouthshire. That in the opinion of this Conference the functions of such committee should be restricted to examination and inspection of all schools and the co-ordination and the training of teachers of all grades. That such joint committee should in the opinion of this Conference be composed exclusively of members of the constituent education authorities." A committee was appointed to draw up a scheme. This involves eventually a request for a Government Education Department for Wales, at least so the mover of the resolution declared.

MOST important of all the speeches, perhaps, at the Llandrindod Conference was that of Lord Kenyon, who boldly advocated the desirability of an understanding between churchmen and nonconformists, and undertook to call a meeting which should be representative in North Wales of those who managed the voluntary schools. A committee was appointed by the Conference to meet the representatives of voluntary schools. There is a sense of hopefulness arising in the Principality that such a conference may settle the basis of a concordat and that thus, as Lord Kenyon said, "the blessings of education for the children of Wales may be secured, and that once and for all the question of education may be put outside the limits of party politics."

IN the report of the Scholarships Committee to the Denbighshire County Council, reference is made to a suggestion which had been before them as to the importance of modern languages and the best mode of giving instruction in them by means of a travelling teacher. The question, it was said, had been referred to the head teachers of the county schools and it was unanimously decided that there would not be any educational advantages by the employment of a travelling teacher for modern languages. Professor Lloyd at this meeting drew attention to the custom which has been established at Ruthin County School for Girls whereby each pupil leaving school is asked to give a book to the school library.

CURRENT HISTORY.

THE authorities of British Guiana are preparing to celebrate this year the centenary of their existence as a British colony. In 1803 the territory was taken from the Dutch. Who were the Dutch from whom we captured their South American colony, and how came it about that we were then at war with a country which since the time of William III. has generally been our good friend and ally, which indeed was in the eighteenth century described by Frederick the Great as Britain's "cock-boat"? It is a curious story, our relations with the "Dutch." We helped them against Spain to gain their independence in the sixteenth century. We fought with them in the seventeenth for commercial supremacy. In the eighteenth we maintained their independence against France, under the name of the "Protestant Liberties of Europe." But they were conquered by France at last in 1795, and made into a "Batavian Republic," which lasted till, in 1805, Napoleon placed his brother Louis on the throne of "Holland." It was, therefore,

from the Batavian Republic, an ally, often an unwilling ally of France, that we conquered Guiana. When the Treaty of Amiens was broken over the "Malta" and other affairs, Napoleon forced the Dutch to declare war with us in May, 1803, and by the end of September Dutch Guiana had become British, and though we gladly erected the Netherlands into a kingdom in 1815, and guaranteed it against aggression, we did not restore the colony.

"THE first representative of independent Cuba to Spain presented his credentials to the King last January. Complimentary speeches were exchanged." In 1785, John Adams, the first Minister of the United States of America to Great Britain, presented his credentials to the King on June 1st. Complimentary speeches were exchanged, which may be read in Stanhope's and other standard histories of the time. It was Spain that, together with France, helped to secure the independence of the formerly British colonies. But it was a policy to which Spain committed herself with much fear of the ultimate results. The Spanish ministers of the time hoped that the British would conquer their colonies lest the Spanish colonies should catch the flame, and feared that the colonies would, if successful, adopt measures for conquests of their neighbours. But Spain was too closely allied with France by the famous Family Compact of 1761 to hold back when France helped the colonies, to revenge herself for the loss of Canada. The independence of the British colonies was secured by the help of the Bourbons, and the resultant United States of America, though "the most peaceful nation in the world," have since gone "conquering and to conquer." They have now left to Spain nothing of her former colonial empire, and they control to a large extent the international policy of the whole western continent.

THE French bishops have been asking for the beatification of Jeanne Darc, "in whom, in the fifteenth century, was incarnated the soul of the French fatherland, and who passed across our history as a radiant apparition of the love of Christ for the Franks." Jeanne Darc and George Washington are, perhaps, the only two enemies of the English State whom Englishmen admire. It is curious how anti-patriotic most of us become when dealing with the career of those two soldiers. George Washington has long been "beatified," so far as Americans require. Indeed, he reached that position before his death. The French folk, belonging to theocratic Europe, want something more, and have therefore had to wait longer. The word "Franks" has had a curious history. We know in history the Franks who under the lead of Hlodowig (Clovis) conquered Latin-speaking Celts, and then abandoned their German speech for that of their conquerors. We know, too, that the Mohammedan enemies of the Crusaders called their western foemen Franks. But when modern Frenchmen, whose blood and language is mainly Latin-Celtic, identify themselves with the followers of Hlodowig, and count "Clovis" as the first "King of France," we are tempted to smile. Napoleon made a clever use of this unhistoric practice when he spoke of himself as the successor of "Charlemagne," and called himself "Imperator Francorum."

Cassell's "Union Jack" Series. Book I. 110 pp. 8d.—The form of this reading-book suggests that the first duty of the young Imperialist is to learn to read. Or, at least, this seems the interpretation to be placed upon the Union Jack on the front cover, the music and words of "God save the King" and "Rule Britannia" on the insides of the covers, and the portrait of His Majesty with which the little volume commences. And if this conjecture is correct, the illustrations and the lessons themselves together combine to make the duty a simple and delightful one.

TEST EXAMINATION PAPERS IN ENGLISH.

At the request of a number of our readers, we are resuming the publication of test papers suitable as revision exercises for candidates in the principal public examinations of secondary schools. We have decided to vary the form of publication, and to deal with one subject only at a time, in the hope that teachers will in this way secure a large selection of questions in various subjects in a more convenient form.

London Matriculation.

ENGLISH LANGUAGE AND LITERATURE.

I.—Language. (Not more than SEVEN questions to be attempted.)

- (1) Distinguish between the Teutonic and the Romance elements of the English vocabulary, and write two short sentences, one containing no words of Romance origin, the other none of Teutonic. Which is the easier to write, and why?
- (2) What letters are called "mutes"? Illustrate the changes they have undergone in shifting from the "Classical" languages to the Low German ones.
- (3) Discuss these forms:—porringer, uttermost, wist, next, potion, poison, vixen, or, could, its.
- (4) We write *he thinks*; why do we not write *he musts*? Illustrate your answer by reference to some other words.
- (5) What is the history of the so-called *gerund* in English?
- (6) Distinguish between the uses of *who* and *that* as conjunctive pronouns. Explain the phrase *indirect question*.
- (7) What is the difference in meaning between *vocation* and *avocation*, *immanence* and *eminence*, *deduction* and *induction*, *distinguish* and *discriminate*, *liberty* and *freedom*? Give examples of words the meanings of which have been modified during the last three hundred years.
- (8) Explain the terms:—idiom, verbiage, homonym, paronym, simile, solecism.
- (9) Point out any errors that are common in ordinary colloquial speech. State exactly what you understand by "good English."
- (10) Analyse:—

It is not to be thought of that the flood
Of British Freedom, which, to the open sea
Of the world's praise, from dark antiquity
Hath flow'd "with pomp of waters unwithstood"—
Roused though it be full often to a mood
Which spurns the check of salutary bands—
That this most famous stream in bogs and sands
Should perish, and to evil and to good
Be lost for ever.

II.—Literature and Composition. (Not more than THREE questions to be attempted.)

- (1) "From the times of Elizabeth to our own there has been no break in the line of great writers." Justify this statement.
- (2) What do you know about Jacques, Euphues, Sancho Panza, Quentin Durward, Dr. Primrose, Isaac Bickerstaff, Bottom, Captain Costigan, Mulvaney?
- (3) What is meant by Lyric Poetry? Write out any sonnet you have learnt, and explain its structure.
- (4) Enumerate and illustrate the chief peculiarities of poetic diction.
- (5) Write a few notes on the authors of the following:—Comus, Hudibras, Gulliver's Travels, Vanity Fair, Tale of Two Cities, Hypatia, Crossing the Bar, Lucy Gray, The House of Fame, The Spanish Armada.

Scotch Leaving Certificate.

ENGLISH. (Higher Grade.)

- (1) Write an essay on one of the following subjects:—
(i) Alien Immigration. (ii) Conscription—its advantages and disadvantages. (iii) Present-day developments in the means of communication.
- (2) Paraphrase:—
*Like as the waves make towards the pebbled shore
So do our minutes hasten to their end;
Each changing place with that which goes before,
In sequent toil all forwards do contend.
Nativity, once in the main of light,
Crawls to maturity, wherewith being crowned,
Crooked eclipses 'gainst his glory fight,
And Time that gave doth now his gift confound.
Time doth transfix the flourish set on youth,
And delves the parallels in beauty's brow;
Feeds on the rarities of nature's truth,
And nothing stands but for his scythe to mow:
And yet, to times in hope, my verse shall stand
Praising Thy worth, despite his cruel hand.*
- (3) Parse the words in italics.
- (4) Make a general analysis of the following sentence:—
In fact, up to twenty years ago, the word "ether" was a familiar name, a great convenience in bridging a tremendous void in science which nobody knew anything about, or ever would know anything about, so far as could then be seen.
- (5) In what respects is our orthographical system unsatisfactory?
- (6) Give the derivation of each of the following words and add comments where necessary:—porringer, eclectic, kickshaws, tawdry, gossip, treacle, chattels, lunatic, queen, bridegroom.
- (7) Explain and illustrate:—doublet, elegy, metaphor, assonance, onomatopœia, satire, epic, gerund, archaism.
- (8) At what different periods has a French element been introduced into our language? Give examples.
- (9) Correct the following sentences, and add explanations:—
(a) Having perceived the weakness of his poems, they now reappear to us under other titles.
(b) Whether we shall succeed or no depends on ourselves.
(c) More than one soldier met his death at that encounter.
(d) Before committing yourself to any speculation of this kind you should first consult the authorities.
(e) I am not judging so much by his looks as by the cultured ease of his demeanour.
- (10) Narrate, as vividly as you can, one scene from any famous drama or novel.
- (11) Give some account of any elegiac poem you have read.

ENGLISH. (Lower Grade.)

- (1) Write a short essay of about two pages on:—
(i) Scenes at a Railway Station or (ii) a Soldier's Duties.
- (2) Express the following passage in your own words:—
My good blade carves the casques of men,
My tough lance thrusteth sure,
My strength is as the strength of ten,
Because my heart is pure.
The shattering trumpet shrilleth high,
The hard brands shiver on the steel,
The splinter'd spear-shafts crack and fly,
The horse and rider reel;
They reel, they roll in clanging lists,
And when the tide of combat stands,
Perfume and flowers fall in showers,
That lightly rain from ladies' hands.
- (3) Analyse the last four lines.
- (4) Parse the words in italics.

(5) Correct the following sentences and give reasons for any alterations you make :—

- (a) Whom is it you saw ?
- (b) The *Iliad* is different than the *Odyssey*.
- (c) Each of the boys had a pole in their hands.
- (d) Of all other cities London is the biggest.

(6) Distinguish between the meanings of :—*currants* and *currents*, *practice* and *practise*, *dessert* and *desert*, *diseased* and *deceased*, *faint* and *feint*, and make sentences to illustrate these differences.

(7) Explain what is meant by the comparison of adjectives. What kinds of adjectives cannot be compared ?

(8) Mention, with their authors, the names of any six poems that deal with the sea. Quote a few lines from as many of the poems as you can.

(9) About what time was each of the following authors living ?—Shakespeare, Wordsworth, Chaucer, Defoe, Johnson. State briefly what you know about the life and works of one of them.

College of Preceptors.

ENGLISH GRAMMAR. (Second Class.)

(1) Analyse :—

There was a time *when* meadow, grove and stream,
The earth, and every common sight,
To me did seem
Apparelled in celestial light,
The *glory* and the freshness of a dream.
It is not now *as* it hath been of *yore*—
Turn *wheresoe'er* I may,
By night or day,

The things *which* I have seen I now *can see* no more.

(2) Parse the words in italics of Question 1.

(3) Comment on the syntax of the following sentences :—

(a) He had a large fortune, and which was quite different to his brothers'.

(b) A large collection of books, that nobody knew the value of, were sold by auction.

(c) Not less than six questions are to be attempted, and having done this, the papers must be given in.

(d) The jury were unanimous in their verdict, and the prisoner was condemned for death.

(4) Define "Transitive Verb," and show how your definition is applicable to the following sentences :—(a) Men eat ; (b) They were killed by the lions ; (c) I am not to be laughed at.

(5) Illustrate the various ways in which adverbs are formed in English.

What can an adverb modify ? Give examples.

(6) What are the distinctions of meaning between :—(a) eldest and oldest ; (b) first and foremost ; (c) nearest and next ; (d) later and latter ? Give examples.

(7) Show how the subject of a sentence may be enlarged. Make two sentences in one of which the subjoined clause is the principal subject, in the other the object.

"Who committed the murder."

(8) Give examples of the employment of the suffix *en* in the formation of nouns, adjective and verbs, and state the force of the suffix in each case.

ENGLISH GRAMMAR. (Third Class.)

Study the following passage before answering Questions 1, 2, 3, 4.

"Wellington, who saw them coming on, placed his own guards four deep in a ditch behind the slope, and waited in silence for the charge. When the French gained the ridge they

noticed only Wellington and his staff. But the next moment they heard a voice—it was the Duke's—like the shrill blast of a trumpet, cry, 'Up, guards, and at them !' From the ground there started, as if by magic, a long line of redcoats, who poured a deadly volley into the French and then rushed at them with cold steel."

(1) Say what parts of speech the following words are, and give your reasons in each case :—*who*, *deep*, *only*, *heard*, *blast*, *up*, *French*.

(2) Parse fully : "and then rushed at them with cold steel."

(3) Give the subjects and, where possible, the direct objects of the following verbs :—*saw*, *placed*, *gained*, *placed*, *started*, *poured*, *rushed*.

(4) Give the two participles of :—*saw*, *waited*, *noticed*, *cry* ; and write out the future tense of *rushed*.

(5) What is a phrase ? Pick out three phrases in the above passage and say to what word each belongs.

(6) What are the rules for forming the plurals of nouns ?

(7) Compare the following adjectives :—*beautiful*, *pretty*, *big*, *much*, *gay*, *tender*, *ill*, *noisy*.

(8) Write, with capitals, stops, inverted commas, &c. :—in the midst of the battle when every man was sure of victory a bullet from a french ship struck nelson in the back and he fell with face forwards on the deck captain hardy was soon at his side hardy said nelson they have done for me at last i hope not said hardy yes replied nelson my backbone is shot through.

Oxford Locals.

ENGLISH. (Senior.)

(1) Analyse :—

As long as we remain we must speak free,

Tho' all the storm of Europe on us break ;

No little German state are we,

But the one voice in Europe ; we must speak ;

That if to-night our greatness were struck dead,

There might be left some record of the things we said.

(2) Parse fully the words in italics :—

(a) *Theirs* not to reason *why*.

(b) So we made *women* with their children *go*.

(c) I had'st thou *but* lived !

(d) Old Time is still *a-flying*.

(3) Discuss the syntax of these sentences :—

(a) Methinks nobody should be sad but I.

(b) They neither ill-treated him at play or work.

(c) I shall have great pleasure in accepting your invitation.

(d) I had rather not go.

(4) What principles do you apply in the classification of a verb as Strong or Weak ? Give examples.

(5) What are the chief rules for the comparison of adjectives ? Explain the formation of *eldest*, *nearer*, *furthest*, *former*.

(6) Trace as exactly as you can the formation of the following words :—*bridegroom*, *which*, *number*, *or*, *such*, *one*, *kine*.

(7) Explain the following terms :—Transitive, Clause, Apposition, Gerund, Doublet, Conjunctive Adverb.

(8) Explain the suffixes of the following words :—*kingdom*, *every*, *seemly*, *farthing*, *hardship*, *piecemeal*, *orchard*, *dullard*, *hillock*, *balloon*.

ENGLISH GRAMMAR. (Junior.)

(1) Parse :

For ever in this humble cell

Let thee and me, my fair one, dwell.

(2) Paraphrase :—

The small inheritance my father left me

Contenteth me and is worth a monarchy.

I seek not to wax great by others' waning,

Or gather wealth I care not with what envy ;
Enough that what I have maintains my state
And sends the poor well pleased from my gate.

(3) Analyse :—

Nature, that hateth emptiness,
Allows of penetration less,
And therefore must make room
Where greater spirits come.

(4) Give in a table of three columns the past indefinite tense (1st person singular), and the imperfect and perfect participles of:—*bring, swim, lay, lose, run, dench, prefer, differ, light, choose*.

(5) State four different ways of forming the plurals of simple nouns, with examples.

Give the plurals of:—*looker-on, castaway, Lord Mayor, groom-in-waiting, knight-errant, Miss Gray*.

(6) What class of verbs may take an object ?

Rewrite the following sentence, changing the verbs into the Active Voice:—"They were immediately followed by us, but were not captured until two of them had been shot by our soldiers."

(7) Write sentences containing examples of adverbial phrases, adjective clauses, verbs of incomplete predication, nominatives absolute, gerunds.

(8) What are the chief uses of the prefixes:—*in-, re-, sub-*; and of the suffixes:—*-ly, -ock, -th*? Give examples.

ENGLISH GRAMMAR. (Preliminary.)

(1) Parse:—"Fifteen men were sitting in the hall when we arrived."

(2) Put into your own words:—

Far Kentish hop-fields round him seen'd
Like dreams to come and go;
Bright leagues of cherry-blossom gleam'd,
One sheet of living snow;
The smoke, above his father's door,
In gray soft eddyings hung:
Must he then watch it rise no more,
Doom'd by himself, so young?

(3) What parts of speech may the following be:—*round, in, that*? Give instances.

(4) What is meant by the degree of an adjective? Compare:—*many, good, beautiful, sad, little*.

(5) What are (a) Transitive, (b) Strong, verbs? Parse the verbs in:—"Many sailors left their homes and sought those new lands of which glorious reports were spread by every traveller that returned."

(6) Mention some conjunctions that are used in pairs. What are they called? Write sentences containing them.

(7) How do you distinguish prepositions from adverbs?

Cambridge Locals.

ENGLISH GRAMMAR. (Senior.)

(1) Analyse:—*As* predominant habits of warfare are totally irreconcilable with those of industry, not *merely* by the immediate works of destruction which render its efforts *unavailing*, but through *that* contempt of peaceful occupations *which* they produce, the feudal system *must have been* intrinsically *adverse* to the accumulation of wealth and the improvement of those arts which mitigate the *evils* or abridge the labours of mankind.

(2) Parse fully the words in italics in Question 1.

(3) What is a diphthong? From the following words make a

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list of those which contain true diphthongs:—*noble, note, noise, noon, now, name, net, night, naught*.

(4) What are the chief uses of the "articles?" Give half-a-dozen phrases in which the article is omitted.

(5) Distinguish carefully between (a) demonstrative adjectives and demonstrative pronouns; (b) conjunctions and conjunctive adverbs; (c) the simple infinitive and the gerundial infinitive.

(6) Give examples of (a) double plurals; (b) plurals that have become singular; (c) singulars that have become plurals.

What traces remain in English of lost adjectival terminations?

(7) Show clearly that English in its origin and basis is a Teutonic language. By what other Teutonic languages has it been influenced since its coming into this island?

(8) Name and define the etymological changes of which the following words are examples:—*apron, tender, what, ask*. Give examples of the different uses of the suffix *en*. Define *hybrid, doublet*.

ENGLISH GRAMMAR. (Junior.)

(1) Analyse:—*Therefore* I sat *upright*, with my little trident still in one hand, and was *much* afraid to speak to her, *being* conscious of my country brogue, lest she *should cease* to like me. But she clapped her hands, and made a *trifling* dance *round* my back, and came to me on the other side, as *if* I were a great *plaything*.

(2) Parse the words in italics in Question 1.

(3) How may prepositions be classified? Give examples of *off* used as (a) a preposition, (b) an adverb, (c) an adjective.

(4) Explain the following words and phrases:—*methinks, so be it, I go a-fishing, a friend of mine, get you gone*.

(5) Define *Tense*. Give all the tenses, indicative mood, active and passive, of the verb *to hear*.

(6) Explain carefully what is meant by a relative pronoun. By what other name is it known? Parse fully the relative pronouns in this sentence:—"I know that the man whom you are seeking is not such a genius as you think, and his is certainly an acquaintance that I should not cultivate."

(7) Explain, and illustrate the use of, the terms:—Complex Object, Gerundial Infinitive, Prepositional Phrase, Subordinate Clause, Indirect Question.

(8) Give instances of (a) diminutive suffixes, (b) negative prefixes.

What is meant by a *root*?

ENGLISH GRAMMAR. (Preliminary.)

(1) What is the function of each word in the following sentence:—"Twelve of the largest monkeys quickly ran across the bridge."

(2) What do you understand by (a) Tense, (b) Case?

Parse fully:—

One of his own ancestry

Drove the monks out of Coventry.

(3) Give the plurals of: *chimney, hero, dormouse, daisy*; the feminine of:—*fox, wizard, abbot, duke*; the objective case of:—*I, we, he, she, who*.

(4) What is an auxiliary verb? What is the auxiliary verb used in forming the passive voice of a verb? Parse the verbs in the following sentences:—

(a) I am coming. (b) I am betrayed. (c) Are you glad

(5) Show that the same word may be used as different parts of speech.

Make a sentence consisting of a verb, three nouns, two adjectives, a pronoun, an adverb, and a preposition.

(6) Analyse the following sentences:—

(a) John saw two ponies in the field.

(b) Where are you going?

(c) Do not take the fish from the hook yet.

RECENT SCHOOL BOOKS AND APPARATUS.

Classics.

The Aeneid of Virgil. Literally rendered into English blank verse. By T. H. Delabère May. 2 vols. ix. + 433 pp. (Nutt.) 5s. net.—This is certainly a very literal rendering, bald in fact, and it is not correct to describe it as blank verse. The blank-verse rhythm, which depends so largely upon the distribution of pauses, is not to be found in these lines: they are stiff and monotonous. But the translation does not pretend to be more than a "crib," composed in metrical lengths because the translator thinks it is more easily to be remembered in this form: and it attains its modest object. It is generally careful and correct. Cyclops, however, is not a plural (p. 95). There is some originality in the spelling of proper names, such as "Sibyll" (p. 162) and "Passiphae" (p. 169).

M. Val. Martialis Epigrammata Selecta, secundum recognitionem W. M. Lindsay. Oxonii: e Typographeo Clarendoniano. Not paged. 3s. 6d.—This book undoubtedly meets a want, and will be welcomed by school teachers. It includes all the decent portions of Martial—a very large proportion of the whole—reprinted from the edition in the Oxford *Bibliotheca*, with the critical notes and the numbering of the original. Strange that no one has thought of doing this before. It is just the book for schools, to be kept at hand while reading Juvenal and read *pari passu* with him.

Illustrations of School Classics. Arranged and described by G. F. Hill. With 29 coloured plates. x. + 503 pp. (Macmillan.) 10s. 6d.—This is an admirable little book. Messrs. Macmillan have collected together the illustrations used in their school classics, and Mr. Hill has edited and arranged them. Thus the illustrations are such as have been found practically useful for the chief authors used in schools. Mr. Hill's competence as an editor will not be doubted by any one, and we need say no more than that the book is worthy of his reputation. Each picture is fully described, and moreover a bibliography of references is added for each in case readers wish to pursue the subject further. As the illustrations are now classified, anyone who is interested, say, in Zeus, can glance his eye over the successive pages and thus get some connected ideas of the myths connected with him. We have only two general criticisms to offer. First, the book is thick and unwieldy owing to the heavy paper. Secondly, we regret that the pictures have been bowdlerized, or mutilated of all sign of sex. This is not only inartistic, but equally with the figleaf serves to attract attention to what no one would otherwise notice. It is a piece of prudishness which we might well leave to Italy or Germany. (Otherwise we cordially recommend the book.)

The Cyclops of Euripides. By J. Henson. xv. + 63 pp. (Blackie.) 1s. 6d.—This book appears to be well suited for a boy's first Greek play: it is easy and short. The notes are short and to the point; the illustrations mostly good (but as usual in this series without proper references). The title-page mentions a vocabulary; but there is none in this book, we are glad to see. The list of verbs will be useful.

A Popular Handbook to the Greek and Roman Antiquities in the British Museum. Compiled by Edward T. Cook. xxii. + 794 pp. (Macmillan.) 10s. 6d. net.—Mr. Cook's "Handbook to the National Gallery" is well known; it is really sufficient praise to say that the present book is quite as good. It is so

arranged that the visitor can carry it round with him, and find his way; it is selective, only those objects which are specially interesting being noted; and discursive, quotations being given from the best authorities both on archaeology and on art, whilst Mr. Cook's own impressions are often quite fresh and instructive. It is surprising how much the author has learnt, seeing that his chief interests have been elsewhere; but his references to the literature of the subject show a quite competent knowledge. In spite of the great quantity of detail, this book is interesting to read, and there are very few scholars who will not learn a great deal from it. One thing every one will learn from it, if he be capable of learning it at all—an intelligent appreciation of the beauties of ancient art. Mr. Cook has done a great service to the public by compiling this book.

Edited Books.

Macaulay's Lays. By W. J. Addis. 95 + xxiv. pp. (Allman.) 1s.—This volume, to judge by its table of contents as compared with its pages, should be a wonderful example of the *multum in parvo* principle. Examination discloses the fact that the editor has conscientiously endeavoured to act upon that noble motto. Everything in the book is good of its kind, only the method throughout is mechanical. The "Hints for Classes" are devised to save some labour which otherwise would be unavoidable, for the arrangement of the whole is complete enough in all conscience. And when in these "Hints" Mr. Addis starts by saying that "in every case a thorough knowledge of the topography is advisable," surely he is setting up a standard which even an upper-form boy would not very easily attain. Four of Macaulay's Lays are included in this volume, but the "Life" of Macaulay is an ineffective performance.

Longfellow's Hiawatha. viii. + 84 pp. *Longfellow's Evangeline.* By F. Gorse. 59 pp. (Holden.) 6d. each.—Two very careful editions of poems which have not perhaps received their due recognition as educational subjects. The notes to "Evangeline" are worthy of attention, because in some cases the editor, instead of explaining a point, asks a question upon it: e.g., p. 43, "Mighty—in what sense?"; p. 45, "Why wavering?"; p. 50, "'Farewell,' said the Priest"—to whom?" This procedure is somewhat unusual, but it is by no means inexpedient. The literary matter is trifling in this case, and not less so in the edition of "Hiawatha," where, however, the notes are excellent.

King Henry V. By R. F. Cholmeley. 167 pp. (Holden.) 1s. 6d.—The notes are excellent, though it is questionable, considering the present state in which prosody exists in school-work, whether the notes on metre subserve any end worth considering.

Marryat's The Children of the New Forest. Abridged. 167 pp. (Bell.) 1s.—No introduction; not even a preface; no notes; some illustrations which cannot fail to be attractive to juveniles, and a fairly careful abridgment of the text of a well-known story; such are the distinctive points of this reading book. We can recommend it heartily. It will answer its purpose.

Kingsley's Heroes. By A. E. Roberts. xix. + 167 pp. (Bell.) 2s.—A capital edition, but one conceived on the same general lines as two or three recently issued. Originality of treatment is perhaps somewhat discounted by the story, but uniformity only tends to remove any real *raison d'être* among competing editions. The book is attractively bound, printed, and illustrated.

The Acts of the Apostles. By A. E. Rubie. 209 pp. (Methuen.) 2s.—Like all the preceding volumes in the well-known "junior school" series, it is carefully done. The notes are good, and so are the appendices, especially those numbered three and four, but the introductory matter gets over a great deal of ground at a too rapid pace. A little more space, and a little greater fulness in treating this part of the book, would have improved it. There are some excellent maps.

A Concise Bible Dictionary. (Based on the Cambridge Companion to the Bible.) viii. + 160 pp. (Pitt Press.) 1s. net.—If it had been possible to have used type a little larger than that which prevails throughout most pages of this edition, its perfect adaptation to the need of securing a thoroughly handy, condensed, cheap and trustworthy guide to "Scripture knowledge" would have called for emphatic praise. As it is, there is no end of information compressed within its covers: some beautiful maps are appended; every possible point dealing with the places and history of Bible lands receives attention; and some articles are included bearing upon the somewhat weightier matters which lie at the bottom of all Scripture study, to say nothing of a few attempts (highly successful attempts, too) to deal with some doctrinal subjects in a non-controversial way. But the type is too small.

A First Course in English Literature. By Richard Wilson. 144 pp. (Arnold.) 1s.—This is a simple and at the same time useful book. It is adapted to the middle forms of schools, and contains much information attractively presented. The book is not a guide to literary criticism but a brief elementary history of English literature. As such it will be found trustworthy for examination purposes. Its chief fault is its lack of suggestiveness. It tells a reader what for his immediate practical purpose he wants to know; it may be questioned whether the use of it will stimulate much independent inquiry.

English.

Literary Studies of Poems, New and Old. By Dr. Dorothea Beale. ii. + 170 pp. (Bell.) 4s.—Miss Beale's book consists mainly of papers written for English literature classes at the Ladies' College, Cheltenham. They do not pretend to be serious contributions to literary criticism, and no one of them is a complete and reasoned study of all the aspects of a chosen topic or a chosen poem. At the same time they are by no means a hastily prepared dish of literary commonplaces. Each essay bears the mark of personal thought and conveys personal impressions and conclusions. Although the subjects are various, selected to meet special occasions and not forming a systematic series, a certain unity pervades them. For Miss Beale treats literature as something to be understood and appreciated rather than as matter to be dissected, paraphrased and annotated. In interpreting the "poems, new and old," she expounds especially their religious and ethical purpose and to a slighter extent their aesthetic aim. The principal papers in the book show how from these points of view a play of Shakespeare like "King Lear," a difficult poem such as Browning's "Christmas Eve," a poet like Dante and his whole work, a poetical personage like Spenser's "Britomart," and a poetical theme such as the religious teaching of Browning, can be handled by a skilled and cultured teacher. The warmth of the method of treatment will perhaps appeal more to women than to the soberer enthusiasm of men.

History.

An Introduction to the History of Western Europe. Part I. (the Middle Ages). By J. H. Robinson. viii. + 273 pp. (Ginn.) 4s. 6d.—This is an excellent little book from the Professor of History in Columbia University, U.S.A., well illus-

trated, and provided with bibliographies. More prominent, because more necessary than the recent story of events, is the explanation given of ways of thought and life in the centuries between the fifth and thirteenth. We cordially recommend the book to all our readers.

The British Empire in the Nineteenth Century. 232 pp. (Blackie.)—The title should read "mainly in the Nineteenth Century," for there is much matter, almost necessarily and certainly well introduced, which relates to the eighteenth century. It is a well-written "reading-book for schools" which minimises more than usually the military matters and devotes the space thus saved to chapters on the industrial revolution at home and to the peaceful growth of our colonies. There are illustrations, coloured and other, a summary, "notes and illustrations." This book may be used with confidence.

English History Illustrated from Original Sources. 1660-1715. By J. N. Figgis. xx. + 114 + iii. + 207 pp. (Black.) 2s.—Like the other books of the series which we have previously noted, this consists of introduction, selections from authorities, bibliography and date summary. It is, like them too, divided into two parts, a device for which we fail to see the reason, and in this case leads to some otherwise unnecessary repetition. Mr. Figgis has, we think, performed well the task of selection, difficult as this comes to be in the later periods. We wish, however, he had made some discrimination in his bibliography, and had called Burnet's book by its correct title, "History of my own Time." The book will be very useful.

A First History of England. Part IV., 1485-1603. By C. I. Thomson. xii. + 264 pp. (Horace Marshall.) 1s. 6d.—Miss Thomson here tells the story of the Tudor Period in the delightful way in which she has previously treated the earlier portions of our story. We are glad to note that the constitutional history, so far as it is touched upon, is correct. We heartily commend this book to our readers, and look forward to its continuation.

A Survey of English Ethics. By W. A. Hirst. li. + 180 pp. (Longmans.) 3s. 6d.—This is a reprint of the first chapter of Lecky's "History of European Morals," edited with introduction and notes. The notes are few and chiefly consist in translations of the Latin and French passages in Lecky's book. There is also a short bibliography, and a biographical index of philosophers. The whole makes a good introduction to the subject of which it treats.

A New Student's Atlas of English History. By Emil Reich. (Macmillan.) 10s. net.—This Atlas contains fifty-five maps, an introduction of two pages, and an index of fifteen. Thirty-five of the maps have explanations, historical in character. About half the maps illustrate military campaigns. The special feature of these consists in coloured lines indicating the marches of the armies. Of the others, those which are of a specially novel character are a "Part of Domesday," "Tudor Discoveries and Voyages," and the three last maps which aim at a "geographical distribution of British genius." The work throughout is quite scholarly and up to date with the latest information. It will be found a useful addition to the teacher's library.

English Grammar and Composition.

Essentials of English Composition. By H. S. and M. Tarbell. xv. + 281 pp. (Ginn.) 3s.—This volume is a little less academic in its aims than most American books on composition. The second chapter of it, for instance, goes somewhat fully into the different modes of letter-writing, and includes hints and exercises on telegrams, advertisements, circulars and the like. Another useful chapter is that on "A Study of Longfellow"—

the chief idea being to provide the child with material for practice in composition: at the same time a capable teacher will make it the means of inculcating, at any rate, something of the literary spirit.

A Primer of Historical English Grammar. By Bertha M. Skeat. viii. + 119 pp. (Blackie.) 2s. 6d.—A new text-book that gives in a concise form information that will certainly be of use to those for whom, amongst others, it is intended—would-be matriculants of the University of London. The nine chapters of the volume are as follows:—(1) Where the English language came from; (2) the English tongue in England; (3) growth of vocabulary, borrowings; (4) vowel changes; (5) consonantal changes; (6) spelling; (7) accentuation; (8) derivation; (9) inflexion—the last containing 35 pages. So far as we have been able to judge, the book is quite accurate; it has had the advantage of a revision in proof by Professor Skeat, and a further point in its favour is its comparative conciseness.

Science and Technology.

Theoretical Organic Chemistry. By Julius B. Cohen. xv. + 578 pp. (Macmillan.) 6s.—One of the most important and novel features of Dr. Cohen's book is the attention paid to the industrial applications of organic chemistry, and students other than beginners will derive benefit from reading the sections on the sugar industry, the petroleum industry, and the manufacture and analysis of soap. In its main outlines the book follows the course usually adopted in teaching organic chemistry, but the descriptions given of Lansberger's apparatus for determining the elevation of the boiling point, of Young and Thomas' still-head, of Buchner's researches on yeast extracts and of the synthetical manufacture of indigo, show that the author is fully in touch with recent developments in the subject with which he deals; the synthesis of cane-sugar, referred to on p. 4, must be regarded, for the present, as an anticipation. Brief descriptions are given of the most important dye-stuffs, of the ureides, and of the vegetable alkaloids and terpenes. The author has not ventured to introduce Bredt's formula for camphor, and is perhaps awaiting the long-sought synthesis. Tautomerism is dealt with briefly under ethyl acetoacetate, and is again referred to in connection with nitrosophenol and phloroglucinol, but no indication is given that the nitroparaffins belong to the same class of substances, or that their salts do not contain a nitro group. The book is well illustrated and contains descriptions of a number of experiments, many of which are suitable for use as lecture experiments.

Elementary Lessons in Chemistry. By W. L. Sargent. 163 pp. (Blackwood.) 1s. 6d.—This volume is divided into forty lessons, which are to some extent arranged in the historical order of discovery. The first paragraph of each lesson is generally devoted to a brief historical summary, and is followed by one or more simple experiments which may be demonstrated to a class; and, at the end of the lesson, several *exercises* and *problems* are given for the student to work out in a heuristic manner. Problems in physics are rigidly excluded. The volume is clearly illustrated with 98 diagrams of the necessary apparatus (which is very simple in construction). If the requirements of certain examining bodies have to be taken into consideration (and, unfortunately, this is often the case), the book would have been rendered more useful by the insertion of lessons on neutralisation of acids and alkalis, and on the identification of simple substances. In the lesson on Dalton's law, the weights of atoms are expressed in *ats*—the hydrogen atom weighing 1 *at*: the introduction of this new expression is decidedly unfortunate. The author has succeeded in compiling an interesting and useful course of instruction for beginners.

Qualitative Analysis. By L. M. Dennis and T. Whittelsey. 142 pp. (Ginn.) 4s. 6d.—The introduction to this volume contains instructive sections on Reactions, Equations, Precipitation, &c. Part II. is devoted to the study of the reactions of the metallic elements; each group is followed by a table giving details of the method of separation and by a "Discussion" of the principles upon which the method is based. The reactions of the acid radicles form Part III. of the book. Part IV. describes the systematic analysis of a solid substance. The authors appear to lay very little stress upon the "dry tests," for no table of these tests is given, and, even in the reactions of the metals, the familiar beads of silver or lead, the coloured flames of the barium group, and most of the borax-bead tests are unmentioned. Marsh's test for arsenic and antimony is not mentioned, but is replaced by the "Gutzeit" test, which does not appear to offer any great advantage. The methods of separation of groups II.B. and III. differ widely from those which are in general use in English laboratories. The volume contains many suggestions which would be useful to teachers, but would only be suited to junior students as a book of reference. The typing and arrangement of the subject-matter are excellent.

Elementary Manual on Applied Mechanics. By Andrew Jamieson. xvi. + 345 pp. (Griffin.) 3s. 6d.—This is a fifth edition, arranged to meet the requirements of first-year Board of Education, and other elementary students, and contains all the subjects usually forming part of an elementary course. An additional chapter deals with micrometer and limit-measuring gauges. There is a good selection of exercises, but in the answers given to these some curious mistakes occur.

Mathematics.

Practical Exercises in Geometry. By W. D. Eggar. xii. + 288 pp. (Macmillan.) 2s. 6d.—This seems very well adapted for use as an introductory text-book. The use of instruments is clearly explained, and illustrated by numerous diagrams: the exercises are very numerous, and arranged so that by a sort of heuristic process the pupil may proceed from the simplest measurements to the construction of figures by which most of the facts of elementary geometry (including proportion) may be tested and illustrated. Whenever a book of this kind is used, it is essential to make the pupil understand that his experimental results are not *proofs* of theorems, but only approximate verifications: with this proviso, Mr. Eggar's book may be cordially recommended. A theoretical course might very well accompany work of this sort, after a few selected exercises have instilled the elementary notions of the subject.

Geometry. By S. O. Andrew. xii. + 184 pp. (Murray.) 2s.—This is a new volume of Mr. Murray's attractive "Home and School Library." The work may be said to contain the substance of the really important parts of Euclid I., III., and VI. Proportion is only discussed for the commensurable case, and instead of Book II. there is a chapter on areas, mainly arithmetical in character. The last two chapters (viii., ix.) deal with the elements of solid geometry, and mensuration of prisms, &c. There are many easy and practical examples, a table of trigonometrical ratios, and some examination papers quite recently set for the London matriculation and the Board of Education examinations. Mr. Andrew's book may be recommended as a good sample of a text-book on the lines advocated by moderate reformers. The only serious criticism we feel inclined to make is that unless the teacher takes care his pupils will probably be left with the erroneous impression that any two quantities of the same kind are commensurable, or at any rate that this is the usual case.

Theoretical Geometry for Beginners. By C. H. Allcock. x. + 136 pp. (Macmillan.) 1s. 6d.—This contains the substance

of Euclid I., with changes of order and proofs. The treatment of parallels is made to depend on Playfair's axiom. There are not too many abbreviations: the language is simple: the print and diagrams are good: and there are numerous easy exercises. To those teachers who prefer a modified Euclid to text-books which are frankly revolutionary, this book will be very acceptable. Undoubtedly Mr. Allcock has succeeded in retaining the good features of the "Elements," while removing most of those which make Euclid's work most distasteful to the schoolboy.

A New Geometry for Beginners. By R. Roberts. 88 pp. (Blackie.) 1s. 6d.—In this book the author deals in order with rectilinear figures, similar figures, and the circle. His method is certainly novel, and deserves to be tried. Together with practical exercises, theoretical propositions are given, some with complete, and some with outline proofs. Parallels are defined as straight lines which have the same direction, and the difficulty of incommensurables in proportion is ignored. Euclid I. 47 is proved by proportion. At the end are a few pages on elementary graphs, with excellent figures to scale on squared paper. It is to be hoped that this book will be practically tested: it has many good features, and even those teachers who are not prepared to agree with the author on every point will find it useful and suggestive.

Miscellaneous.

The Encyclopedia Britannica. The seventh of the new volumes, being volume xxxi. of the complete work. MOS-PRÆ, xx. + 909 pp. (Black and *The Times*.)—The comprehensive character of the contributions to the supplementary issue of the "Encyclopædia Britannica" is now known to all who have taken the trouble to consult the pages of the volumes already noticed in these columns. Granting, then, that the present volume contains something about everything and everything about something within the alphabetical boundaries of "Mosaic" and "Prevesa," let us select for mention a few articles which teachers concerned with particular departments of school work will find it worth while to consult. For the mathematical master there is an article on number, by Prof. G. B. Mathews, who gives some of the results of a critical analysis of the subject. For the classical master there is a very instructive article by Mr. D. G. Hogarth on Mycenaean civilisation, in which the main results of the work from Schliemann to the present time are described; also an article on palæography, by Sir E. Maunde Thompson. For the physical geography lesson we have articles on oceanography, by Dr. H. R. Mill, and on the polar regions by Sir Clements Markham, Dr. Nansen and Dr. Mill. The student of phonetics will find some points of interest in the article on the phonograph; but there ought also to be one on phonetics as well as the one on philology, in which the subject is briefly mentioned. The article on photography will appeal to many teachers who practise the art or encourage others to do so, and the music master will find the pianola described with the piano, in addition to an article on music. For the science master and medical student there are valuable articles on power transmission, palæobotany, plant physiology, animal physiology and pathology. The article on polytechnics will interest students of educational developments, and the introductory essay, by Mr. F. Greenwood, on "The Influence of Commerce on International Conflict" will appeal to students of history and economics. Among the general articles that on newspapers is especially noteworthy, as it contains the most informing treatment of the subject that has come under our notice.

Handbook of Linear Perspective. Shadows and Reflections. By Otto Fuchs, Director of the Maryland Institute. 34 pp.

(Ginn.) 5s. 6d.—This strikes us as a thorough and comprehensive text-book of perspective which should prove useful to students of mechanical and architectural drawing as well as those who are studying with a less special end in view. The matter is divided into "Parallel Perspective," "Angular Perspective," and "Perspective as applied to Architectural and Landscape Drawing," and is illustrated by twelve loose plates which are contained in a flap envelope in the cover and are readily accessible. Both text and diagrams are on the whole adequate, but we could wish that the last two diagrams had been rather better drawn. They give, it is true, what is necessary, but they might with advantage at that more advanced stage have some pretensions, at least, to artistic merit.

Nelson's Blackboard Drawing. By Allen W. Seaby. 135 pp. (Nelson.) 3s. 6d. net.—Mr. Seaby's book, which is primarily designed to meet the needs of teachers and student teachers, gives a very concise and useful account of blackboard drawing its scope and method, as well as hints on the use and abuse of this type of drawing as a means of education, and practical notes on how to arrange and organise a class in the subject. We are glad to see that the author lays due stress on the importance of cultivating the powers of observation, and insists throughout that blackboard drawings, however slight and diagrammatic they may be, should above all things convey accurately the salient points of the objects they are intended to represent. The volume contains 227 illustrations, many of which are photographic reproductions of actual blackboard drawings and serve both to give a good idea of what can be done by the method they illustrate and to exemplify special points brought out in the letterpress. The book is prefaced by a few words of commendation from Mr. Walter Crane, and contains in an appendix the syllabus of Blackboard Drawing of the Board of Examination, South Kensington, and an examination paper of the National Froebel Union.

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 Beginnings of Arithmetic.

THE very interesting article, "A Chapter in very Elementary Arithmetic," by Sir Oliver Lodge, F.R.S., in the March number of your Magazine, seems to suggest one or two important queries. May I be permitted to summarise them thus:—

(1) Am I right in inferring that it is of vital importance to lead young pupils to "discover" the decimal, at the conclusion of the initial stage in arithmetic, viz., the first four simple rules?

(2) Before the young mind is confronted with endless varieties of our British system of weights and measures, would it be advisable to show the simple methods of decimalisation by which these complex quantities may be made to appear less formidable?

(3) Is it possible to substitute the fractional and decimal methods altogether for the cumbersome and lengthy process known as "long" multiplication, "long" division, &c.?

WILL R. DUNSTAN.

Collegiate School, Bude.

In answer to Mr. Dunstan's queries :—(1) I should say that what is "of vital importance" is to give a rational and vividly intelligible account of the system of Notation; treating the different "places" as a series of boxes, any one of which might be empty, but a single counter in one of the boxes being understood to represent a dozen or ten, or some other arbitrarily fixed number, while each counter in a box on the left signifies a dozen dozen, or ten tens, and each counter in a box on the right signifying itself alone; and so gradually, but with no haste, to lead pupils to think what would happen, consistently on this system, if a box were added on the right of the unit box. If the "unit" represented a dozen, or a linear foot, or a shilling, or a regiment, or a century, or some other single group which could be easily subdivided, the step can be more easily taken, and the idea of abstract fractions deferred. The unfortunate adoption of ten as the radix for the conventional scale of notation makes these matters a little more troublesome than they otherwise would have been.

(2) Now that there is so very much of value to learn, I should hope that "the British system of weights and measures" will be relegated to its proper insignificance, only the most frequently occurring things being dealt with, and those somewhat lightly. The system is an extension of the "notation" scheme, wherein each box has an arbitrarily attached label-of-value, instead of the value of each box rising or falling by the same factor from that of the adjacent ones. The system thus affords good means of practice, provided it is not made too mechanical and confusing, and too hopelessly dull. It is fatally easy to employ it as a mere treadmill.

Question 3 may be more intelligible to some of your readers than it is to me.

OLIVER LODGE.

Simple Proportion and Graphs.

In reference to Sir Oliver Lodge's paper on the teaching of simple proportion, it may be worth while suggesting that this stage in arithmetic would be the most suitable for the introduction of "graphs" into the teaching of the class room, the graph of proportionals being the simplest kind of graph, viz., the straight line through the origin.

As a teacher of physics, I find that my youngest pupils readily understand the use of graphs in all cases of change of units, inches and centimetres, pounds and kilogrammes, or centigrade and Fahrenheit degrees (not proportionals in this case), and that they evince considerable interest in the novelty and simplicity of the method. Similarly, I imagine, any simple proportion sum, simple interest, or exchange values of money, if graphed, will afford a pleasing and intelligible variety to the arithmetic lesson.

A proportion sum set out on squared paper might also form the introduction to the properties of similar triangles, and thus establish a connecting link between arithmetic and geometry.

The "graph" method might further be used to show what Sir Oliver Lodge describes as the breakdown of simple proportion, and some such instances as those quoted might be graphed from data supplied by the teacher. The fact of obtaining a curve instead of a straight line would render the failure of the proportion method evident and give some inkling of a means of dealing with these more recondite problems. Some of the questions suggested would no doubt not be amenable to the process, but the class would consider the teacher lacking in humour if he were to offer any explanation about the peacocks or the camel.

EDMUND G. HIGHFIELD.

Scarborough.

Geographical Puzzles.

THE discrepancies to be found in modern geographical textbooks are very puzzling both to teacher and pupil. May I call attention to three points and ask three questions?

The Hoang-ho.—Does this flow into Yellow Sea, or into the Gulf of Pe-chi-li? In "Longman's New Atlas," it is marked as flowing, until 1853, into Yellow Sea; from 1853 to 1887, into Gulf of Pe-chi-li; and now again into Yellow Sea. On the other hand, the "Times Atlas" makes it flow into Gulf of Pe-chi-li; and so does Herbertson's "Illustrated School Geography." Gill's "Imperial Geography" in one map makes it flow into Gulf of Pe-chi-li, and in another into Yellow Sea.

The Victoria Nyanza.—Mr. Herbertson gives its area as 40,000 sq. miles. Other authorities make it no more than 29,000. Is Mr. Herbertson correct? If he is, then Lake Superior is no longer the largest fresh-water lake in the world.

The longest River in the World.—Is it the Nile, the Missouri-Mississippi, or the Amazon? In Bartholomew's pocket Atlas the order is: Nile (4,000 miles), Missouri-Mississippi (3,656 miles) and Amazon (3,060 miles). In Gill's Geography the Amazon leads with 4,700 miles—a difference of over 1,500 miles. The Missouri-Mississippi is largest according to Mr. Herbertson, who cuts down the Nile to 3,670 miles. Meiklejohn's Geography says the Missouri-Mississippi is the longest (4,200 miles) and yet he gives the Nile as 4,300 miles.

I should be greatly obliged if some one would throw any light on the subject.

E. C. C.

(1) The Hwang-ho has emptied itself into the Gulf of Pechili since 1853, but its mouth has moved steadily southwards until it is now some 20-25 miles from the 1853 outlet. In my copy of Longman's "New Atlas" (1889) the river is correctly drawn flowing to the Gulf of Pechili. It may be that in one edition the river was shown to flow to the south-east, as in 1887 a great flood ruptured the banks, near Kaifeng, and, until they were repaired, the river did flow again in that direction.

(2) The area of the Victoria Nyanza given in the tables of the "Illustrated School Geography" was retained from the American book on which the work was based. This estimate is now known to be much too great, but as the shores of the lake are still not completely explored we cannot determine its exact area. It probably is about 26,000 or 27,000 square miles. Has E. C. C. never compared a map of Equatorial Africa a dozen years old with one of to-day?

(3) It is expressly stated in the "Illustrated School Geography" that some of the river lengths and other data are merely approximate estimates. The Missouri-Mississippi is the only one of the three rivers which we can measure with some certainty, and the figures given are accurate, not to a mile, but as a round number. The figures for the Nile and Amazon were taken from the most trustworthy reference book available at the time of publication. Probably they are both too small, but I think it may be asserted that neither river is so long as the Missouri-Mississippi. Taking the longest stream of the Kagera system in the case of the Nile, and in the case of the Amazon the longest stream of the Ucayali system, the extreme eastern limit of the estuary and allowing for all the windings, it is just possible that in both cases the length may extend to nearly 4,000 miles.

From such letters as E. C. C.'s one learns how many conscientious teachers of geography are hampered by having had no training in the subject and so not knowing where to turn to settle such points as those which he has raised.

A. J. HERBERTSON.

OXFORD.

Galvanometer Lamps for School Laboratories.

Most people will agree with Mr. Hadley that a "full moon" with dark line is preferable to a bright line. There is, of course, no difficulty in obtaining this, if a convex lens of short focus, placed behind the cross-wire, is used in addition to the usual concave mirror of the galvanometer. A good result is obtained if, while the cross-wire is near the centre of curvature of the mirror, the lens is so placed as to focus an image of the lamp filament in or near the plane of the mirror, so that a part of the image completely covers the mirror.

If a straight line is desired, I have found nothing better than the small straight filament 10 volt lamps of the Ediswan Co. They may be run from batteries, or, a number in series, off mains. They have the disadvantage of taking rather large current; but, particularly if judiciously over-run, can be relied upon to give a very distinct image under any reasonable conditions.

But there is now available a much better source of light than either of these—the Nernst lamp. In the small form we have 50 c. p. emitted from about an inch of filament. For ordinary use the lamp may be supported horizontally, pointing towards the galvanometer, and a small screen with circular hole and cross-wire placed directly in front of it, focusing directly from the mirror. The ground-glass globe supplied need not be removed. There is no need otherwise to screen the lamp except to ensure that it does not illuminate the scale directly. If a still brighter image is wanted the lamp can be used with a lens, exactly like an ordinary incandescent lamp.

WILLIAM BENNETT.

Municipal Technical School,
Gravesend.

Preparation of Lantern Slides.

I SHOULD like to mention a method of preparing diagrams, &c., as lantern slides, which I have found very useful. It is, I think, an improvement on the smoked glass recommended by Mr. Busbridge, in his article in THE SCHOOL WORLD for March. White lines on a perfectly opaque ground are trying to the eyes, and do not show up so well as white lines on a transparent coloured ground. I have found glass coated with printers' blue ink, the colouring matter of which is Prussian blue, to answer extremely well for such slides. The printer can easily coat the glasses by rolling them with the inking roller. I find it convenient to keep a racked box of them ready, and the diagram is easily made with a sharp-pointed hard pencil. The ink hardens somewhat after a time, and the plates can then be handled without damage; whereas, as Mr. Busbridge remarks, the smoked glasses will not bear touching, the slightest touch produces "a white smudge which cannot be obliterated." Finer drawings can be made on glass varnished with a coloured varnish. I believe such glasses ready varnished can be purchased.

W. MARSHALL WATTS.

Grammatical Analysis at the Oxford Locals.

To those of your readers who prepare pupils for the Oxford Locals, the following letter may be of interest. The general impression seems to be that candidates *must* use the "Detailed Scheme" of analysis provided at the examination, and that "tabular analysis" is barred. My excuse for trespassing on your space is that this is the first time the Delegates have had the matter laid before them.

H. WATSON.

[Copy.]

From THE SECRETARY,

March 4th, 1903.

Local Examination Offices,
Merton Street, Oxford.

DEAR SIR,—I have laid before the Delegates your enquiry with regard to the forms for analysis which will be provided in the examination room.

I am to say in reply, that a candidate may arrange his analysis in any form which he prefers, and that, if his work is correct, he will obtain full credit for it. He cannot, however, be allowed extra time for the purpose of preparing the tabular form which he prefers, nor can he bring copies of such a tabular form into the examination room.

Yours very truly,

(Signed) H. GERRANS.

A Correction.

IN your valuable review of the *Schoolmasters' Yearbook and Directory*, appearing in the February number of THE SCHOOL WORLD, you imply that the name of the Headmaster of Highgate School does not appear in the *Directory*. Will you allow me to point out that Mr. Allcock's name will be found in its proper place in the *Directory*?

THE EDITOR OF "THE SCHOOLMASTERS' YEARBOOK."

[We much regret the mistake. Our reviewer looked up the name of the Headmaster of Highgate under "Alcock"; had he looked under "Allcock" he would have found the entry.—EDITORS.]

The League of the Empire.

IN reference to suggestions in the newspapers for the starting of a Correspondence Club for English and Colonial children, may I ask you to let it be known that such an institution has been in existence in our League (till now named Children of the Empire League) for the last two years. Eight hundred of our children in all parts of the empire are already in correspondence with each other. A further scheme for the linking of schools, English and colonial, for friendly competition and exchange of specimens for school museums, is in working order. The Agents-General have already placed our papers before the heads of the Education Departments of their different colonial states and provinces. Promises of co-operation from the colonies are already arriving. Schools, both primary and secondary, are already linked under our schemes. For the last two years we have been giving lantern and other lectures in all grades of schools with much success.

All information as to the Comrade Correspondence work may be obtained from Mrs. Haldane, 4, St. Margaret's Road, Oxford, and from the Hon. Secretary, 67, Great Russell Street, W.C.

(MRS.) E. M. ORD MARSHALL,

Hon. Sec. Central Committee.

The Heating and Ventilation of Schools.

WITH a view to secure the best conditions of atmosphere in a school, the following trials were made, and the results noted. A large schoolroom with canopy-formed roof, with centre ventilators, and amply lighted from the front wall, and also from the four sides of the roof, was selected. The inlet for fresh air was through numerous floor gratings; the heating was done by two large open fires, placed in the end walls.

This proved to be an excellently ventilated school in summer weather, but the floor gratings proved very uncomfortable, and kept a very low temperature in the room during cold weather, even with the two fires burning brightly. The first step towards improvement was the closing of the floor gratings and

substituting Tobin tubes placed all round the walls, and a stove was substituted for one of the open fires.

As the limiting of the inlet of fresh air was thought to have rendered the atmosphere of the school more impure, it was thought advisable to test its purity. The result was that from a sample taken towards the close of the school 25 volumes of carbon dioxide per 10,000 was found; 3 volumes being the normal state of the external air. Subsequently additional facility for opening the roof lights was provided, which had the effect of giving a purity of 15.5 volumes. A heating system was then introduced by the method of hot-water pipes; this improved the purity to 11 volumes. The opening roof lights were then raised to the apex of the roof, and made easier to manipulate, which gave 8.37 volumes of purity.

At this point a trial was made to ascertain the amount of impurity which might be in the air before the assembling of the school in the mornings, and it was not a little surprising to find that this amounted to 7.25 volumes, instead of 3 volumes. It was now seen that, to be able to deal with the matter properly, steps must be taken to ensure at all times a pure air at the opening of the school. It was found that from 15 to 30 minutes, with doors, windows, and ventilators open after the dismissal of the scholars, was necessary for complete renewal, which gives the school a start with a purity of 3 volumes, which is equal to the external atmosphere.

There should be no difficulty in ventilating in warm weather. Sufficient openings for air admissions is all that is required, and complete renewal at the termination of the classes. In winter, provision for heating is indispensable, as cold air should not be admitted without the means of warming it, and moreover the greater the heating power the greater the means of obtaining a pure atmosphere.

A sample of air taken from the middle of a class of scholars at the close of the school should not be higher than 9 volumes per 10,000, and means should be taken to ensure that at the beginning of the day the air be as pure as the external atmosphere, otherwise the impurity will become cumulative from day to day. To secure this, apart from any mechanical means, every door, window, and ventilator should be opened for a period before the school is finally closed for the day.

P. M.

PRIZE COMPETITION.

Result of No. 17.—Most Popular School-Books on Arithmetic.

IN this competition the following six books have by the competitors been adjudged the most popular. They are arranged in the order of their popularity.

FINAL LIST.

- (1) "Arithmetic." By C. Pendlebury. (Bell.) 4s. 6d.
- (2) "Arithmetic for Schools." By Rev. J. B. Lock. (Macmillan.) 4s. 6d.
- (3) "A New Arithmetic." By G. A. Christian and G. Collar. (Holden.) 4s. 6d.
- (4) "Arithmetic for Schools." By C. Smith. (Cambridge University Press.) 3s. 6d.
- (5) "A Treatise on Arithmetic." By J. Hamblin Smith. (Longmans.) 3s. 6d.
- (6) "Arithmetic for Schools." By Rev. Barnard Smith. Revised by Prof. W. H. Hudson. (Macmillan.) 4s. 6d.

The first book was named on fifty-two lists, and the second on fifty. Messrs. Christian and Collar's book was given on twenty-six lists, Mr. C. Smith's on twenty-five, Mr. Hamblin Smith's on twenty-four, and that by Messrs. Barnard and Hudson on twenty-one. "The Tutorial Arithmetic," by W. P. Workman (Clive), 3s. 6d., was the seventh book.

The first prize is awarded to

L. F. E. Johnson,
Kenilworth,
Vicarage Road,
Henley-on-Thames,

whose list was the only one sent in which named all the six books given above.

The second prize goes to

H. Gray,
Wellington College,
Berks,

who named five of the winning books.

The following competitors also named five books mentioned in the final list, but the order in which the books were arranged was not so good as that of the second prize winner:—Miss E. M. Morris, Holland House School, Beverley, Yorks; Egerton Smith, Ackworth School, near Pontefract; E. L. Gardner, Mayfair House, Grove Park, Kent; Miss B. M. Porter, The College, Oswestry; George A. Scarfe, Park Grove School, York.

No. 18.—Most Popular First-Year Books in French.

Which six books are most widely used in schools at the present time for the first year's work of pupils beginning the study of French? Answers to this question are required in the competition for this month. Each competitor must send a list of the titles, &c., of **six first-year books in French** that he considers are the most popular ones now in use in schools.

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

We offer two prizes of books, one of the published value of a guinea, the other of half-a-guinea, to be selected from the catalogue of Messrs. Macmillan and Co., Limited. The prizes will be given for the two lists which most resemble that drawn up as a result of the voting of the competitors.

In naming a book, its title, author, publisher and price should be given. Each list of books sent in must be accompanied by a coupon printed on page vii., though a reader may send in more than one list provided each has a coupon attached. Replies must reach the Editors of **THE SCHOOL WORLD**, St. Martin's Street, London, W.C., **on or before Monday, May 11th, 1903.** The decision of the Editors in this, as in all competitions, is final.

The result will be published in the June number, when the successful list will be published.

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

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No. 53.

MAY, 1903.

SIXPENCE.

CLASSICAL TRANSLATIONS FOR ENGLISH READERS.

By FANNY JOHNSON.

Late Headmistress of Bolton High School.

CERTAIN difficulties in education are due to what may be called machinery. But when Government Bills and private efforts have done their best—and worst—the real crux of the situation remains. And this may be summed up in the one word—curriculum. Every teacher is occupied in the main with what, in old-fashioned phraseology, was called “imparting knowledge,” and the instinct is natural to impart such portions of knowledge as the teacher has most at heart, or in which he feels most at home. A man who has spent the better part of his own life in digging for Greek roots finds a fascination in the pursuit that he would fain share with another, while the rarer teacher whose circumstances and inclination have led him into out-door life thinks “nature-study” all important. These secret desires on the part of teachers are, of course, decently veiled under high-sounding expressions, such as “training of the observation,” of the “reasoning powers,” of the “imagination” and the like. But when we honestly consider the mental condition of an average boy or girl at the school-leaving age, whether, among the middle classes, that age be sixteen, or lower down in the social scale, twelve or thirteen, as the case may be, it is clear that what counts is not the arithmetic, or history, or French that the pupil may have acquired, but the attitude of mind towards these or any other subject of instruction that he has imbibed as a result of school training. In other words, the How, rather than the What, is the cardinal matter for educationists. Schoolmasters are distracted by the multiplicity of subjects; they honestly attempt for an all-round curriculum, the more honest and conscientious falling between—not two—but many stools in their efforts. So that, especially among girls' schools, the crowded time-table frequently leads to a condition of chronic indigestion. There is much to be said in favour of limitation to the three R's, taking them in their wider sense. For the man who can read—intelligently—has the key to all book knowledge, and

the greater part of knowledge is, after all, contained in books; while he who can write—in which we ought to include the power of drawing—is able to record his first-hand observations. And the arithmetician, having once learnt to reason about numbers, can apply his logical powers to any other subject that presents itself. Teachers are in too much of a hurry, and the examiners, inspectors, universities, and makers of the educational machines are the most to blame for this.

The curriculum which vexes our souls need not disturb us, if only we frankly acknowledge that Life (of the schoolboy) is short, and education (in its broader sense) is *unendlich lang*, and therefore the digestibility rather than the quantity of mental food given to the school child is the all-important point. And this brings me to my main thesis, that—at school—acquaintance with “the classics,” or indeed with any literature outside our own, may well be gained through the medium of *translations*. Let me quote from the prospectus of a series of translations, not unfavourably known in their day, “The ‘Valpy’ Family Classical Library” [the italics are mine]:

. . . So diversified are the objects to which general education is *at present (i.e., in 1830) directed*, that sufficient time cannot be allowed, in most instances, to lay the foundation of an adequate acquaintance with the most popular authors in the Greek and Latin languages. . . . The facility of reference to a *series of correct and elegant translations* must afford pleasure and occasional assistance even to the scholar. To him who, as Dr. Knox observes, although engaged in other pursuits, is still anxious to “retain a *tincture of that elegance and liberality of sentiment which the mind acquires by a study of the Classics*, and which contributes more to form the true gentleman than all the substituted ornaments of modern affectation,” such a collection will, it is confidently hoped, prove acceptable. As the learned languages do not form part of the education of females, the only access which they have to the valuable stores of antiquity is through the medium of correct translation.

The series here referred to was followed at no long interval by the immortal Bohn's libraries, which, including a vast number of translations, began in 1846 and have never ceased, under the auspices of the original publishers, nor (since 1863) of their present guardians, Messrs. Geo. Bell and Sons, to maintain the reputation designed for them by their founder. Unequal in merit as are the translations lurking under the shelter of the

name of Bohn, the scheme of bringing all the literatures of the world within the view of the man, poor in purse and education, who can only read in his own language, is a magnificent one. Its success can be estimated to some extent by the fact that new volumes are constantly issued, and in most instances compare favourably both for readability and accuracy with their forerunners. Thus the publishers early recognised the "felt want" which, by all the signs, will become more and more felt, and is, in fact, being more and more recognised.

Such names as Messrs. Macmillan and Messrs. Bell, among publishers, and among scholars such reputations as those of Messrs. Kennedy, Long, Calverley (translators respectively of Demosthenes, Plutarch, Theocritus, published by Messrs. Bell), or Messrs. Leaf, Church and Brodribb (translators of Homer and Tacitus, published by Messrs. Macmillan), &c., carry with them their own guarantee. Messrs. Methuen have also a shorter series of classical translations, including Lucian, "Six Dialogues," translated by S. T. Irwin, and Tacitus, "Agricola and Germania," translated by R. B. Townshend; both works well calculated to appeal in their English form to the ordinary reader. And Messrs. Nutt, whose unflinching efforts in the direction of pure scholarship are well known, have recently issued a translation of Aeschylus, "Prometheus Bound," by E. R. Bevan, whose preface is not only an interesting modern counterpart to the puff preliminary of the Valpy series, quoted above, but also expresses better than any words of my own, the views I am upholding in this paper [the italics are mine].

To hand down translations may seem too poor a mark for the ambition of the age. And yet the Book which has been the most powerful force in English literature is a translation. In the case of the Greek poets, how much of our intellectual heritage comes from them, even though all the while a strange tongue has had to be mastered in order to know them, no one needs to be reminded. Such mastery was possible to the few, and literature was mainly the concern of the few. But this is so less and less, and if *democracy is destined to lay hold of literature*, as of everything else, that generation will have made no mean contribution which *delivers to the people a standard rendering of the great works upon which our own literature has been nourished*. . . . If our age is to bring forth a translation of the Greek poets of permanent and universal authority, it would probably have to be by the co-operation of many minds, in which the idiosyncrasies of each would find correction. With so much ability at large, directed to the production of excellent verse and genuine poetry, which yet represents no new force in literature, would it be impossible to consecrate some of it on such a work as I have named?

The democratising of learning is indeed a kind of democracy with which all generous spirits have constantly sympathised. And now that the tone of the best public opinion is set towards the production of an educated community, as against the earlier ideal of the educated select ones, so much Greek "as may become a gentleman" must be put within the reach of all. That being so, it is evident that translation is the only way. I seem to

remember the time when, among one's pastors and masters, the peep into a "crib" was held an offence worthy of awful punishment. Nowadays, I believe, the student is encouraged in the intelligent use of translations while wrestling with the difficulties of a foreign tongue. But the vast majority will never, perhaps, reach even this preliminary wrestle. Why, then, should the treasures of the past be debarred from them, or offered in such attenuated forms as Kingsley's "Heroes," or the "Tanglewood Tales?" The worst translation of Homer that was ever made brings one more in touch with the spirit of the elder world than all the "Tales from Homer" that were ever devised. We must get as near as we can to the sources. In literary matters, this corresponds to the investigation of origins in science. Though Homer may speak to us in muffled tones through the voices of Messrs. Lang, Leaf and Myers, it must be recollected that the revelations of the gods are always partial, and the Word, which was from the beginning, is still only half understood. What I have said would apply to some extent to modern and living languages, but it is peculiarly fitting that we should approach the ancients, *at first*, robed in a modern dress. We cannot recite Hamlet so that Shakespeare would follow what we were saying, and still less can we speak as Herodotus and Tacitus pronounced their respective dialects. After all, matter is more than form, and thought is better than speech. We can get at the *minds* of the ancients as well, or better, when we are not carefully puzzling out their sentences phrase by phrase. It is rarer than would perhaps be admitted for even a scholar to read a Greek or Latin classic without any sense of effort, as he would read an English or French novel.

Even for those who hereafter may be destined to soak themselves fully in the originals, I believe the best way would be to begin with translations. One hears not infrequently of the schoolboy for whom the name of Caesar carries a life-long sting, because he has first made Caesar's acquaintance in scraps and paragraphs, slowly puzzled out, of Caesar *De Bello Gallico*, Book I. If Caesar, and Xenophon, and Herodotus, all the ancient writers of straightforward narrative, in fact, were first presented to youthful minds in the guise of an attractive *English reading book*, illustrated by pictures, &c., and read in school as part of the ordinary course in history and literature, how different the effect would be! Pleasanter, no doubt, says the pedagogue, but what about the discipline of the mind? Well, as I began by saying, the mind of the average schoolboy remains to the end of his schooldays pretty much undisciplined anyhow. Let him read, read, the best you can get him to read, translated Homer, or abbreviated Scott, the whole of the Iliad in English, rather than half a book of it in Greek. Let him learn to adore Alexander through Messrs. Stuart and Long (translators of Plutarch's "Lives," in Bohn library) rather than detest Hannibal through Livy. Greek, *in the original*, might be banished from all

the *schools* in England, but yet the Greek spirit and all that is best in the Greek ideal flourish. For children nourished on such adequate translations as Mr. Bevan generously forecasts for them would long but the more for a draught from the fountain head. A pious grocer's assistant whom I knew, for love of his English New Testament, spent the evenings of a hardworking life in learning to read it in the Greek; so these school pupils, I fancy, would sometimes continue their education by conning the Greek and Latin grammar in their maturer years in order to get nearer to the heart of those delightful raconteurs, Homer, Virgil, Xenophon, Tacitus, and the rest. The best efforts of every teacher are spent in providing solace for his pupils in later life. It is indeed a commonplace and trite reflection, uttered in one form or another on every school speech-day, that the things of beauty we learn at school are joys for ever. The habit of learning a language is soon acquired; it really does not matter which language you begin with. Grown persons have been known to learn even Hebrew and Russian; many grown *women* have learnt Greek or Latin having had no previous acquaintance with these languages in their childhood.

For school use, the work in its translated form must look as little like a translation as possible. There should be no reference to the original language in the notes. Such words as "lictor," "parasang," "peltast," &c., should be explained in note or glossary, as though they were unusual English, not foreign words. Some of us were brought up in the belief, or at any rate under the impression, that Isaiah was divinely inspired to utter the words, "Comfort ye, comfort ye, my people," exactly as they stand in the English Bible, and neither our religious sense, nor our literary taste, nor even our knowledge of Jewish or universal history, has suffered from having been led to abandon that half-truth only in later life. Of course, the teachers should "know better." They should, and must, be as learned as can possibly be managed. But a teacher who has first approached his Homer, his Sophocles, and his Virgil as charming story-tellers will be able the better to commend these authors to his pupils as the "best of good fellows." There are certain foreign authors, not to speak of the Hebrews, whom we think it no shame to know only in borrowed plumes. We do not blush to confess that "Don Quixote," or to take later examples, the works of Tolstoi, or Ibsen, are unknown to us in their original tongues. Fewer still can read the "Arabian Nights' Tales" as they were spoken at the first. I only plead to extend this principle a little further, and to provide school children from the first, not with snippets, or arrangements, or derangements from the classics, but to give them at least whole episodes, or carefully connected portions, in a form as attractive as possible, *i. e.*, in pleasant readable English, printed in an easily handled book, and not overloaded with extraneous learning. Something of this sort has already been tried in French and German, and I believe, in American schools. One great English

headmaster, at least, was much for "Hellenising without Greek." And to the rabid Hellenists we would say, that this method is bound in the long run to prevail in the majority of schools, if any *tincture of that elegance and liberality of mind* which is inseparably bound up with a study of the two classical languages is to be maintained.

THE GEOMETRICAL TREATMENT OF ANGLES AND PARALLELS.

By H. B. WOODALL.

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EUCLID'S difficulty in treating parallels is due to his failure to define angle, the essential nature of which seems to have eluded his grasp. His statement about parallels is a negation, and not a definition, while his "inclination of one line to another" is merely an ingenious makeshift for a definition. Every geometer since the days of Proclus has been aware of the difficulty, but, until quite modern times, none saw that it arose out of the notion that angle is a function of line, or of line and surface. Thus, Borelli (1608-1679), treating of the difficulty in his "Euclides restitutus," says that angle is neither line nor surface, but he nevertheless regards it as a function of these magnitudes, and uses the analogy that the proportion of two magnitudes is a quantity different from either of them.

The doctrine that kinematical notions should not be admitted into pure geometry is, no doubt, largely responsible for the practice of keeping beginners as long as possible in ignorance of the modern definition of angle. If we look for this definition in our text-books we find it relegated to footnotes, and teachers who are not content to leave it embedded there like a fossil are regarded as innovators by the upholders of the said doctrine. If it were a fact that, in every case, geometry is concerned only with the statical result of motion, it would by no means be an argument in favour of this doctrine; for, if the motion is necessary for the production of the result, it may well be that the conception of the motion is necessary, or at least helpful, to the conception of the result. Even when we speak of a line "meeting" another, or of being "produced," or of one figure being "applied" to another, kinematical notions are in the mind, and it is practically impossible to treat geometry without the constantly recurring use of words which imply motion of some kind or other. Borelli defines a circle as formed by the revolution of a finite straight line in a plane about one extremity, which is fixed, until the moving line reaches its original position. The same kinematical notion used differently gives us the modern definition of angle. Indeed, we may almost say that the difference between the ancient and the modern view of angle is the difference between associating it with line and associating it with circle.

By defining angle as "amount of turning" we

have a definition independent of other geometrical definitions, and one which greatly simplifies the proofs of many fundamental theorems. A spinning top is making a continuously increasing angle. The natural unit of angle is one complete turn. If, therefore, the top has made a hundred turns, a hundred is the measure of the angle it has made. When we have defined a right angle as a quarter of a turn, the statement that all right angles are equal becomes the statement that a quarter of a turn is equal to a quarter of a turn, and is, therefore, axiomatic beyond dispute.

It may be advisable, after careful revision, to retain some of the conventional phrases associated with the line-and-space notion of angle, but many of them must be condemned as misleading. Of the former, "angle between two lines" is the most important. Let a line turning in a plane be pivoted at any point in itself, and let its initial position be marked by a fixed line in the plane, then, reckoning from this initial position the amount of turning made by the pivoted line, moving always the same way round, is called the angle between the fixed line and the pivoted line. Or, alternately, we may say that the angle between two given crossing lines is the amount of turning that the first-named of them must make in order to lie along the other. "Interior" and "exterior," as applied to the angles between adjacent sides of a rectilinear figure, are useful conventions which we shall notice presently; but "interior" and "exterior," as applied to the angles between two non-intersecting lines and a transversal, are to be classed with "alternate" and "vertically opposite" as erroneous terms, inconsistent with clearness of thinking.

The consideration that, if one line crosses another, there are two ways in which one of them may turn so as to lie along the other, introduces the definitions of positive and negative ways of turning. To avoid ambiguity we observe the convention that the first position of conformity shall determine the angle, and then the definition of supplementary angles and a formal statement of Euclid's thirteenth proposition naturally follow; but the theorem is clearly axiomatic. Next, let us draw any triangle, and name its corners A , B , C , in negative order—the order in which they would be passed by a line turning negatively about a pivot inside the triangle. Let a straight edge, whose ends are distinguishable, lie along AB . Let it be pivoted at B , and turn positively, until it lies along BC . Then, let it be pivoted at C , and turn positively, until it lies along CA . Lastly, let it be pivoted at A , and turn positively, until it lies along AB once more. Two things are evident. First, that the straight edge moves across the area of the triangle in each motion. This gives us the definition of "interior" angle, while "exterior" angle is that made by the straight edge in turning from the direction of one side to the direction of another without moving across the area of the triangle. Second, that the straight edge has, by turning through the three interior angles of the triangle, made half a turn. That is to say, the sum of the

interior angles of any triangle is half a turn, or 180 degrees, if we define a degree as the 360th part of a turn. The important fundamental propositions 13 and 32 of Euclid's first book are thus established immediately from the definition of angle. Taken together, they give us the fact that the exterior angle whose pivot is any corner of a triangle is equal to the sum of the interior angles whose pivots are the other corners. Propositions 16 and 17 follow as immediate corollaries, although the former may be deduced directly from the definition of angle, and the second case of proposition 26 is brought under the first case, for, if two angles of a triangle are known, so is the third angle. The placing of the above and other important propositions on an independent basis is one of the distinct advantages of this method of treating angles. The Euclidean plan of making all succeeding theorems depend on the first, and grow out of it, in the fashion of a genealogical tree, is unnecessary to a scientific treatment of geometry, and can be regarded only as an ingenious device, often laboured, often producing an unnatural sequence, and founding many simple and almost axiomatic theorems on involved and otherwise useless lemmata.

If a line pivoted at a point in itself is turned through any positive angle, and then through an equal negative angle, it will obviously conform with its original position. If, however, we choose one point in the moving line as pivot for the positive angle, and another point in it as pivot for the equal negative angle, the line will then be parallel to its original position. Two co-planar lines are thus defined to be parallel when one of them can be equal amounts of positive and negative turning be brought to lie along the other. The definition, unlike Euclid's statement, is positive. In place of Euclid's 29th proposition we have the immediate and important deduction that the positive angle between a transversal and one of two parallels is equal to the positive angle between that transversal and the other parallel. For, let a and b be the parallels, and t the transversal; then, from the definition, the positive angle between a and t is equal to the negative angle between t and b , but this latter is the same scalar magnitude as the positive angle between b and t . We may observe that this definition of parallels is not equivalent to Euclid's 27th proposition, which refers to the transversal; but that if in place of this proposition we put the statement that parallel lines, if produced, do not meet, we shall have a theorem capable of a *reductio ad absurdum* proof; for, if they do meet, then a positive angle of less than half a turn alone suffices to bring about conformity. Revisers of Euclid have frequently proposed to interchange his definition of parallels and his 27th proposition, and the complication of the latter due to its dependence upon the transversal has been the chief objection to so doing.

The definition of angle taken along with Borelli's definition of circle gives the principle of the usual method of measuring angles less than one turn. Let a line AB , of constant length, be pivoted at A and revolve positively. Then, when AB has made one

turn, B has traced the circumference of a circle. Therefore, when AB has made any given fraction of a turn, B has traced the same fraction of the circumference. Hence, by determining the latter fraction, we shall determine the angle in terms of the natural unit of angle. The practical outcome of this is, firstly, the method of copying the limits of an angle, and, secondly, the circular protractor. Lastly, we have a simple and readily proved method of finding the bisector of an angle. Let A and Z be the ends of the arc determined by the angle whose pivot is the centre of the circle. In the arc take points B and Y, so that $AB = ZY$; then the mid-point of arc AZ is in arc BY. In the arc BY take points C and X, so that $AC = ZX$, then mid-point of arc AZ is in arc CX. As the process is continued the points thus found approach one another till in the limit they coincide in the mid-point of the arc AZ. If M is this mid-point, then it is clear that the angle between the radius drawn to A and the radius drawn to M is equal to the angle between the radius drawn to M and the radius drawn to Z. In practice, it is easy to find the mid-point in the second, or, at most, the third step of the process, and accuracy is as nearly attainable as by any other method with the instruments used. The principle of this method of finding the mid-point of a line is obvious at once; but its chief merit in our present point of view is that the bisection of the angle is provable immediately from the fundamental relationship between angle and circle. It is worthy of passing notice that those who wish to prove Euc. i. 5 by bisecting the "vertical" angle, and using i. 4, may do so without the logical somersault which comes about by making the proof of the bisection of an angle depend indirectly upon that very proposition.

APPARATUS FOR EXPERIMENTS IN CALORIMETRY.

By E. S. A. ROBSON, M.Sc.

Lecturer in Physics Royal Salford Technical Institute.

THE experiments and apparatus to be described in this article are intended for students in secondary schools, and the apparatus is intended for use by the boys and girls themselves.

For the purpose of weighing, chemical balances reading from 250 grams to 1 centigram (price £1 10s. of any good maker) will be required; while, for heavier weights, a flat-pan kilogram balance (price £1 5s.) is necessary.

In most calorimetric experiments the temperature will require estimating to $\frac{1}{10}^{\circ}$ C., and a preliminary test in noting time and temperature readings when heating a tank of water may be performed by the student. Chemical thermometers 0° - 100° C., etched on the stem, with enamelled back and marked in single degrees, may be purchased for 2s. each from any apparatus maker. For more accurate work a 0° - 35° C. thermometer

graduated in $\frac{1}{10}^{\circ}$ C. may be recommended. The reading of the temperature is most important, and it takes some time and patience on the part of the teacher before the students understand that the virtue of weighing to the nearest milligram will not compensate for the vice of estimating the temperature merely to the nearest degree.

With regard to the important subject of calorimeters, certain definite requirements are evolved from long experience. In the first place, it is essential that the calorimeter should be made of "spun" metal, copper or aluminium for preference. If the vessel is slightly thickened round the upper edge it is practically unbreakable and will last for years. Soldered calorimeters should not be tolerated in any good laboratory; the specific heat of the metal is an unknown quantity, and, moreover, such calorimeters have a habit of developing an exasperating leak while the experiment is in progress. A convenient size of vessel for ordinary use is 3 inches height \times $1\frac{3}{4}$ inches diameter; these will cost 1s. each, and may be obtained from Messrs. J. J. Griffin & Co., Sardinia Street, London, W.C., or from Mr. F. Jackson, Cross Street, Manchester. Other makers stock them in slightly different sizes.

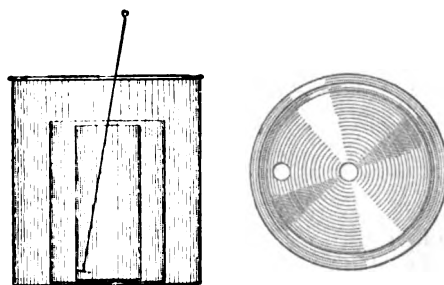


FIG. 1.—Simple calorimeter and enclosure.

The calorimeters must be placed in an enclosure, for which a double-walled cylindrical tin-vessel may be recommended, the inner portion 3 inches height \times $2\frac{3}{4}$ inches diameter being soldered to the outer portion, which is 4 inches height \times 4 inches diameter. The inner vessel is lined with $\frac{1}{8}$ -inch sheet asbestos¹ which acts as a non-conducting material, and the space between the inner and outer vessel may be filled with cold water or left empty. The calorimeter, enclosure, and lid (Fig. 1) will cost 2s. 6d. each (Jackson). The substance, the specific heat of which is to be determined, will have to be heated in a steam heater, and after trying most of the usual forms of apparatus, I can recommend the following simple combined boiler and heater (Fig. 2). It consists of two drawn-brass tubes 7 inches height \times $2\frac{1}{2}$ inches diameter brazed inside a cylindrical copper vessel 9 inches height \times 5 inches diameter which contains the water. The apparatus is fitted at the top with an outlet for the steam and is heated by placing it on a tripod. The price is 15s. (Mr. G. Cussons,

¹ Price 2s. per sheet 40 inches \times 40 inches. United Asbestos Company, Billiter Street, London, E.C.

Lower Broughton, Manchester). The substance is lifted out of the heater instead of dropping it through a circular trap-door, as in the case of most heaters. The best example of the latter plan is Glazebrook & Shaw's steam heater and calorimeter, which costs £4 (Mr. W. G. Pye, Cambridge).

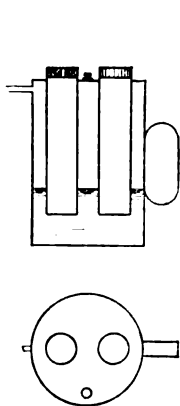


FIG. 2.—Metal heater for calorimetric experiments.

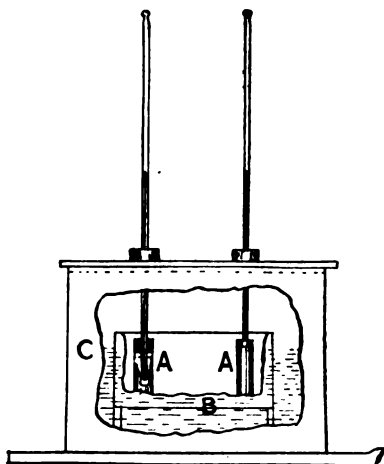


FIG. 3.—Apparatus to determine the specific heat of liquids by the method of cooling.

Teachers should notice that a more satisfactory result for the specific heat is obtained where a fairly large mass—say, 100 grams—of the substance is used, and, moreover, should avoid the use of tacks or pieces of wire, as the cooling surface is excessive. Students may also determine the temperature of a muffle furnace or blowpipe by means of a calorimetric method, using a brass disc 3 inches diameter \times $\frac{1}{4}$ inch thick, and a large copper calorimeter $4\frac{1}{2}$ inches height \times $3\frac{1}{4}$ inches diameter (2s., Jackson).

For the determination of the specific heat of liquids by the cooling method a special apparatus will be required. The calorimeters AA (see Fig. 3) are each $2\frac{1}{2}$ inches height \times $\frac{3}{4}$ inch diameter, and are made of aluminium (price 1s. 3d., London Aluminium Company, Knightbridge Street, London, E.C.). The cooling determination is performed in an inner zinc vessel B (5 inches \times 4 inches \times 3 inches) supported on four metal rods inside a larger zinc trough C (8 inches \times 5 inches \times $6\frac{1}{2}$ inches), the space between the two vessels being filled with ice or cold water. A wooden lid, lined inside with felt, is fitted over the top, and two holes $\frac{3}{8}$ inch in diameter and $2\frac{1}{4}$ inches apart serve for the insertion of thermometers into the calorimeters. The complete apparatus costs 15s. (Cussons). The determination may also be performed in one of the calorimeter enclosures for the specific heat of solids, using one liquid at a time.

Of course it is necessary that all liquids in common use for calorimetric experiments—*e.g.*, glycerine, turpentine, castor oil, methylated spirits, benzol, aniline—should have their specific heats determined from time to time, since the specific heat varies considerably with the amount of water

or other impurities present. As a general rule, the commercial liquids will have a higher specific heat than the pure liquids. Aniline is found to absorb water slightly, and hence there will be a corresponding rise in its specific heat. For testing purposes we require an instrument analogous to the hydrometer, which will give the value of the specific heat for any liquid correct to the second decimal place.

Andrews' calorifer (Fig. 4), which will fulfil the above requirements, consists of a large glass bulb A (about 4.7 cms. in diameter) filled with mercury, and connected with a stem 25 cms. long, on which are the smaller bulbs B and C. The calorifer is suspended in a dry metal can and heated until the mercury appears above the upper mark *a* on the stem. It is now immersed in a known quantity of water contained in a calorimeter. The heat given out by the mercury in falling from *a* to *b* can be determined once for all. The calorifer is again heated to the upper mark *a*, and immersed in the same number of grams of the liquid under test. With the instrument in use here 300 grams of the given liquid are employed and the specific heat calculated from the simple formula $s = \frac{6}{t} - 0.03$

where *s* = specific heat, *t* = rise in temperature of liquid, as measured by a centigrade thermometer. Further, when once the constants of the instrument are determined a curve may be plotted for definite values of *t* (*e.g.*, taking *t* = 6°, 8°, 10°, . . . 18°, and obtaining the corresponding values *s* = 0.97, 0.83, 0.72, . . . 0.27). The curve is a portion of a rectangular hyperbola, and from it

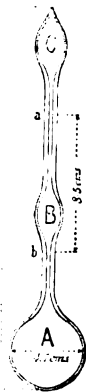


FIG. 4.—Andrews' calorifer.

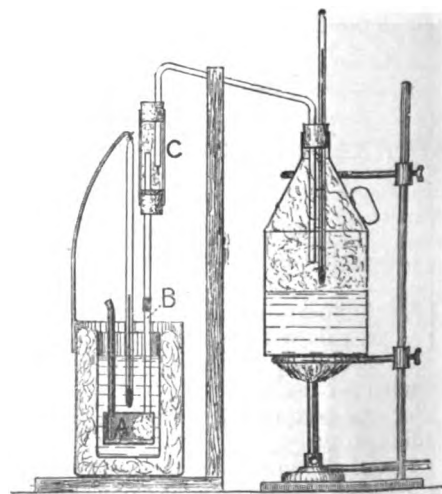


FIG. 5.—Apparatus to determine the latent heat of steam.

the values of *s* are read off with ease. The price of the calorifer is 15s. (Griffin).

Passing on to the determination of the latent heat of steam, the simple apparatus in Fig. 5 may be set up by the teacher himself. A metal can containing water is connected to a steam trap C, and to a copper condenser A, the dimensions of which

are 2 in. \times 2 in. \times $\frac{1}{2}$ in., the height of each opening being $1\frac{1}{2}$ in. The price of the condenser is 4s. (Jackson), while a more elaborate form of apparatus fitted with a copper boiler costs £1 5s. (Cussons). Berthelot's well-known form of appa-

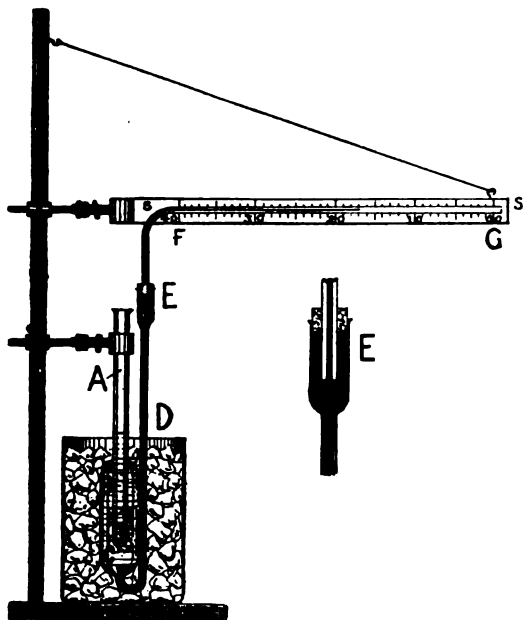


FIG. 6.—Bunsen's ice calorimeter.

ratus will be found to give trustworthy results (price £2 15s., Max Kohl; agents, Messrs. Isenthal and Co., Mortimer Street, London), the only objection to the apparatus being that it is made entirely of glass, and is therefore likely to suffer at the hands of inexperienced students.

Considering the low price (3s.) of Bunsen's ice calorimeter, it is rather surprising to find it so neglected in calorimetric work, since its accuracy is unquestioned. In Fig. 6 is shown a simple method of measuring the decrease in volume of the melting ice by means of the barometer tubing FG and the metric scale SS. The great difficulty lies in filling the outer tube B with pure distilled water, but detailed instructions are given in most text-books, and when once filled the instrument may be used for some time.

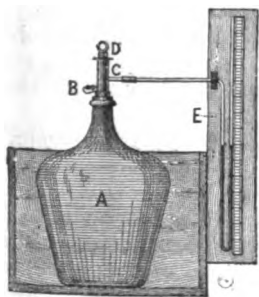


FIG. 7.—Apparatus for the determination of the ratio (γ) of the specific heats of a gas.

Although strictly not included in the subject of calorimetry, the determination of the ratio (γ) of the specific heats of a gas may be introduced as an advanced experiment. The apparatus (Fig. 7) consists of a carboy, the neck of which is fitted with a metal tube and a valve D. A pneumatic valve B is soldered on the metal tube, and

serves to pump in the air, while a manometer E, about 25 in. in height, and filled with castor oil, measures the pressure inside the carboy. The price of the apparatus is £1 10s. (Cussons).

Of other advanced pieces of apparatus dealing with calorimetry the following deserve mention:—Lewis Thompson's Fuel Tester (price £5 10s.), P. Harris, Birmingham; Regnault's apparatus for the specific heat of a gas at constant pressure (price £13), Max Kohl; and Favre & Silbermann's calorimeter for the heat of combination (price £4), Max Kohl. The money would be well spent in acquiring these latter instruments, provided that the course in practical heat is used as a practical course in elementary steam, thus extending the utility of the subject to students of physics, chemistry, and engineering.

With regard to duplication of apparatus, I should recommend ten 100° C. thermometers, two steam heaters, and six calorimeters and enclosures, for a class of twenty students, the remaining pieces of apparatus being bought singly as required.

THE ASSOCIATION OF ASSISTANT-MISTRESSES IN PUBLIC SECONDARY SCHOOLS.

THE idea of an Association of Assistant-mistresses was suggested in 1883, and was at once welcomed by many ardent teachers who had felt the need of greater opportunities for the discussion of educational questions. The inaugural meeting was held on January 15th, 1884, under the presidency of Mrs. Fawcett, who in her opening speech strongly advocated the formation of such an association. The Association was incorporated under the Companies Acts in 1897, and the first president after its incorporation was Mrs. Withiel. Its objects, as stated in its "Articles of Association," are: To promote the cause of education generally; to protect and improve the status and to further the legitimate professional interests of teachers. Any assistant-mistress of a public secondary school—that is, a secondary school administered by a representative or other governing body of a public character—is eligible for ordinary membership of the Association. The business is managed by an executive committee, consisting of a president, honorary treasurer, and fifteen members. The president and hon. treasurer hold office for one year, the other members of the committee for three. The president is chosen alternately from London and the country. The secretary is appointed at the first meeting of the executive committee held after the annual meeting. The president elected last January is Miss Laurie, of Cheltenham Ladies' College.

The Executive Committee entrusts much of the work of the Association to a sub-committee, known as the Emergency Committee, whose business it is to take whatever action may appear desirable for the furtherance of the objects of the Association,

such as sending representatives to conferences, joining deputations, memorialising the President of the Board of Education on any educational question that may arise on which the opinion of the Association has been ascertained. Already this year the Association through this committee has sent representatives to the conference held at Durham on the training of teachers, and to the conference of the National Association for the promotion of Technical and Secondary Education. At the present time, there are 682 members, representing about 140 schools. A large proportion of members naturally come from London, but there is hardly a county in England unrepresented, whilst the Welsh branch includes teachers from over twenty schools, and Scotland furnishes over



MISS LAURIE,
Assistant-mistress of Cheltenham Ladies' College; President of the
Association of Assistant-mistresses.

thirty members. The Association is gaining a footing in Ireland, and has a member in Denmark, and another in India. The representative character of the Association, the fact that it draws from such a large area, is of immense importance: it enables the Association to get together a body of opinion on educational questions, such as the training of teachers, which is of the utmost value to the profession—and to legislators.

The branches are free to organise any meetings they like, but they may not take any action involving the Association as a body. Any group of schools can form itself into a branch without reference to the committee, but naturally every member has to apply for election (forms of application may be obtained from the Secretary, Miss Fountain, 3, Osberton Road, Lee, Kent), and the candidate's election is then considered by the Executive Committee. Branch meetings are held about once

a term, or oftener, when educational politics, or some subject of practical interest, such as the school curriculum, is discussed. Each branch has its own secretary, and each school in the branch its special correspondent. The branches send delegates to the general meeting held every year in London. Extraordinary general meetings are summoned, when necessary, by the Executive Committee.

It may be asked, has the A.A.M. succeeded in improving the status of teachers? Undoubtedly it has. It will be sufficient in support of this statement to show the influence that the Association has had on the registration of teachers. In 1891, Miss C. E. Collet, the president of that year, gave evidence before the Select Committee of the House of Commons formed for the consideration of the Registration Bills. In 1894, when the Bryce Commission on secondary education was sitting, the A.A.M. was again invited to give evidence, mainly on the subjects of registration and training. Miss Lumby, the President, and Mrs. Withiel, advocated, on behalf of the Association, that training should not be taken as a substitute for a knowledge qualification and that it need not necessarily be at a training college, for it was felt that it should be as varied as possible. The alphabetical register, consisting of columns in which the qualifications and training of teachers should be entered, were suggestions which, among others, have been adopted in the Registration Order of Council issued last March. Mrs. Withiel supplied special information on the financial position of women teachers, which the Commissioners regarded as very valuable. Lastly, in connection with this subject of registration, the fact that Miss Wallas, for two years president of the A.A.M., should have been nominated by the Board of Education a member of the Registration Council speaks for itself.

It is evident from these and many other facts which could be adduced that the A.A.M. has a recognised official position as an Association through which it is possible to get at the opinion of assistant-mistresses in secondary schools. At the present time, no joint committee is formed on matters of any importance to secondary education without representatives from the Association being invited.

One is sometimes asked what are the benefits of belonging to the A.A.M.? That there are advantages it is easy to show, but it is somewhat surprising that the undeniable devotion of assistant-mistresses to their work does not more often lead them to ask, for the sake of the profession to which they belong, "Can I help on in any way the work of the Association by joining it?" Every assistant-mistress who joins the A.A.M. and attends meetings is helping to form that body of professional opinion which it is so important to have, especially in these days of educational activity. Not only this, but intercourse amongst teachers, the exchange of views, contact with different schools and systems, are invaluable. The experienced teacher gives of her experience and

receives in return from younger members a knowledge of newer methods and books, which might otherwise not have been gained, and thus the standard of the whole Association is raised and the profession benefited. Owing to the able management of its finances by its hon. treasurers—past and present—the A.A.M. appears to be one of the few societies that always meets its expenses and has a balance in hand, and this although the annual subscription is only 2s. 6d. Last year two members were sent, partly at the expense of the A.A.M., to the meeting of the British Association, to attend the debates of the Educational Science Section. In this way, not only can the views of the A.A.M. be stated as opportunity occurs, but through the reports furnished by their representatives and circulated amongst members the Association is kept in touch with the educational thoughts of the day.

One of the first acts of the Association was to start a free registry for its members. In January, 1898, at the invitation of the Teachers' Guild, the free registry of the A.A.M. was amalgamated with the Joint Agency for Women Teachers, managed by a committee of representatives from various educational bodies.

Then there is a library, from which members may obtain books by merely paying the postage; they may be kept for months, if not wanted by other members, so that country members who have not access to good libraries have found it useful. And here the valuable reports which are issued every year to members may be mentioned, for they contain a mass of information on current educational matters which it would be difficult to get elsewhere.

These material advantages are, however, of small moment compared with those that must result to individuals from any action taken by the A.A.M. in its corporate capacity. These it is not so easy to define, but they are none the less real, and perhaps the greatest is the inspiration that comes through the consciousness of many working together to advance the highest interests of the profession they have chosen for their life-work.

Wordsworth. By Prof. Walter Raleigh. 232 pp. (Edward Arnold.) 6s.—Prof. Raleigh has the art, when writing a literary monograph, to make it almost as fascinating as a novel. It is not that this book is to be called great or epoch making. There is already such a voluminous Wordsworth literature in print that to write anything absolutely new about this particular poet is exceedingly difficult. But there is a way of putting things, and of that way Prof. Raleigh is a master. Consequently he has written a charming and suggestive book upon a man whose genius still continues to puzzle many inquirers. Of course the vexed question of poetic diction could not be left out of account, but the most fascinating chapters of this work are those which deal with Wordsworth's relation to Nature and Humanity and his own powers of illuminative insight. The most worn-out critic will hardly fail to read these with enjoyment; and the whole book breathes the spirit of lofty reverence united to a singular charm of style.

SQUARED PAPER.

By W. H. SALMON, B.A., B.Sc.

SINCE the introduction of the heuristic method into our system of education the use of squared paper has come to play a very important part in laboratory instruction, more especially in physical work; the student is now encouraged to find out by his own experiments the relations between connected physical quantities, and to plot for himself curves to determine these relations. There is a growing tendency, too, in favour of concrete methods in science which necessitates a training in this and other methods of graphical representation. A few words, therefore, on the means of obtaining the different kinds of squared paper, and their cost, may be useful to the science teacher.

Many varieties may be obtained from the Educational Supply Association, Holborn Viaduct, E.C. This firm supplies at £1 7s. per gross a science exercise-book very useful for beginners, consisting of fifty-six pages of ordinary manuscript ruling and four squared pages ruled to tenths of an inch with red and blue lines at alternate half-inches, and containing a handy list of physical data. A similar book may also be obtained from them at £2 14s. per gross, consisting of sixty-four pages all ruled square, either to $\frac{1}{4}$ inch or $\frac{1}{2}$ cm., or $\frac{1}{3}$ cm. Other kinds kept in stock by this firm are the 13-inch by 16-inch sheet ruled at intervals of $\frac{1}{8}$ inch, $\frac{1}{4}$ inch, and $\frac{1}{2}$ cm., price 7s. 6d. per ream; a 9 $\frac{1}{4}$ -inch by 14 $\frac{1}{2}$ -inch sheet ruled with dark brown lines on a yellow background at intervals of a millimetre, the centimetres and $\frac{1}{2}$ centimetres being marked by thicker lines; and a 13-inch by 16-inch sheet ruled to tenths of an inch with faint blue lines, every $\frac{1}{2}$ inch being marked by red and dark blue lines alternately. This can be obtained at 15s. per ream.

This last is also supplied in rather better quality in sheets of 11 inches by 17 inches, by Messrs. Lamley and Co., Exhibition Road, S.W., at 9d. per quire or 12s. per ream. This firm also keeps squared paper notebooks in cloth covers, price 1s. 6d., ruled in tenths of an inch with thicker lines at every inch and containing 120 pages, 8 inches by 10 inches.

Other London firms may also be mentioned. Messrs. Relfe Bros., 6, Charterhouse Buildings, E.C., will rule squared paper to any size from one-sixteenth of an inch upwards; while more expensive kinds (from 3s. to 11s. a quire) may be obtained from Messrs. Waterlow and Sons. An extensive variety, too, including tracing paper and tracing cloth, may be obtained from Messrs. Tacey and Co., 39, City Road, E.C.

In addition the Midland Educational Co. have an establishment in Corporation Street, Birmingham, and a branch in Market Street, Leicester. Their "Physical Exercise Book," with cloth covers, may be especially noticed as being very useful for school laboratory work; it consists of sixty-four

leaves, ruled on one side with ordinary manuscript lines, on the other in squares, at intervals of $\frac{1}{10}$ -inch; the ruling is very distinct, and the book is sold at £2 14s. per gross. Squared paper, ruled to tenths of an inch in faint blue lines, can also be obtained from them made up in "Reporter's" notebooks at 3s. per dozen. Square rulings, at intervals of $\frac{1}{4}$ inch, may also be had at 4s. 6d. to 7s. 6d. per ream, or made up in sixpenny notebooks. A very good quality paper supplied by this firm is their $\frac{1}{8}$ inch, ruled with blue lines and a thicker blue line at every inch, sold at 1s. 6d. per 100 sheets, or in books at 9s. per gross. Another Birmingham firm which should be mentioned is Messrs. Philip Harris and Co., who supply at 4s. per dozen a notebook of 96 pages, with one side in $\frac{1}{10}$ -inch squares, the other being ruled straight, and who keep in stock many varieties of the rulings brought out by the German firm, Schleicher and Schüll, mentioned below.

From the North of England School Furnishing Company, Darlington, may be obtained a sheet, $7\frac{1}{2}$ inches by $9\frac{1}{2}$ inches, ruled in squares at intervals of about one-eighth of an inch, and sold at 1s. 6d. per 100 sheets.

Perhaps the best quality of squared paper on the market is that published by Schleicher and Schüll. This can be obtained either in sheet or roll from most of the firms mentioned above. It is, of course, somewhat expensive, costing about 12s. 6d. per roll (11 yards by 30 inches) unmounted, and 25s. mounted on cloth, or 5s. 6d. per quire of sheets 18 inches by 23 inches.

A recent introduction, probably unknown to most teachers, is Granville's Plotting Paper for polar co-ordinates. This only appeared in England last year, and the sole agents here are Messrs. Bemrose and Sons, 4, Snow Hill, E.C. It consists of a series of concentric circles with straight lines radiating from the centre at intervals of five degrees, and is published in books of 40 sheets at 1s. per book. This has been quite lately introduced in the first-year course in mathematics at the Central Technical College, and has been found useful in classes in elementary trigonometry.

So far we have referred only to squared paper for mathematical and scientific work, but a few words might be said about square rulings for drawing purposes. A varied assortment of these is kept in stock by the Midland Educational Company, and can be obtained either in the sheet form or made up in books, from 1d. upwards. The sheets are ruled at intervals, varying from $\frac{1}{8}$ inch up to one inch, and are sold at 1s. 3d. per 100 sheets. A different quality paper with rougher surface, marked with dots instead of lines, in squares of $\frac{1}{4}$ inch or $\frac{1}{2}$ inch, may be obtained here, made up into 1d. drawing books, having a page of 5 inches by $6\frac{1}{2}$ inches. Most of these varieties can, in fact, be obtained from almost any school stationer.

Of the various kinds of squared paper enumerated above, one of the most suitable for fairly advanced scientific work is the $\frac{1}{10}$ -inch ruling with thicker red

and blue lines at every alternate half inch. This is certainly to be preferred to the uniformly coloured faint-blue ruling, which is apt to be very confusing, and to lead to mistakes in plotting observations on the paper. The $\frac{1}{10}$ -inch ruling has also the advantage of being convenient for decimal computations. If, however, a laboratory notebook is desired square ruled on every page, then the fainter colours must be used, that the book may be suitable for ordinary writing. For more elementary work wider rulings would do, such as the half-centimetre or the centimetre, and the exercise books, ruled partly for ordinary MS. work, partly in squares, would be found very useful.

It will not be out of place to conclude with a strong recommendation in favour of the introduction, and the *early* introduction, of lessons on squared paper into purely mathematical classes. The recent agitation for a reform of the accepted methods of teaching mathematics in schools has been entirely in favour of a less abstract line of education. This alone is sufficient to show the necessity of some change, and every mathematical teacher will agree that the mind of the average boy is unable to assimilate a course of mathematics consisting wholly of abstract reasoning. A course of lessons on the use of squared paper (assuming practically no previous mathematical knowledge) might very well be given to an elementary class, and would afford an excellent introduction to the study of co-ordinate geometry later on, should the pupil ever reach that stage. Common illustrations of the principles involved, as, for example, a temperature chart, showing their application to everyday life, would rouse a fresh interest in mathematics, and, apart from the practical possibilities thus opened out, the concrete aspect of the subject would do much to relieve the mental strain which for some minds seems always associated with the study of abstract science.

THE LONDON EDUCATION BILL.

THE Education Bill for London was introduced in the House of Commons by Sir William Anson on April 7th, and read a first time. The object of the Bill is to extend and adapt the provisions of the Education Act of last year to London. Under the Bill, the School Board is to be abolished, and education is to be linked with municipal government. The London County Council is to some extent placed in the position of the county councils throughout the country, under the Act of last session; as the education authority for London, it will provide the money and exert a general control over educational policy, and it will act through an Education Committee which is to number ninety-seven, and be constituted as follows:—

London County Council	36
Each Borough Council, one	27
Westminster and the City of London, two each	4
London University and various public schools and technical institutions, and the great contributories to London education, such as the trustees of the City parochial charities and City Guilds... ..	25
	—
	92
For the first five years five members of the existing School Board	5
	—
Total number of members	97

The council of each metropolitan borough is to manage all "council," *i.e.*, board schools, within the borough. In other words, the appointment and dismissal of teachers, the custody of school buildings, the selection of sites for new schools and the erection of new buildings, is to be left to the metropolitan boroughs in their capacity of "managers." These borough councils may, if they think fit, delegate their powers to a committee or committees appointed by them, consisting either wholly or partly of members of the council.

The relation of voluntary schools to the new local authority is to be precisely the same as that set up under the Act of 1902.

In the event of any dispute between the education authority and a metropolitan borough as to the distinction between "management" and "control," or in respect of negligence on the part of a borough council to perform its duties, the Board of Education is to arbitrate, and its decision is to be acted upon.

Woolwich is treated in an exceptional manner. It is regarded by the Bill as a separate borough apart from London, and will have the rating powers of a borough council under last year's Act.

Such are the main provisions of the Bill before Parliament. The Bill has not received the approval of any responsible body of educational opinion, and it seems more than likely that important modifications will be introduced. There is need for a re-adjustment in the composition of the education committee. No good argument for the inclusion of thirty-one representatives of borough councils is forthcoming. The delegation to local borough councils of such important duties as the appointment and dismissal of teachers and the selection of sites for new schools are defended by no political party, and it is almost certain that the London Education Act as finally passed will differ in many important respects from the Bill which has now been read a first time.

ROYAL COMMISSION ON UNIVERSITY EDUCATION IN IRELAND.

FINAL REPORT.

THIS report is the outcome of much labour in the attempt to solve a problem the difficulty of which arises from the two incompatible ideals of higher education held by Protestants and Roman Catholics. Ireland has been traversed, thirty-six sittings have been held, and one hundred and forty-seven witnesses examined. The result is clearly a compromise, for while ten of the eleven commissioners sign the report, six of the ten enter important reservations by way of notes which are appended.

Many persons have questioned the advisability of excluding Trinity College from the scope of the Commission's inquiry, as they look for a solution in a plan alluded to by the report (p. 31), by which the constitution of the University of Dublin might be modified to suit Roman Catholics. The wish is father to the thought. There is no sign that the Roman Catholic authorities would accept any modifications that Protestants could suggest.

The recommendations actually made are in view of the following defects in the present constitution and working of the Royal University: (1) A merely examining university, however high the standard of its examinations, must have a "paralysing and disheartening influence" on teaching; (2) Its peculiar organisation is such "that every appointment from that of senator to that of hall porter shall be such as to maintain an even balance between the churches"; (3) Since it came into existence, the growth of the Queen's Colleges has been arrested. A "coaching" system has hit hard attendance on lectures, and the reduction in the number of students has been remarkable. In Belfast it has gone down from 567 in 1881-2 to 349 in 1901-2, in Cork from 402 to 190, and in Galway from 201 to 93. It is necessary to restore the academic principle and to insist on residence as a qualification for a degree. (4) Lastly, there is the religious difficulty. The Roman Catholic Church has objected to the Queen's Colleges, and there is no possibility of the removal of the ban. This has led to a lack of properly qualified Roman Catholics for responsible appointments and to very serious economic and social evils.

The proposals discussed "have all a common basis and a common characteristic. Whether college or university be the form of the new institution, that institution, if it is to serve its purpose at all, must be a Roman Catholic institution. . . . Its teaching shall be effectively guaranteed to be safe to the faith and morals of Roman Catholics." It is, however, noted with regret that they run counter to the hope that the Irish youth of all creeds might meet and mingle in college life. Nor is it "probable that more than a small proportion of young men studying for the priesthood would attend even such a Roman Catholic College or University" as is described.

Triumphs of Science. Edited by M. A. L. Lane. v. + 154 pp. (Ginn.) 1s. 6d.—These interesting essays by well-known authorities on some applications of science should prove of use in upper classes as affording a change from the orthodox form of reading-book. Telescopes, lighthouses, guns, warships, tunnels, and railroads are some of the subjects dealt with, and they are described in easily understood language. Many boys will devour the contents of the book in their leisure time.

It should, again, provide training for both primary and secondary teachers.

The suggestion of a Roman Catholic University is rejected on three grounds. (1) "There arises on the threshold the intrinsic objection to giving to an institution intended for one religious denomination, and largely controlled by ecclesiastics, the right to confer degrees." And "it is obvious that degrees conferred by such a body would not pass current in the market of life as compared with degrees conferred by institutions resting on a broader basis." (2) This proposal is always associated with the establishment of another university in Belfast, mainly Presbyterian, but "it is clear that Belfast does not desire, and would not in present conditions accept, a university." (3) It leaves Cork and Galway outside either university and virtually derelict.

It is therefore recommended that the Royal University be reconstituted as a "teaching university with four constituent colleges, the three existing Queen's Colleges and a new Roman Catholic College." The new college would find its nucleus in the present University College in Dublin, which at present receives £6,000 indirectly from the State. Each college would be amply endowed and practically autonomous, the Senate of the University merely supervising and approving their graduation courses, and taking care that the standard of the examinations is properly maintained. The Senate would be reformed, and each of the colleges would have a governing body appropriate to its local needs. A hope is expressed that, with the establishment of a purely Roman Catholic College in Dublin, the present religious difficulty in Cork and Galway may disappear.

The claims of women are fully recognised in the report. "All degrees and other privileges of the University should be open without distinction of sex. The existing women's colleges might easily be converted into residential halls in connection with the University."

There are also recommendations dealing with higher technical education, the co-ordination of primary, secondary, and technical education, and a department of Irish studies.

The most important note appended to the report is that by the Chairman, Lord Robertson, in which he says that he cannot concur in the scheme because the "most authoritative Roman Catholic opinions have already declared against it," and, further, "the question whether such an institution ought to be endowed by Parliament would at any time be important; and it arises after the system of concurrent endowment has been finally extinguished by the disestablishment of the Church of Ireland. But, further, that question must be faced in all its bearings; and it will be for the Government and for Parliament to judge how far the added influence which would unquestionably accrue to the Roman Catholic prelates would be exercised to the furtherance of national enlightenment and imperial strength."

It may be added that nothing is yet known of the intentions of the Government in reference to

the report, but it is officially stated that in any case due regard will be had to the interests of those who have already entered upon a career in the Royal University, and that a considerable time will be allowed them within which to complete their courses under the present regulations.

THE REPORT OF THE INDIAN UNIVERSITIES COMMISSION.

ITS RELATION TO SECONDARY EDUCATION IN INDIA.

(FROM A CALCUTTA CORRESPONDENT.)

OWING to the prominence that has of late been given to the questions of primary and secondary education in England, the Indian Universities Commission that was appointed and issued its report last year has roused more interest outside scholastic circles than in all probability it ordinarily would have done. But the tendency for an Englishman to interpret events that happen abroad in terms of what he himself is personally acquainted with appears to have been at work in this case also, and one is glad of an opportunity of pointing out the different circumstances that have to be faced in our eastern empire from those that have to be dealt with at home.

A Universities Commission in England, if it were instructed to enquire into the condition and prospects of the Universities, and to recommend measures for the promotion and advancement of learning, would undoubtedly conceive it to be one of the main divisions of its duty to study the relation of the Universities to the schools from which their students are drawn. And one would naturally look for suggestions for improving the curriculum of the schools, if that was in any way deficient, and for bringing the school system more in harmony with that of the Universities. Not so in India. In the report with which we are dealing, it is left to the one dissentient member, Mr. Justice Banerjee, to draw attention in his note to the almost complete omission of reference to the condition of school and college life (as a matter of fact, barely two pages in all out of the seventy-two of the report are devoted to suggestions that deal even remotely with this important subject), and it is accordingly proposed, in the first place, to try to explain the system under which such a condition of things can be possible.

Extraordinary as it may seem to western minds, the hub about which education turns in India is the entrance examination of the Universities. Government, in an unwise moment, laid down that the smallest qualification for even minor clerkships in its gift should be a university entrance examination, and as a Government appointment is traditionally in India the be-all and end-all of existence, meaning as it does to the native a life of *otium cum dignitate*, the aim of every village youth who desires to improve his position is to pass the entrance

examination at the earliest possible age, and the schools inevitably are forced to cater for this demand.

The various university entrance examinations differ somewhat amongst themselves, but a fair idea of the standard of these examinations, upon which, in the circumstances mentioned above, so much depends, can be obtained by quoting the syllabus for the entrance examination of the Calcutta University. A candidate must take up the following subjects:—

- I. (a) English.
(b) One other language from a list of seventeen. Usually, in Bengal, either Bengali or Sanskrit is taken, or if the candidate be a Mohamedan, Persian.
- II. Mathematics. (a) Arithmetic up to square root.
(b) Simple algebra.
(c) First four books of Euclid.
- III. Outlines of the history of England and India, and the elements of general and physical geography as taught in three or four prescribed text-books.

Two papers are set in English. The first contains questions set from a text-book of selections published for the University, with questions on grammar arising therefrom. This text-book contains a mixture of prose and verse, and its standard can be gauged from the fact that the following pieces of poetry are those chosen to be learnt by heart: "Thou art, O God," "The Journey Onwards," "The Soldier's Dream," "The Village Blacksmith." The second paper contains passages for translation from the vernacular of the candidate, together with simple questions on English composition.

This syllabus gives us the key to the whole educational question. Practically speaking, in Indian schools there exists nothing corresponding to the secondary education of England. True; high schools exist in name, but these are simply devoted to training boys for the university entrance examination. In reality, therefore, the educational course is two-fold: (a) school or primary; (b) collegiate; the former being governed by the requirements of the latter. What, then, is the collegiate education with which the Commission was asked to deal? To answer this question, let us consider the Calcutta syllabus for the B.A. degree, taking for preference the scientific or B course (pass degree), as we can then more easily compare the work with that done by an English boy.

The requirements for this examination, which is taken two years after the first Arts, or intermediate, and four years after the entrance examination, are as follows:—

I. English. For 1903 the questions are to be selected from text-books dealing with two plays of Shakespeare, two poems of Milton, Book IV. of Palgrave's "Golden Treasury," Burke's Speeches (1 vol.), Trevelyan's "Selections from Macaulay."

II. Mathematics, including statics, dynamics, hydrostatics, and descriptive astronomy, the standard of work being similar to that required in the advanced stage of South Kensington examinations.

III. One of the following:—

- (a) Physics and chemistry. Text-books: Ganot (with numerous omissions) and Newth.
- (b) Physiology and botany, or zoology. Text-books: Huxley, Reynolds Green, and Parker.

(c) Geology and mineralogy, or physical geography. Text-books: Geikie's "Class Book," Cole, and Rutley.

No practical work is required.

This is, in fact, the course, or rather less than the course, an English boy of seventeen at a grammar school would have done, if he intended going up for a scholarship at Oxford or Cambridge.

The honours course is naturally more extensive, but, so far as science is concerned, the writer can vouch for the fact that honours students seldom, if ever, know as much as an English boy who has just obtained a scholarship at one of the English universities. In chemistry, for instance, an Indian honours student has to read the elements of organic chemistry, *excluding* benzene and its derivatives, and be able to analyse qualitatively a mixture containing not more than two acids and two bases, but in the other honours scientific subjects no practical work is required at all.

This similarity of English secondary with Indian university education up to the B.A. degree has not been fully grasped even in India, where the authorities, although realising that something is radically wrong with the whole system, cling to the belief that the Universities Commission ought to be competent to set matters right. Undoubtedly, the Commission's recommendations must improve the standard of work in the colleges, if they are carried out—although there is grave fear at present that the Government is inclined to give way before the clamour of the native Press, and make fatal concessions—but it hardly needs a Commission to introduce true reform and sound education. Government itself, by a stroke of the pen, could abolish the rule of entrance examinations being a qualification for Government employ (in this they are supported by the Commission), and following such a simple though far-reaching step, the lately-appointed Director-General of Education, Mr. Orange, would be able, in consultation with the provincial Directors of Public Instruction, to draft a scheme for the introduction into high schools of a satisfactory amount of true secondary education, sufficient to supply the wants of those who now read up to the standard of the entrance and intermediate university examinations. A school final examination, as the Commissioners also suggest, would, it is hoped, satisfy the desire for a testimonial of simple education.

The colleges and universities would thus be relieved from the business of looking after an enormous number of unprofitable students (*e.g.*, in 1901, 6,135 candidates appeared in the entrance examination at Calcutta, of whom 3,307 passed), and with fewer students at the colleges individual attention could be paid to students, better work could be attempted, and better results produced in the end. At present, with unwieldy classes (in many cases over 100), it is impossible for the professor to come properly into contact with even a small number of the students that attend his lectures.

We will now briefly detail the recommendations of the Commission, which, if carried out in conjunction with the reforms just dealt with, are

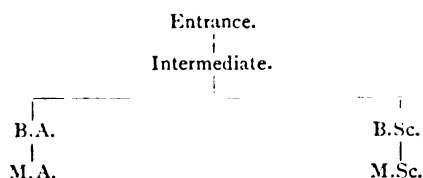
calculated to bring Indian college teaching more in line with that of colleges in England.

Age Limit.—As regards matriculation, it is recommended that no student should appear at the entrance examination until he has completed his fifteenth year. At present there is no limit, except at Allahabad, and although the average age is higher, students fairly often manage to pass the examination before they have reached the age of 13.

Distinction between School and College.—The Commission suggest that universities should decline to affiliate any new second-grade college, and those second-grade colleges which cannot hope to rise to the first grade ought to revert to the position of high school. A second-grade college is generally a high school that has added two college classes, so as to teach up to the university intermediate examination.

The Study of English.—The Commission points out that, notwithstanding the prominent position given to English throughout the university course, the results are most discouraging, and it is notorious that cases often occur of even M.A.s not being able to carry on an ordinary conversation with an Englishman without constantly requiring to have remarks repeated. The Commission considers that all teachers whose mother tongue is not English should be passed through a training college where they can be tested in expression and elocution by an Englishman before they are given certificates to teach, and recommend that no text-books in English should be prescribed for the matriculation classes. A list of descriptive and historical books, illustrating the course desired, may be given, but this list should be long enough to exclude the possibility of all the books being committed to memory. This latter clause is intended to check the almost universal custom, inconceivable though it may be to an Englishman, of getting up the prescribed book or books by heart. In the higher courses it is recommended that books should be chosen as examples of language and style, and should be studied more or less minutely. Books which deal with the history and criticism of literary works which the student has no opportunity of reading are not to be included.

Reorganisation of Courses for Degrees.—Lastly, the Commission proposes a complete reorganisation of courses of work at the university in accordance with the following scheme:—



The intermediate course is to include—

- (1) English.
- (2) A classical language, such as Sanskrit.
- (3) Mathematics.
- (4) One of the following: (a) Physics and chemistry, or
- (b) Deductive logic and elementary psychology.

The student who desires subsequently to take up science would take physics and chemistry for the intermediate examination, while the future B.A. student would take the alternative of logic and psychology. It is strongly recommended that practical work in physics and chemistry for this course, as well as in all science subjects in subsequent examinations, should be compulsory, and if in the case of the intermediate examination no actual practical examination be held, the written examination should be devised to elicit the fact of his proper practical training, while the university should assure itself that adequate facilities for giving practical instruction exist in all colleges from which its students are drawn. For the B.Sc., in which chemistry and physics, with either mathematics or another science, are to be taken, practical examinations are to be passed independently of the written examination, and are to be assigned separate minima of marks. The M.Sc. is to be awarded by examination after the candidate has specialised for a fixed period in any *one* of the subjects included in the B.Sc. course.

The proposed B.A. course differs very little from the present honours Arts course except in making the study of a classical language compulsory, while for the M.A. the student has the choice between languages, philosophy, history, and mathematics.

Henceforward the B.A. and B.Sc. are to be pass examinations, and the M.A. and M.Sc. considered the corresponding honours examinations. Post-graduate research is to be encouraged by allowing M.A.s and M.Sc.s to proceed to the degrees of D.Litt. and D.Sc. on showing that they have pursued successfully a course of original investigation for a period of, say, five years.

CAMBRIDGE LOCAL EXAMINATIONS, 1902.

HINTS FROM THE EXAMINERS' REPORTS.

ONE of the chief uses of the examinations conducted by public examining authorities is to indicate for the benefit of teachers the directions in which their teaching may be improved; and a well-recognised plan is for examiners to point out the common failings of candidates presented for examination, so that teachers may appreciate fully what are the usual difficulties experienced by boys and girls in their study of the subjects comprised in the school curriculum. Judged from this point of view, the "Forty-fifth Annual Report of the Syndicate of the University of Cambridge," dealing with the local examinations held last December, is most helpful. Attention is directed, in the following extracts, to those general weaknesses which stand in need of immediate attention, in the hope that teachers will take special pains to fortify their pupils preparing for the examinations of next December against what have in the past proved to be vulnerable points.

COMPULSORY SUBJECTS.—Speaking of *arithmetic*, the examiners say that, so far as preliminary candidates were concerned, more attention to order, and more care given to individual steps of the work, would have saved the candidates much time; in several instances, duplicate sets of correct workings were sent in, one in pencil and the other in ink. The candidates did not appear to realise that correct answers to a limited number of questions are worth more than fragmentary attempts at all. With respect to decimals, there was much evidence, in the case of the papers of junior candidates, of bad teaching, especially in many of the answers to a question on metres and francs, where use was made of vulgar fractions instead of decimals. In the answers by junior candidates to a question on the cost of painting the walls of a room there was often confusion between linear, square, and cubic measures, and the method used was frequently unnecessarily long.

ENGLISH SECTIONS.—Comparatively few of the preliminary candidates in *English grammar* mentioned two adverbs capable of inflexion, or gave a complete list of the pronouns occurring in a selected passage, the majority being apparently unable to distinguish the different uses of the word *that*; in the parsing of these candidates, too, the infinitive mood proving a stumbling-block to very many. A good many junior candidates failed to recognise a phrase used absolutely, generally through want of attention to the punctuation of the passage.

A minor fault of the composition exercises of senior candidates was the frequent recurrence of such vulgarisms as "different *to*," and "their," "them," as the oblique cases of "one," "person," "everybody." On the whole there was a marked decline in standard as compared with the preceding year; it was evident that in many, if not most, schools the subject was entirely neglected.

Referring to the answers of preliminary candidates on *Scott's "Lady of the Lake,"* the examiners say that, where the meaning of words was correctly given, the impression frequently left was that notes had been remembered but not properly understood, and in numerous cases the extraneous information given by a generous editor had been read into the text of the poem. Certain words—notably "knell" and "presumptuously"—were almost invariably wrongly explained.

In the case of *Shakespeare's "A Midsummer Night's Dream,"* the report states that the paraphrasing was much the weakest part of the work of junior candidates; a large number of them made absolute nonsense of the passage, while of those who seemed to have grasped its general sense comparatively few gave a close and intelligent rendering.

Of junior candidates who offered *Scott's "Lady of the Lake,"* the examiners say that the text of the subject had not been studied with sufficient care by many; and, as a consequence, the notes were often misunderstood, and there were many failures in the explanation of detached words and phrases, and in naming the poetical equivalents used by *Scott* for certain common words.

In the papers of senior candidates on the play of

Shakespeare, there was far too much reliance on mere verbatim quotation without any attempt to show the bearing of the passage on the particular questions asked. Instead of defining *imagination* briefly, and in *Shakespeare's* words, as they were asked to do, most of the candidates wrote out a passage of ten to fifteen lines, only one line of which was relevant. There was throughout a great weakness in paraphrase; to many senior candidates the passages set for that purpose appeared to be altogether unintelligible. With senior candidates, too, who offered the *Selected Works of Milton*, the merits of the poetic diction and of the verse were far from being understood, and more attention should have been paid to the literary influences apparent in the poems.

In the *English history* answers of preliminary candidates, phrases from text-books or notes supplied by teachers occurred again and again, and the context often showed that they were imperfectly understood. The same unintelligent committal to memory of paragraphs from short text-books and of notes, which was commented upon in last year's report, was as noticeable as ever in the papers of junior candidates. Even where verbal accuracy was attained, it was clear that a large number of the candidates had very vague ideas about the subject-matter to which the questions related. Dates were given in the most haphazard fashion. Questions connected with constitutional history showed that there was considerable confusion in the minds of most of the junior candidates, and incidentally there were signs of great ignorance of historical geography. As usual, the most noticeable faults of senior candidates in *English history* were irrelevancy, diffuseness and heedlessness. In many instances they had evidently not stopped to consider the real meaning of the questions, but had seized upon a hasty interpretation of them as a pretext for displaying their knowledge, and giving long accounts of events quite outside the scope of what was asked. Another unsatisfactory feature, at some centres where the work was otherwise good, was that the teachers had evidently encouraged their pupils to commit to memory carefully prepared answers of likely questions. As a result many answers were almost word for word the same.

The two chief defects of the papers of junior candidates on the *history of the British Empire* were (i.) ignorance of the outlines of general history, which was shown by confusion between different centuries, and (ii.) inattention to geography, which in some cases lowered the value of every answer attempted.

In the junior *geography* papers the answers to questions on industries and products were not satisfactory: often a long list was made—a common fault with girls—in which the trivial and the important were jumbled together regardless of rank, the dominant trade being perhaps given last of all; there was too much enumeration, too little emphasis on salient features. In the answers to the question on the leading industries of S.E. Lancashire and Ulster, woollen goods were often

described as made of flax or cotton, and linen goods of cotton or wool, the transformation being apparently effected by the skill of the operatives in the respective districts. This confusion, common amongst the girls, was possibly due to an intimate knowledge of modern textile fabrics.

The least satisfactory answers of junior candidates were those relating to physical phenomena. Thus, many wrote as if climatic regions were continuous with political boundaries. In explaining why most of Brazil is well watered and why most of Australia is dry, a large percentage were content if they quoted the profusion of rivers in the former country, and their paucity in the latter, though a great many were able to go beyond the symptoms to the cause. Regarding the altitude of the sun at different points on the surface of the globe, the candidates showed great ignorance.

CLASSICAL SECTION.—Many preliminary candidates who offered *Latin* had committed to memory the various forms of the verb, but were quite confused as to their names and meanings. So far as the *Latin* of junior candidates was concerned, the most noticeable faults were inability to break up a long *Latin* sentence into clear English sentences, and confusion of *Latin* conjunctions, moods, and tenses. In syntax, the candidates seemed rarely to have advanced beyond the ordinary rules for the noun, the answers to the questions on the verb being in most cases poor. The questions on the subject-matter of the *Cæsar* produced a large number of weak answers from junior candidates, and the maps on the whole were disappointing, although some were satisfactory, and a few were excellent. For the last two years the poorness of the answers of juniors on the declension of substantives has been made the subject of unfavourable comment, and this year showed no improvement. The most unsatisfactory feature of the work of senior candidates was the ignorance of grammar displayed by a large number of the candidates. Many answers on points of grammar, especially from the girls, were worthless.

MODERN LANGUAGES SECTION.—The renderings of the detached sentences into *French* by preliminary candidates were mostly marred by false concords. Their parsing was very unsatisfactory; in almost every instance the answers were meagre and inaccurate. The *French* composition of a large majority of the junior candidates was practically worthless owing to the almost complete absence of any agreement of the adjectives, &c., with their corresponding nouns, and verbs with their subjects. The rendering of the idiomatic phrases from the set books, too, was, for the most part, poor. The *French* composition of senior candidates was very weak; the great majority of the candidates not only failed in vocabulary, but were guilty of the worst mistakes in genders and grammar generally. In the examination of senior candidates in spoken *French*, the rules of *liaison* were more often neglected than observed. In conversation the best candidates were able to understand perfectly and carry on a regular conversation in idiomatic *French*; they were also able to give a

fairly connected narrative on a suggested topic. There were, however, a large number of failures in this part of the examination. The majority of those who failed did so from either a lack of vocabulary or inability to frame proper grammatical sentences. In all cases teachers should train their pupils to give a complete sentence by way of answer.

The performances of preliminary candidates in *German*, taken as a whole, were distinctly disappointing; the candidates showed an entire ignorance of the declension and comparison of adjectives, as well as of the conjugation of the commonest strong verbs. The spelling of the *German* words was very careless indeed, and the total disregard of the mark of modification seemed to indicate that the candidates were unfamiliar with the spoken forms. The piece for unprepared translation contained none but the simplest words; nevertheless the drift of the whole was rarely caught, whilst those who did make sense of the passage stumbled over the easiest constructions. The composition was naturally the weakest part of the paper. The candidates showed themselves quite incapable of building the simplest *German* sentence, and the most elementary rules for the order of words were entirely disregarded. Here, again, it seemed evident that the direct method has not yet been applied in the teaching of elementary *German*. The prepared translation was exceptionally weak.

The *German* composition of junior candidates left much to be desired. Gross blunders in the declensions and conjugations were far too frequent, and with few exceptions the most elementary rules for the position of words were neglected. These were the principal causes of failure—seldom lack of vocabulary. A great change was noticeable in the proportion of senior candidates taking prescribed books and those taking unprepared translation instead of them: in former years the large majority of candidates preferred to take the prescribed authors, this year three-fifths availed themselves of the alternative of taking unprepared passages. More than two-thirds of the failures occurred among the candidates who did not take the prescribed subjects, and the general quality of their work was in many cases inferior. The translations from the *German* were often marred by gross carelessness and senseless guesswork. Not a few of the candidates were unable to translate some of the most common words, and many teachers had obviously neglected to put their scholars in possession of an ordinary working vocabulary. This is a very important point to which frequently far too little attention is paid in schools. The piece set for translation from English into *German* was very badly done by most of the candidates who attempted it. It is perhaps not sufficiently realised by many teachers that *German* composition can only be attempted successfully if a sufficient amount of time has previously been given to the teaching of *German* at school, if the children have acquired a useful stock of *German* words and phrases and, by means of much

reading of German and constant oral practice, some feeling for the idiomatic use of the foreign language. Without ample preliminary training of such a kind good results in German composition cannot possibly be hoped for. From many bad mistakes in German spelling (*frohlich, gluhte, sechzehn, &c.*) it was evident that teachers had failed to insist on a correct pronunciation of characteristic German sounds.

MATHEMATICAL SECTION.—Too many junior candidates were presented in *Euclid* who showed little or no hold of geometrical principles. The easiest rider was solved correctly by about half the junior candidates. The most frequent mistake in this rider was assuming that lines given in length are also given in position. The answers of senior candidates to the question in solid geometry seemed to show that the subject had been taught with very little reference to actual concrete bodies.

Many of the preliminary candidates in *algebra* were unable to substitute numerical values accurately in the simplest expressions, and still more saw no difference between the square of a sum and the sum of the several squares. In presenting the sum of several fractions there was a general tendency to throw aside the denominator, and of the three simple equations set only one was solved correctly by more than a few candidates. Many of the weakest candidates seemed to have been hurried along to the progressions without grasping the simplest principles of algebra. Comparatively few of the junior candidates succeeded in simplifying correctly the sum of a number of fractions. A very small proportion understood how to select the coefficient of a specified power of x in a given algebraical expression. Most junior candidates made errors in simplifying the expression whose square root was required. About half the senior candidates who tried an example on arithmetical progression wrongly took the common difference as positive. The work of several candidates, especially among the girls, showed that they had hurried on to the more advanced parts of the subject while their work on the quite elementary parts was very unsound.

The examiners in *trigonometry*, speaking of junior candidates, say that attention must again be drawn to the fact that boys are too often hurried on to the solution of triangles before they have really grasped the rudimentary definitions and formulae. The most unsatisfactory feature in the results of this year's examination is the large number of candidates who made serious mistakes in their answers to the first three questions, even though many of them could write out the bookwork of the other part of the paper.

NATURAL SCIENCES SECTION.—In the *experimental science* papers of junior candidates there was a certain amount of confusion between the barometer and the thermometer. In explaining the method of obtaining the boiling-point of a liquid hardly any reference was made to the necessity of observing the pressure at the time of the experiment; in fact, in many cases the use of a closed flask was indi-

cated. The complete determination of the latent heat of fusion was given, generally with a wrong formula, when only experiments showing that heat was absorbed on fusion were asked for. In fact, the answers to the heat questions did not indicate an experimental knowledge of the subject.

The answers of junior candidates to their second paper in experimental science revealed a real danger in the modern method of teaching science, namely, that of inferring more from an experiment than can legitimately be drawn from it. The answers to a question on the nature of air furnished good illustrations of this tendency. The old didactic method of teaching is not more objectionable than the habit of teaching students that they have proved things when they have not really done so.

In the *botany* papers of preliminary candidates the evidence that such knowledge as was possessed by very many of the candidates was derived almost entirely from an elementary text-book or from the words of the teacher was unmistakable. It is of the utmost importance that those responsible for teaching the subject, especially to young students, should recognise that botany is essentially a science of observation. The unnecessary technical terms introduced into many of the answers are doubtless the outcome of a system which teaches botany rather as an exercise of memory than of observation. Several candidates from widely separated centres used the word "spermoderm" to denote the seed-coats of the bean. It is doubtful whether such a term is ever required; it is certainly not in general use, and there can be no justification for forcing it upon the memories of young children. In the case of juniors, candidate after candidate expressed the opinion that a plant takes in some or all of its water-supply through its leaves, and not a single answer contained any suggestion that the erectness and strength of a herbaceous stem are dependent upon the turgidity of its soft tissues. Altogether the physiological side of the subject had been seriously neglected in the teaching, well adapted though much of it is for elementary demonstration.

The practical part of the *physical geography* as defined by the schedule issued by the Syndicate had evidently been studied in a *practical* manner by very few junior candidates. For instance, in the majority of the papers in which a question referring to a rainbow was attempted, the colours of the rainbow were given in the order exactly opposite to the correct one, and had obviously been learned by rote. In the examiner's opinion, unless more attention is paid by teachers to the proper instruction of their pupils in the practical part of the subject, its value as a means of education is seriously diminished.

Many senior candidates had never seen a contoured map, and had no idea of what is implied by the scale of a map, the distance between two points on a map of a few miles of country being frequently estimated at from ten to twenty times the circumference of the earth. Some ingenuity was shown in answering a question on the de-

termination of one's position by simple observations, but there seemed a wide-spread belief that the sun always rises due east, and everywhere reaches the zenith at mid-day. A question on the features of a river was poorly done, the meaning of the term estuary being rarely understood. Much carelessness in reading the questions was displayed; where a description and explanation of certain phenomena were asked for, only an explanation was offered, and vague theories of the causes of earthquakes were offered in place of an account of their effects.

UNCONSIDERED LITERARY TRIFLES.¹

AMONG the neglected prophets of this age, Prof. Arber is not least. His knowledge of the byways of English literature is probably unique, and no man living has done more to recover quaint and curious pamphlets from oblivion. It is true his taste in poetry is not of the finest, but this is of no importance in most of his collections, which have been made for the purpose of illustrating history, life, and manners. The most fascinating of all Prof. Arber's books is the "English Garner," an omnigatherum of unconsidered trifles, each quaint than the rest, and the whole flashing innumerable sidelights on our past.

We have often wished that selections from this work could be served up for schools, in readers to be used in the lessons on history or literature. For practical purposes, a number of small and cheap pamphlets would be most useful, the original volumes being rather too expensive for school use. The volumes now before us have the same fault. They are cheap at the price, true, but a schoolbook is so soon worn out that four shillings is a good deal to give for one. Apart from that one criticism—suggested only by the weakness of human nature, which causes so many parents to regard money spent on books as money wasted—we have nothing but the highest praise for the new "Garner." It has the advantage over the old, that the contents are to be arranged according to subjects, instead of being, like Julia's dress, in a sweet disorder. Some new matter has been added, and an error corrected here and there; otherwise there has been no change in the texts.

And what will be found in these rare volumes? From the first, the curious may learn how the Field of the Cloth of Gold looked to an eyewitness; they may compare the coronation of Anne Boleyn with that of Queen Elizabeth, or read of warlike expeditions into Scotland, of the sack of Antwerp, of the Spanish Armada itself, told in plain prose or doggerel verse. Here we can learn what was Princess Elizabeth's life in the Tower, and of the charming little boy who brought her flowers; of

Wyatt's rebellion, the loss of Calais, and Bloody Mary's death; of the burning of St. Paul's in 1561, and a false, fearful imagination of fire at Oxford University, when one monk stuck fast in a window and another got clear over the heads of the crowd with a boy inside his cowl. It is quite impossible to describe the impression of reality which these pages give: we seem to be looking on at the scenes of horror or pageantry, and our forefathers rise up as if in life before the mind's eye.

The second volume is as interesting as the first, but in a different way. Here are contained specimens of the most important early works on literary criticism, from Thomas Wilson's "Art of Rhetoric" (1554); from Francis Meres's "Palladis Tamia" (1593), so important for its remarks on Shakespeare and other contemporaries; Dryden's masterly "Essay of Dramatic Poetry," and other such. Here, too, are Thomas Ellwood's few precious reminiscences of Milton; Bishop Coplestone's "Advice to a Young Reviewer," with his burlesque review of "Lycidas" (1807), contains a melancholy foreboding of what has now come to pass in the modern world. For real stinging satire, commend us to Swift's "Isaac Bickerstaff," and his parody of Partridge's *Almanack*, his prophecy of the quack's death and description of its fulfilment, and Partridge's indignant protest that he was not only alive then, but had been alive on the very day when Bickerstaff described him as dead. Besides these, there are the Bickerstaff papers of Steele, "Poor Richard's Proverbs," and other pieces of note.

We must not forget to mention the excellent introductions to both volumes, and the full indices. This is an admirable venture of Messrs. Constable, and we hope it will meet with the success it deserves. Once more, the "Garner" is delightful.

ANGEVIN ENGLAND.¹

SIR JAMES RAMSAY has long been known as an independent student of the Middle Ages. After devoting many years to preparing his material, he is now publishing the result of his researches. To the story of "Lancaster and York" and the "Foundations of England" he has now added this volume on the reigns of Henry II., Richard I., and John. We are thankful to him for several things. For those who are interested in military details, the whole of the fighting is described, and specially the two great battles of the period—Arsuf and Bouvines—and the siege of Les Andelys, all of which are illustrated with plans. For the others, who find military details wearying, these sentences (p. 219) come as great consolation: "It would seem that Henry II.'s sons did not necessarily go to war with any definite end in view. They did not seek the fruits of

¹ "An English Garner." "Tudor Tracts." 1532-1588. With an Introduction by A. F. Pollard, M.A. xxxvi. + 520 pp. "Critical Essays and Literary Fragments." With an introduction by J. Churton Collins. With Index. xlix. + 344 pp. (Constable.) 4s. each net.

¹ "The Angevin Empire." By J. H. Ramsay. xxiv. + 556 pp. (Swan Sonnenschein.) 12s.

victory; they loved war for its own sake, they revelled in the excitement of danger, the license of pillage, and apart from sieges we hear of no direct encounters, only of the sacking of homesteads and robbing of monasteries. Having no compunctions, they could sheath their swords and make friends again at a moment's notice." Again, there is much comfort in the following frank confessions of inevitable ignorance (p. 251): "Of Henry II.'s foreign revenues we know nothing at all;" and (p. 371) "With respect to King Richard's ransom, we are quite in the dark as to how far, or how, or by whom it was met." If only our historians would more often tell us of these blanks in knowledge, we might in time make a list of things which we feel we ought to know but which will probably never be discoverable. We found it interesting to compare Sir J. H. Ramsay's account of John's reign with that of Miss Norgate which we noticed in the January number of *THE SCHOOL WORLD*. We learnt thus how differently two capable historians can interpret the same documents, how one can believe a certain chronicler on a given event, while the other dismisses the same evidence as untrustworthy. We wonder how far the bias which Sir James evidently displays against the Papacy may account for some of these differences. There is, in this book, an excellent bibliography and an index, and the only complaint we have to make is that the list of errata is not always explicit enough. There are here and there a few slight misprints, and "from thence," which occurs several times, is at least not logical. "Emperor and Empress of *Germany*" (p. 291) is an obvious slip.

The history of the Angevin Empire has two leading features of interest. There is, first, the story of that Empire, so curiously brought together in the person of Henry II. of England. It consists of constant fighting, on the part of the Angevin princes, Henry II. and his sons, and of their suzerain, the King of the French, who, feeble at first beyond all comparison, is yet able to hold his own owing to the family disputes of his otherwise too great vassals, and finally to acquire the northern part of their Gallic possessions and make the kingship of the French a strong reality. It is a weary story, full of details which no memory surely can retain, and the usefulness of which we take leave seriously to doubt. Then there is the story of the way in which the Angevins governed their island realm. They desired to use it as a means of revenue, and for that purpose improved its administration, and gave it good forms of government. So were laid, by our foreign Kings, the foundations of our national liberties. Henry II. may roughly be said to have given us trial by jury, the Courts at Westminster and the assizes. For his own sake he fought against ecclesiastical power and checked the "liberty of the Church." For their own sakes Richard I. and John abused the system which their father inaugurated, and thus drove all classes to demand the Great Charter, which, with all its shortcomings, was the starting point of those limitations of the crown which differentiated England from all other European monarchies.

THE ATHENIAN DRAMA.¹

THESE two books belong to a series projected by the late Prof. Warr, who wrote the first volume; and for a series, the three volumes are strangely unlike. Prof. Warr seemed to delight in the crabbed and uncouth, a fault which sadly marred his good scholarship. He used the blank verse and eschewed rhyme even in the lyrics. Prof. Phillimore affects the precious and the flippant, and seems to think more of himself than his author. Dr. Murray, on the other hand, writes with the easy mastery of finished culture and scholarship, and his verse is really good. It is a pity that the series was not wholly carried out by the last scholar, or at least subject to his editorial criticism.

It is a pity that Sophocles, in particular, has been entrusted to a temper so whimsical as Prof. Phillimore's. There is a lack of serenity and control which strikes the reader on the first page, and abides. It may be that the "*I wot* and *I ween* style of English" is not a wholesome convention; but we prefer it to the jerks and antics which meet us too often here, so strangely that we can doubt whether misprinting is to blame for the phrase on p. xxxii., "the dissolution is the formation beginning of something else;" or that on p. xxxvi., "what is the form into which this *means* to *tends* to determine." And what on earth has happened to his Greek accents? There are ridiculous mistakes on pp. xlvii., lvi., lviii., lix., and in many other places. All these childish faults will tend to obscure the author's knowledge and a criticism often acute. He is at pains to show, not without success, how fully Sophocles embodies Periclean Athens; this is the substance of the introduction. And his remarks on his author's mastery of style are good, although he is subject to a strange fallacy as to the relation between colloquial and literary language. We gladly admit that Mr. Phillimore's translation is better than his preface in point of style; but we cannot say that it is a success. It lacks both dignity and grace.

But Dr. Murray is fine. We have not met with a more illuminating criticism of Euripides than his. Euripides has himself to blame for the adverse criticism which has been dealt out to him; he would not do himself justice. There were also faults of temper—a lack of balance, a bitterness and pessimism, a certain weakness of intellect where the emotions touched him deeply—which deny him a place with the greatest. Yet at his best, how noble he is, how tender: "Euripides the human, with his droppings of warm tears," as a later poet has said. It is not everyone who sees, and we thank Dr. Murray for pointing it out, that Phaedra's love is "entirely fragrant and clear"; that "Hippolytus," in spite of flaws, is "a singularly satisfactory and complete work of art, a thing

¹ "The Athenian Drama." II. "Sophocles," translated and explained by John Swinerton Phillimore. With illustrations. lxxvi. + 215 pp. III. "Euripides," translated into English rhyming verse by Gilbert Murray. With illustrations. lxxviii. + 355 pp. (Allen.) 7s. 6d. net each.

of beauty, to contemplate and give thanks for, surrounded with an atmosphere of haunting purity." Dr. Murray's estimate of the "Bacchae" is also excellent, and throws a clear light on that literary puzzle. In a few pages he is able to give a rational account of the development of the poet's genius and its relations to his times; and his "Appendix" on the last plays will add to the knowledge of most scholars. Like Mr. Phillimore, he has also chosen the rhymed couplet for his translation, but his work is remarkably good. His manipulation of the verse shows something of the skill of Keats, although he has not (indeed, who has?) Keats's magic of phrase.

The plays chosen as the most characteristic of Sophocles are naturally "Oedipus Tyrannus," "Oedipus Coloneus," and "Antigone"; from Euripides, the "Hippolytus," and the "Bacchae." We could wish that another had been added, say the "Medea," rather than the "Frogs" of Aristophanes, which completes this volume. Prof. Murray is no humourist, and he fails to reproduce the rollicking form of the original.

A word is due to the illustrations. Each volume contains a portrait of its poet, and a number of vase-paintings, or other works of art. The blocks are clear and adequate, and the photo-gravures beautiful; especially Danae in the "Sophocles" volume, and an exquisite Aphrodite in the Euripides.

SUGGESTED EDUCATIONAL IMPROVEMENTS.¹

A COLLECTION of some two-dozen newspaper articles on educational subjects—designed by their Editor to present "a comprehensive account of existing English education from the primary school to the university and the special colleges in which young men are trained for the national services"—should contain much useful guidance. The contributors number ten, and they were chosen as "teachers and others practically engaged in educational work;" they should have much to say which will help the cause of education. So they have, but a careful study of the essays leads the reader to long for a simple method of determining the highest common factor of, say ten, opinions on educational matters by persons who ought to know.

Here are ten experts attempting to instruct the British voter as to his duty towards national education, yet they seem neither to be agreed among themselves nor to have recognised some at least of what other high authorities regard as fundamental needs in education. But the Editor of the book tells us "there is perhaps no healthier sign of our condition as a nation than the general

prevalence of the belief that our system of education is defective," so that, may be, if the book merely accentuates this belief it will have done some good. First, as to the want of agreement among the doctors: take the question as to whether boys and girls should be taught together or in separate schools. One writer affirms, "it is undesirable to mix boys and girls in school after the age of twelve, and even from the age of ten the conditions should be carefully considered, and there should be constant supervision both in classroom and playground." A second writer says, "there is no more danger likely to arise from associating boys and girls in a *good* school than in associating brothers and sisters and cousins in a large family circle." It is true that in the first case the elementary school is referred to, and in the other the secondary school; but since, as a third contributor insists, human nature is much alike in all classes, this makes little difference. Similarly, if it were necessary, extracts might be given which tend to show that we are still far from unanimity as to the aim of the ideal elementary school, but considerations of space suggest that it is better to indicate those needs of education which seem to have been neglected altogether in the volume.

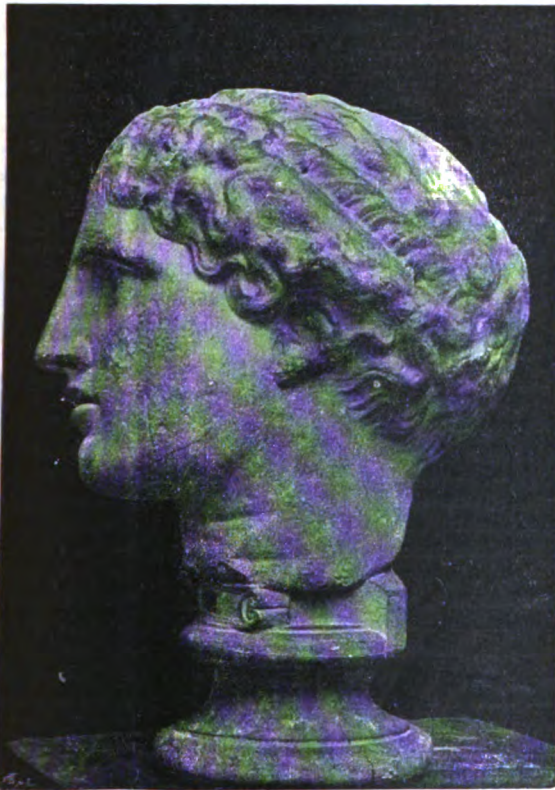
More than one of the essayists refer to the lessons the late war should have taught this country, and all will agree to name as one of these the need there is for this nation to develop in its citizens individual initiative, a personal power to regulate conduct by the circumstances in which one is placed. At the beginning of the war at least, the British soldier was neither remarkable for his powers of observation nor for precision in the execution of his duties. Similarly, in that other war in which the nation is engaged—the incessant competition for the markets of the world—the same power of adapting himself to new conditions and of estimating exactly the facts of a case is the chief need of the manufacturer or merchant. Which available instrument of education is most likely to develop these necessary mental faculties? Without holding a brief for natural science, it may at least be affirmed that many competent judges are of opinion that practical instruction in the scientific method on rational lines supplies just those mental qualities in which, as a nation, we appear to be wanting. Yet, in this book, which undertakes to diagnose the nation's need, no chapter is devoted to the part science should take in education, though space has been found for "household economics" and for the professional education of naval officers. So, too, space might with advantage have been found to insist on means being taken in our schools to secure that nice adjustment of hand and eye which always characterises the healthy body sheltering the healthy mind—an endowment invaluable alike to the soldier, the engineer, the man of science, and any other person who has to deal more with things than ideas. Yet there is no chapter on manual instruction in wood or metal, though we have two essays on the teaching of modern languages.

¹"The Nation's Need: Chapters on Education." Edited by Spenser Wilkinson. 311 pp. (Constable.) 6s.

But we must not give a wrong idea of the book. It contains a great deal of value mixed up with some talking "at large." There are numerous suggestions likely to prove fruitful, and many of these are due to Mr. Graham Wallas and to Dr. Findlay. The book will make people think, and that justifies its publication.

ANCIENT ATHENS.¹

THIS interesting book will be a boon to the teacher or learner who wishes to gain a knowledge of the chief existing remains and a clue to the chief debated questions. Such a reader does not wish for overmuch discussion; he needs to have the case stated clearly and fairly,



De Laborde Head (Gardner's "Ancient Athens.")

and, if possible, a decision suggested which will be received as generally accepted, or at least defensible. In the case of Athens, where there has been so little excavation of the site of the ancient city, each point bristles with controversy, and the darkness has in some respects been thick-

ened by the conjectures of Prof. Dörpfeld, whose wide learning is marred by a lack of judgment. It is most creditable to Prof. Gardner that he steers his reader through the mazes of Athenian topography without dazing his intellect, and generally succeeds in leaving a definite impression behind. His sketch of the early history of Athens will be a useful companion to the history proper, filling in some gaps, and always elucidating. The account of early art, the Dipylon vases for example, and other topics relating to painting and sculpture, is not only interesting but gives in a convenient form much information which cannot easily be found elsewhere. The same may be said of the criticism of the Parthenon sculptures, about which most students have vague ideas, but very little correct knowledge. A chapter is devoted to the Parthenon alone, and this is one of the best in the book. All the other important buildings—Theseum so-called, Erechtheum, Athena Nike, Asclepieum, Theatre—each is treated in detail. The history of Athens is followed out into Roman times, and a chapter is given following the route of Pausanias in his visit to Athens, which is illustrated by a map.

The subjects dealt with are too many to admit of detailed criticism here. In such a book novel views are not looked for, and Prof. Gardner never obtrudes his own. It happens, however, that his views are so generally sound and sensible that they coincide with those of the best authorities, and he is himself an authority; so the reader will be in safe hands if he subscribes to Prof. Gardner's belief in a Greek stage, and the traditional position of the Agora and the Enneacrounos. The most novel part of the book to the general reader—although even here nothing is said which has not already stood the test of publication and discussion—is that on the Peiraeus, where the difficulties as to the "three harbours" are convincingly explained.

The chief illustrations are excellent, and most of the smaller ones good, whilst all are proper to their object, and do really illustrate the text. A number of them appear for the first time.

THE AIM OF TEACHING.¹

By R. T. BODEY, M.A.
Liverpool College.

THE recent Education Act seeks to bring some kind of system into the chaos of English secondary schools, and though there may be differences of opinion as to details, there can be none on the main point, that, for the first time, education has been treated as a whole. Opportunity has been given by statute to foster and to encourage the prosperity of the schools, and to provide schoolmasters with adequate equipment and a better average level of pupil. The use which will be made of this opportunity depends on the constitution of the education com-

¹ "Ancient Athens." By E. A. Gardner, Yates Professor of Archaeology at University College, London; formerly Director of the British School at Athens. Illustrated. xvi. + 579 pp. (Macmillan.) 21s. net.

¹ Abridged from a paper read to the Lancashire and Cheshire Branch of the Assistant-masters' Association.

mittes now starting into existence all over the land. It should be the business of members of the Assistant-masters' Association to see that, so far as in them lies, the interests of the higher schools are not sacrificed to those of the lower. For numbers tell terribly in these democratic days, and in some localities the secondary schools may be at first even less well off than formerly.

I wish to raise a few questions as to the attitude our minds should have towards the work and aim of the individual teacher, questions which are not even new, but only derive a fresh interest from the sense that upon our answer to them will depend largely how we fare under the new régime.

Do we, for example, sufficiently consider that the education of a boy must be always with conscious reference to the future life of the pupil? What the actual profession may be which he is to adorn we know not perhaps; but this we know—that in the ordinary course of events he will grow up into a citizen and elector, and that the future of England depends, in a very real and literal sense, on the work which we do in our schools. I cannot but think that, if we kept this point of view more constantly before us, we should be saved some of the mistakes into which the best of us are frequently falling. If the last war has taught us anything at all, it is the vital necessity of a strong and vigorous physique among all grades of our population, and of individual resource, inventiveness, the ability to deal with new problems and to act in unheard-of circumstances.

In secondary schools as a rule full encouragement is given to all games and sports. Yet, even with us, there is much to be done. Is the sight of our youngest children watched over as carefully as it would be if the ill effects of reading and writing at too short a range were fully realised? A child's head is much heavier in proportion to his strength than that of the adult, and so tends to droop over his work, often with disastrous effect. A form master might easily test the sight of his form once a term, between the rush of the first and the hurry of the last weeks; test-sheets are inexpensive, and discovery of a weakness in good time might often induce parents to send the boy to the oculist. Is it not possible, too, to take into account in the timetable of even a day-school that young brains cannot concentrate themselves long on one subject; short lessons and frequent intervals are physiologically more sound for them than the regulation period of an hour or even forty-five minutes. And in hard-working schools, is it not sometimes forgotten that when we set an hour's extra home-work, it by no means follows that we are getting intellectual value to that extent out of the boy? I have my doubts whether we get any; the boy's play time is *not* an idle time; it is a period of recuperation, and if we trench upon it beyond very narrow limits we, as well as he, must pay the penalty next morning. It is a great mistake to overset the work to be done out of school, and for other reasons than physical. If you fill up a boy's time completely, how is he to develop his own individuality, his taste for music, reading, collecting, carpentry, natural history, or what not? And, if you do not leave him free to do this, you thereby confess your belief that the object of the school is to turn out its pupils impressed with one intellectual stamp, and to that proposition I demur. It is only by affording free play to a boy's natural tastes and aptitudes, that we can make the most of him. For, indeed, the commonest mistake of the teacher is to estimate the pupil according to the perfection with which he can reproduce the information which he has received from his master or the textbook.

I am not going to enter upon the vexed question of the relative importance of classical, mathematical, or more modern studies in a school. The really important question for any master, classical or science, mathematical or modern, is *not* how much of Latin or trigonometry, or the other things, he can

squeeze into the head of his boys, but how by the use of those subjects he may aid them to grow into the best citizens. And the best citizens will be those who are not guided, in dealing with the problems of the future, by mere tradition, doing so because other people have previously done the same. It lies with us either to send them into the world with minds frozen in form and cramped by every species of hard and fast rule the misplaced zeal of their teacher can find to bind upon them, or with a keen eye for principles, a mind accustomed to work for itself under lessening guidance, and the resource and inventiveness which, on finding one plan not entirely satisfactory, sets to work with elastic freedom to devise another free from that particular fault. If we are stiff and formal in our minds so will they be; if we judge always by a reference to authority of some sort or other, so will they; if we are fresh and inventive, on them too the light will fall.

It is the fact that so much of our work is routine that brings to men of our profession such ineffable weariness of mind after fifteen years of teaching, for monotony is not the least among the many curses of our highly specialised modern life. Well, here is one cure for it. If we cease trying to force boys into the mould of our own mind and encourage each to develop his own character, then we shall directly profit by the more varied life around us in our class-rooms. May we not profit a second time by a renewed feeling of satisfaction in our work? Who has not been struck by the painful contrast between the boy of six or seven, just going to school, and the same boy ten years later? We knew him then full of quaint sayings, imaginative, thrilled with joy, or pity, or terror, when we told him stories; when one toy would not suit his purpose he would readily adapt another to serve the same end, and, subject to the limitations of a child's experience and vocabulary, he revealed himself as a bright, alert little soul. And now he has been through the mill, we have dealt with him for ten years, according to that which was in us, and we look for signs of development. What has become of that bright and vivid imagination which was once our own envy? Does his conversation betray a fertility in ideas and a flexibility of language in any degree proportioned to the time we have given him? And if relatively he has gone back in these important respects, as I think he has, what explanation are we to give of this deplorable circumstance? We may conclude that it is a natural change, unfortunately coinciding with the period of school life, yet not associated with it as result and cause; but this view had better be left until we have tried all others. The uncultured atmosphere of many homes, the too luxurious life, may be assigned in explanation, and doubtless with much truth. But, after all allowances, is there no residue of responsibility assignable directly to school influences? And, if there is, how far are we personally the culprits, and how much of the blame must be apportioned to a vicious system under which, though recognised as such, we as subordinates are compelled to work? If our boys show in their various avocations not only honest industry, but resource, adaptive intelligence and public spirit, that will bring us credit and confidence; if they are wooden and parrot-like, it will nothing avail us that some one choice spirit has gained a Cambridge scholarship. We shall have to adapt ourselves to a new environment, and submit to be judged as trainers of good citizens, not by the achievements of a few specialists at the top of the school. And I cannot but believe that a closer, a more intimate relation with the larger world outside the school doors will have a beneficent effect upon the life within them.

"I believe, in brief," says Ruskin, "that a man ought to know three things: *First*, where he is. *Secondly*, where he is going. *Thirdly*, what he had best do under these circumstances. *First, where he is:* That is to say, what sort of a world he has got into; how large it is; what kind of creatures live in it and

how; what it is made of and what may be made of it. *Secondly, where he is going:* That is to say, what chances or reports there are of any other world besides this; what seems to be the nature of that other world; and whether for information respecting it he had better consult the Bible, Koran, or Council of Trent. *Thirdly, what he had best do under these circumstances:* That is to say, what kind of faculties he possesses; what are the present state and wants of mankind; what is his place in society; and what are the readiest means in his power of attaining happiness and diffusing it. The man who knows these things, and who has had his will so subdued in the learning them that he is ready to do what he knows he ought, I should call educated; and the man who knows them not, uneducated, though he could talk all the tongues of Babel."

SCIENCE WORKSHOPS FOR SCHOOLS AND COLLEGES.

By Prof. HENRY E. ARMSTRONG, LL.D., Ph.D., F.R.S.

(Concluded from p. 143.)

Cupboards.—Both at Horsham and Hertford, the space below the bench-top is fitted with two tiers of small cupboards; inside each cupboard there is a small drawer. Each working place has four such cupboards, so that four scholars may occupy the place in succession and each have a cupboard to dispose of. In the case of school work, the amount of apparatus to be stored by the individual scholar is usually small.

Sinks and Drains.—The ordinary earthenware sinks are not only more or less fragile themselves, but when glass objects are dropped into them these are invariably broken: moreover, the connection with the drain is difficult to make and always a source of weakness. Lead-lined sinks are in some respects better but not altogether satisfactory. Thirty years' experience has convinced me that wooden sinks are far the best—provided that they are built up solidly without dovetailed joints and that they are always kept partly full of water by arranging the waste so that it projects several inches (about 4) above the bottom of the sink. American white wood seems to be one of the best to use. Sides and bottom should be without joints. All surfaces should be well painted with thin coal tar before they are butted; and the whole surface inside and out should be similarly coated. The waste-pipe should either be somewhat expanded or should have a conical flange burnt on by means of which it may be held in position by two blocks, one of which—fixed by screws to the under side of the bottom—serves to carry bolts by means of which a second block is caused to clamp the pipe firmly. The space between the pipe and the side of the hole through which the pipe passes is filled in with soft pitch. The sink is wedged up against the bench top. Such sinks may be made of any size that may be desired. No plumber is needed to fix them. The best drain, in my experience, is a U-shaped channel formed in a concrete floor, lined with the best Portland cement and then well tarred when dry. It should be provided with a wooden cover-plate. Such a drain can always be got at. Each year during the long vacation it should be cleaned and when dry recoated with tar.¹

¹ Care should be taken to arrange the drains so that they come *outside* the benches, in order that they may be easily got at. If there be any difficulty in so placing them, it is better to form a channel in the top of the bench at the back or down the middle of a double bench; this may be arranged to drain into a sink at the end of the bench, if sinks are required. Such channels are very easily provided when the bench top is covered with lead. All pipes, whether for gas or water, should be of iron. They should be fixed on the face of the walls and above the bench-top. It is all-important not to fix such fittings within the cupboards. Sinks such as I have described have been made to my entire satisfaction by the Bennet Furnishing Company.

Ventilation Hoods.—One or more of these have been provided for each of the four large workshops, but they are not yet finally arranged. Their position has been determined by that of the flues, which are not always in ideal situations. Had the fact been sufficiently taken into consideration that electricity is at disposal, there can be little doubt that the use of electrically driven fans would have been provided for from the outset and that the attempt would not have been made to produce a draught by means of gas. The trials made thus far have proved that it is desirable to use fans.

The conventional ventilation hood has many faults which are perpetuated time after time; of all the fittings it is the one which most needs study and improvement. The hood is rarely properly proportioned to the work for which it is to be used; and the mistake is almost invariably made of merely providing an exit opening without reference to its position or shape. The improvement, first introduced, I believe, at the Finsbury Technical College and subsequently at the Central Technical College—which is described in Robins's "Technical School and College Building" (Whittaker & Co.: London, 1887), p. 123, plate 50—appears to have passed unnoticed. It consists in giving the flue exit-opening the form of a slot extending across the hood, so that an even draught may be produced extending from side to side of the cupboard. The squeegee fitted to the upper bar, blocking the interval between the glass of the rising sash and the bar in front of which the sash moves up and down, is another feature of importance which has been overlooked. The use of iron plates for the roof—and in many cases for the ends—may be recommended. It is easy to construct a slot flue-exit in the angle which the iron roof-plate forms with the wall by fixing against the wall an iron plate inclined outwards at the angle which will give a slot of the size necessary to secure an even draught from end to end, the size of the opening being determined by trial. The opening into the flue may be at any point inside the V-shaped flue box which is thus formed. The gas-burner should always be placed below the opening from the closet into the upcast flue.

Much remains to be learnt as to the manner in which flues should be constructed for draught hoods. It is the case of the smoky chimney over again: some hoods work well, others badly, no one knowing precisely why. The subject needs to be taken in hand experimentally and it is important that it should be studied. In any case, flues should be made wherever possible in the walls: they are always useful.

One other point of special importance may be referred to. Whatever may be the system of ventilation adopted, there should be no competition between the exits; if provision be made for the *extraction* of the air from a room by mechanical means independently of the hoods, it cannot be expected that the flues of draught hoods will work with full efficiency, if at all; the air should be allowed to escape through open windows, if not entirely through the draught hoods.

Of the two systems available—that in which the draught is secured by means of a gas jet and that in which a fan is used—it may be said that each has its advantages. If the latter be adopted, it will, I think, be found advisable to localise the draught closets, much as I have advocated should be done in the case of water supply, &c., otherwise the cost of fans—particularly the cost of working them if electricity be used—becomes excessive. I may add that to connect up a series of hoods in different parts of a room or building and to use one large fan to produce a draught through all is not really satisfactory in practice; moreover, the construction of the necessary flues introduces special difficulties and is costly.

The use of gas has the advantage that small hoods may be worked economically—so that they are to be recommended in cases in which only the occasional use of the draught hood is

contemplated. But I may here utter the caution that no acid fumes, should be allowed to escape into the air and that draught hoods are therefore essential wherever chemical work is to be done. I am sure it will be found in cases where electric lighting is adopted that the wiring will perish rapidly unless the precaution is taken to soak the leads in molten paraffin-wax before fixing.

Special Appliances.—At Horsham, a carpenter's bench with four vices is placed in two of the rooms (Cavendish and Dalton), provision being made for storing tools and other general requisites in drawers and cupboards in a somewhat specially fitted bench. The top of this bench, it may be mentioned, which is covered with zinc, is intended for use in cutting out cardboard, &c.

A small room on the extreme left of the ground floor is fitted with two lathes (wood and metal), a drill and a circular saw, which are driven by an electro-motor. As the man in charge of the workshops is a skilled mechanic, it will be possible to have a good deal of simple apparatus made on the spot by the boys, so that the manual-training work will to some extent be co-ordinated with the experimental work.

A dark room for optical experiments has been partitioned off from the Faraday workshop. A dark room for photographic work is provided on the upper floor. This latter, it may be pointed out, is an all-important adjunct to the science workshops.

Arrangements for muffle and other furnaces are being made in several of the rooms.

The experience I have of school requirements, especially that gained of late in arranging the fittings at Horsham and Hertford, leads me to think that, by taking into account more carefully than has hitherto been done the character of the fittings to be introduced at the time of designing the building, it will in future be possible to improve considerably upon the arrangements which have been made in the Christ's Hospital Schools, especially in the direction of simplification.

The ideal to be aimed at, I think, is to have the whole of the room, both floor and wall space, available for the work which is to be done in it.

Wall space is invaluable for a variety of purposes—for many mechanical and physical experiments, for black boards, for shelving, &c. I would, therefore, advocate that no benches should be fixed permanently against the walls, but that all benches should be placed out in the room; also that projections into the room should be avoided and that the windows should be inserted at least six feet above the floor. There would then be an uninterrupted wall space at disposal on all sides of the room.

Whenever possible, the steam or hot-water pipes for heating the room should be carried under gratings in channels in the floor. Radiators, &c., not only take up much space against the wall, but interfere with and damage fittings in their neighbourhood.

As to benches, I am much inclined to question the need of the elaborate provision which we have hitherto made. It is doubtful whether cupboards are required under the benches in schools; apart from the fact that there is not much to be stored by the individual scholar, cupboards tend to engender habits of untidiness—everything gets put away into them and the teacher cannot be perpetually looking after them. It is desirable to encourage the common use of apparatus and the habit of keeping things in set places and in good order. If sufficient shelving, racks, &c., be provided and cupboards for general use where necessary, there is little need for cupboards under the benches. In cases where it is necessary to put certain tools, &c., in the hands of each scholar, it would be easy to provide simple lockers against the wall or even to give each scholar a box which could be taken "out of store" at each attendance and put under the working bench during the lesson.

I should like to see steady heavy benches of the kitchen-table type made use of in many, if not in most, cases. I have spoken already of the concentration of water supply and sinks. As to gas supply, of course it is convenient to have it at all benches; and if various grades of work are to be done in laboratory, it is almost necessary to make such provision, but I am inclined to advocate a less permanent arrangement than that usually adopted. I should like to see an overhead system of supply with provision for establishing connection with a simple main—provided with the necessary taps—which could be taken down from pegs on the wall whenever required and fixed temporarily on the bench. To call on boys and even on girls to do a little simple gas-fitting occasionally would be to give them most useful training; some one or other would always be forthcoming with genius for such work. I have previously spoken of the importance of giving eye training in schools through surroundings—of the importance of ornament, colour, pictures, &c. Elsewhere, I have urged that an atmosphere of research should prevail in our college laboratories. From the same point of view, I would here advocate that a workshop atmosphere should pervade our school workshops; they should be arranged as and look like workshops—not like drawing-rooms. Teacher and taught should be constantly called upon to meet contingencies and difficulties—to become handy and self-helpful; and instead of being forced to stand or sit at one place during the lesson, the scholar should be encouraged to move to whatever place in the workshop is best suited for the work in hand. I am a teacher of over thirty years' standing. I have taught students of every grade. What astonishes, indeed appals me, is the absolute inability of almost all the students I meet with to help themselves. I therefore feel that our schools must take the question of hand and eye training seriously into consideration.

For such benches as I have advocated, it is unnecessary to use hard wood. But whatever wood be used in the science workshop for the tops of benches, it should invariably be thoroughly coated with paraffin wax by ironing this in with an ordinary hot iron. Oil is useless as a protection against chemicals.

Sooner or later a wooden bench-top always becomes much stained and disfigured; unless it be exceptionally well made, cracks are sure to develop. All these difficulties are overcome by the use of lead-covered benches; a long experience leads me personally to prefer these to all others. The lead should be dressed carefully over the edge of the bench; a stout hardwood bead, projecting about half an inch above the bench top, should then be fixed against it, using cups and screws. A simpler plan is to clamp the lead firmly at its edge by a hard-wood bead screwed down upon the table top an inch or so in from the outer edge of the table. Before fixing the bead the surface to be hidden should be well painted, so as to make a water-tight joint. Solder should never be used in making joints in any lead work; joints should always be burnt with the blowpipe.

With regard to the treatment of wall space, as much as can be spared here and there should be properly prepared so that it may serve as a blackboard; or the special black canvas, so much used in America, should be fixed against it by battens. The old-fashioned small blackboards, like slates, are fast disappearing, with advantage to teachers and taught. Wherever there is spare space, stout battens should be fixed to the wall a few feet apart; when these are provided brackets, &c., may be fixed up at any time.

Lastly, I may point out that, if it can be provided, a flat roof is very valuable for many purposes—for experiments on the growth of plants, for photographic work, &c. Also that it is desirable that a number of beams be fixed firmly to the ceiling joists, from which pulleys, &c., can be suspended.

TEACHERS AND TEACHING.¹

By W. EDWARDS, M.A.
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THE present paper is not an attempt to perform the impossible by giving a detailed account of Teachers and Teaching in two columns of *THE SCHOOL WORLD*. The writer's aim is to indicate certain aspects of the teacher's work which either seem to be often neglected or which are of such importance as to justify frequent mention. These points may be regarded from the point of view of qualifications, work, and authority.

The first qualification of the teacher is adequate knowledge, for we teach that which we know. This explains the value of degrees, which are a guarantee of knowledge, although they need to be supplemented by that training and experience which alone enable the teacher to make the best use of the knowledge he possesses. But university distinctions are merely the starting point; the ultimate end of teaching is preparation for life, and an object so wide can be attained adequately only by a man of varied interests and extensive culture. Every effort must be made to improve qualifications, to develop powers, and to enlarge interests. As the first means of attaining this end comes reading. The necessity is obvious for wide reading in connection with subjects taught in order to ensure skilful treatment and freshness of presentation. But if all schoolmasters practised what they readily admit, our teaching of history, literature, and above all geography, would not be a byword among the nations. The need of reading books connected with education is not appreciated as it should be. For the young secondary-school teacher in particular, who rarely has had the advantage of a course of training, such literature is invaluable. First come the wells of pedagogy undefiled: Plato, Locke, Rousseau, Herbart and Herbert Spencer. Then there are the lives of educational giants, such as Stanley's "Life of Arnold" and Parkin's "Life of Thring," with their lessons of hard struggles successfully ended, of noble aims realised only with the greatest difficulty. The "Special Reports on Educational Subjects" edited by Mr. M. E. Sadler are a mine of invaluable information about schools at home and abroad. Much may be learned from Mr. P. E. Barnett's books on "Teaching and Organisation," and "Common Sense in Education," and from "Work and Play in Girls' Schools," all published by Messrs. Longmans, and every teacher should read Mr. Sidgwick's Essay "On Stimulus," Dean Farrar's "General Aims of the Teacher," and Mr. Poole's lecture on "Form Management," which may be obtained from the Cambridge University Press. This very incomplete list may be closed with the mention of Russel's "German Higher Schools" (Longmans), Findlay's "Principles of Class Teaching" (Macmillan), and Skrine's "Pastor Agnorum" (Longmans), the last of which is a noble attempt to show "How the school is but a part of Christendom, and schoolcraft only a chapter in the mystery which is the title deed of that realm."

As a second means of strengthening teaching powers I would mention foreign travel. The holiday courses arranged by the Teachers' Guild in France and Germany are admirable, and are conducted on the most economical lines. It is easy to obtain through the Foreign Office permission to visit French and German schools, and much may be learned in this way. Teachers who prefer to stay in England will derive great benefit from the courses conducted at Oxford and Cambridge by the University Extension authorities, and special provision is made at these meetings for those interested in school work.

The work of the teacher often fails through lack of order and

arrangement. Lessons should proceed according to a definite plan which should provide for the performance of the proper amount in each week, month, or term, and should also allow of a short recapitulation of previous work in the course of each lesson. Connected with this is the question of neatness of work. Every effort must be made to ensure good writing and neatly kept notebooks and every lesson in which writing is done must be regarded as a writing lesson. Good work is impossible without good discipline, and this is best attained by the concentration of attention on the lesson. Bad discipline is too often caused by the indolence of a teacher who lacks that "unhasting, unresting diligence" which was one of the most marked features in Arnold's character. Good discipline involves little punishment, which is generally a confession of failure on the part of the teacher. But discipline need not necessarily be harsh. "The pressure of gentleness" may be most efficacious as a means of ensuring order, and a word of judicious praise "blesseth him that gives and him that takes." We may borrow from the House of Commons two excellent rules, which will greatly improve the discipline of our forms—no one must speak until he has caught the Speaker's eye, and all remarks must be addressed to the Chair.

The question of method is a very wide one, but one or two suggestions may be made on this point. The scope of every lesson should be made as wide as possible, provided the clearness of presentation does not suffer. The information given in the text-book must be supplemented by facts connected with it, by associations of time and place, of similarity and contrast; and it should be correlated with the knowledge already possessed by the scholar. A thorough comprehension of the Herbartian theory of apperception is essential for every teacher.

We must carefully avoid the common mistake of talking over the heads of our boys. It is fatal to assume that a form understands what the teacher has said, and the only way of finding out how much really has been understood is to adopt a Socratic method of rigorous cross-examination. In the case of young boys every answer should be a complete sentence, but the answer must not be a mere repetition of the words of the teacher. Written answers should be required from time to time, for "writing maketh an exact man."

In conclusion, let us consider the source of the teacher's power—what it is that warrants him in assuming his position as master of his form. The teacher owes his power to his representative character, and he is, in the first place, the representative of authority. His position is that of a benevolent despot giving to his subjects blessings which they cannot yet appreciate, and it is in virtue of this fact that the master has the right to punish, to insist on the proper preparation of lessons, and to enforce the observance of rules of form discipline. But he should be also an example of courtesy and consideration, and his actions should tend to make his boys honour "the grand old name of gentleman." And here we get the cardinal rule, "always treat your boys as gentlemen," and insist, in return, on courteous treatment from them. Closely connected with this is the question of dignity, the neglect of which impairs the work of many an excellent teacher. Bad temper, for example, to put it on somewhat low grounds, is undignified, and a man who cannot keep his temper is not fit to keep a school. The practice of calling boys names is not only highly undignified but quite unnecessary, for genial chaff is an infinitely better weapon. And in this connection I venture to whisper a hint as to neatness of appearance and dress. Everything the master does influences his boys, and I read not long ago of a master who greatly weakened his influence over his boys by wearing a waistcoat that was voted "bad form" by his youthful critics.

But the teacher represents higher ideas than those of authority and gentlemanly conduct. He has, to the boys under his

¹ Abridged from a paper read before the Darlington and North Yorkshire Branch of the Teachers' Guild.

control, duties similar to those of a clergyman, for no man can prepare his scholars for life unless he prepares them for the higher life. The every-day events of the class-rooms and the subject-matter of the schoolwork afford endless opportunities for kindly lessons in honesty, truth, and morality, which may have the most far-reaching consequences. In "Pastor Agnorum" there is an admirable chapter on the schoolmaster as the "Soul's Friend," and the expression seems so full of meaning as to need no further comment. The author explains the ultimate justification of the schoolmaster's position in the words which explain why the Knights of the Round Table followed Arthur.

The King will follow Christ and we the King,
In whom high God hath breathed a secret thing.

ITEMS OF INTEREST.

GENERAL.

THE preliminary programme has been arranged for the meeting of the Educational Science Section of the British Association, to be opened at Southport on September 10th. Following the course adopted since the section was founded, specific subjects for discussion have been decided, and it is hoped that many practical teachers will be present to express their views upon them. The chief subject to be discussed is the school curriculum, which is to be considered in three aspects, namely, those of general principles, the humanities, and practical instruction. One or more papers on each of these sides of the difficult question of the school time-table will be presented to open the discussions, so that there will be ample opportunity for advocates of any branch of education to claim their share of the curriculum. It is expected that the discussion of these matters will occupy two days of the meeting. It is to be hoped that the result of the discussion will be a pronouncement as to the subjects which have least right to a place in the school time-table.

ANOTHER subject to be brought forward is the teaching of geography, and on this the opinion of the British Association should lead to improvements much to be desired in the direction of developing intelligence. Reports will be presented and discussed on the teaching of botany, hygiene in schools, science teaching in elementary schools, and the influence of universities and examining bodies on school work. To prevent disappointment, it may be well to remark that, as the intention of the organisers of the section is to create a platform for the discussion of educational questions of practical importance, papers which do not come within the range of the subjects mentioned should not be submitted.

THE thirty-fourth conference of the National Union of Teachers was held this year at Buxton, when about 2,000 delegates were present. Mr. Coward, of Bristol, the new president, in his address referred at some length to the Education Act of last year. He was compelled, he said, to part company from all who failed to find anything good in it, and are urging combination to prevent the successful carrying out of its provisions. The Act contains much that is bound to make for the up-lifting of education in the country as a whole, and should ultimately prove a step towards a national system of education. Under the Act there is almost a revolution in the mode of financing and controlling public education. Hitherto more than half of the primary schools have had to depend for their support upon charity—a very weak prop in a large number of cases. Now the whole of the schools are placed on the

rates, as well as on the taxes, for their maintenance. He rejoiced that this step had been taken, and felt sure that the corollary to this—complete public control—would in due course inevitably follow. Mr. Coward also discussed the Education Bill for London, and argued in favour of an *ad hoc* authority. He urged the necessity for more training colleges for teachers, and complained of the division instituted between the teachers of secondary and elementary schools on the new register.

THE sixth annual conference of Manual Training Teachers was held during Easter week. An exhibition of manual work of all kinds was held at the Hugh Myddelton Higher Grade Schools, Clerkenwell, and in opening it Dr. Kimmins said that, with a view to hold a further exhibition early in May, the London County Council were willing to allow all the exhibits to be transferred to the Westminster Technical Institute, so as to give a larger number of teachers an opportunity to study them. Sir Philip Magnus, the president of the National Association of Manual Training Teachers, delivered an address on the second day on "Handwork and Headwork in Elementary Schools: a Forecast." He said the school workshop was an emblem of the change in our methods of instruction, which corresponded to the changed conditions of human existence. Not long since it would have been heresy to suppose that children went to school with any other object than to acquire knowledge, but it was now realised that the acquisition of knowledge was not the aim or purpose of a child's school-training. It was enough if, in our elementary schools, we could show how knowledge might be sought. The knowledge itself might be acquired later on. In future the main function of education would be to train the hands and sense organs and intellectual faculties so that children might be placed in a position of advantage for seeking knowledge. Before long the central feature in all schools would be the workroom, in which children would work with their own hands and gain their knowledge by ordinary experimental methods. Sir John Cockburn has been elected president of the National Association of Manual Training Teachers for the ensuing year.

THE Executive Committee of the Friends' Guild of Teachers recently passed the following resolution and sent a copy of it to the Board of Education: "This committee is of opinion that the introduction of military drill into the schools of the country is entirely at variance both with the physical requirements of the children and with the true ideals of character in which they ought to be trained. It would therefore express the hope that this system may be abandoned; and, if it is considered necessary for a model course to be issued, that it may be one more suitable on both educational and moral grounds."

THE Kiel education authorities have cancelled for this year the arrangements previously made for a Modern Languages Holiday Course. It is hoped to renew the course in 1904.

ALTERNATIVE syllabuses in Euclid will be arranged for candidates in the May examinations of the London Chamber of Commerce. Practical geometry, on the lines of the Association for Geometrical Teaching, covering the syllabus in Euclid, will be given as an alternative.

TWO schools of a new character have been established recently in Rome. One is styled *Diplomatico Coloniale*, and the other *Scuola di Commercio*. The Italian Government, in order better to qualify young men for its Consular service, has established the first of these schools so that its consuls may be able to give expert advice not only to the Government, but also to the public generally on all matters of a commercial character. The second school was mainly established by the commercial

associations in Rome for the training of commercial men, and is modelled on the Manchester Central Commercial Schools.

MR. P. A. BARNETT, whose appointment as Superintendent of Education in Natal we chronicled last December, has lost no time in tackling the complex problems of South African education. In conference with the Directors of Education of the sister colonies he has helped to draft a Syllabus for Primary Education which is intended to secure uniformity of method throughout the continent, and he is now busily engaged upon new schemes for secondary education. The respective Heads of Departments are to meet again in Durban in July, when there will be a convention of Natal teachers. This conference promises to be a most successful gathering. A strong local committee, under the chairmanship of Mr. Barnett and with Mr. E. A. Belcher as secretary, has been formed, and an excellent programme of papers and lectures has been arranged.

THE contribution for April to the series of articles, "Prospects in the Professions," in the *Cornhill Magazine* deals with the work of the schoolmaster. The writer is concerned almost entirely with the public schoolmaster, though he glances at the condition of things in preparatory schools. Small secondary schools are almost, and public elementary schools quite, ignored. A reader with no knowledge of the scholastic profession will obtain too favourable an impression of the emoluments likely to fall to the lot of the ordinary well-qualified schoolmaster. The article states that "many a preparatory schoolmaster must enjoy an income of £1,000 per annum; not a few enjoy incomes reaching £2,000 and £3,000, and two or three at least get even more." A schoolmaster beginning life in a great public school "can live as a bachelor upon £200-£300 per annum, and it will not be long before he earns a larger income. Many masters of boarding-houses make £1,000, such masters in the most expensive schools make £1,500 or more per annum." All these facts may be true enough, but it would have been worth while at the same time to point out that the average income of assistant-masters in secondary schools is probably about £100 per annum without board and residence.

WE have received from Messrs. Geo. Philip and Son samples of a set of 256 lantern slides which are especially prepared for use in institutions and colleges where the History of Architecture forms part of the course of study. The slides are taken from the original drawings and photographs which were used by Mr. Banister F. Fletcher in his well-known work on the subject. The slides are all numbered and labelled to correspond with the illustrations in Mr. Fletcher's book, and are neatly and strongly finished in cloth lantern-binding. Some of the line drawings are rather crowded upon the slide, but in other respects they are very good, many of the photographic slides coming out remarkably well. The latter give the actual appearance of the buildings far better than any drawings could do.

THE *British Medical Journal* rightly maintains that boys and girls who work well should feed well—and most children work hard though not always at lessons. The issue of the *Journal* for April 4th contains an article on "The Food Factor in Education," which expresses the opinion that in many English schools the boys and girls are not given meat enough. Schoolmasters and schoolmistresses responsible for the boarding arrangements of schools would do well to study the detailed dietaries included in the article referred to, and to ask themselves why French and German school-children should be better fed than those at home. One grave fault in the arrangement of the hours for meals in English boarding-schools is the long interval

between the mid-day meal and tea-time, and another the unsubstantial nature of the food a boy or girl receives between dinner at one o'clock and breakfast the next morning.

THE marked tendency towards a decrease in the available number of suitably qualified schoolmasters is as characteristic of Scotland as of England. The *Educational News* says that the two main factors which have contributed to the scarcity of teachers in Scotland, especially men, are the want of prospects and consequent lack of promotion, and the inadequacy of the salary paid to assistant schoolmasters and schoolmistresses. "That we are within the mark in saying that the majority of the men teachers of Scotland will never become headmasters the following statistics will prove. In 1894-95, there were 2,327 principal men teachers in Scotland in state-aided schools, while in 1901-02 the number was 2,330, or an increase of three headmasterships in seven years. Now in the former years there were in average attendance in the schools 578,455 children, and in the latter years 636,374, or an increase of 57,919, yet for this large increase we find an increase of three headships." This result has been brought about by the rapid increase in the number of large schools. Though there has been an increase in the average salary of assistant-masters in the state-aided schools, the present state of things is by no means satisfactory. In 1894-95 the average salary of these teachers was £97 16s. 9d.; in 1901-2 it was £113 7s. 6d.

THE London Chamber of Commerce has, as the *Chamber of Commerce Journal* points out in its April number, from the inauguration of its scheme of commercial education, both for junior and senior candidates, insisted in its examinations on a *viva-voce* test in modern foreign languages. As we have before reported, the London University made it compulsory a few years ago for every candidate in Arts presenting himself in modern languages to read in French and German, and answer in these languages a few questions arising out of the piece read. First-class candidates in the College of Preceptors' examination may now take a voluntary test in oral French or German. The Society of Arts also allows a voluntary *viva-voce* test as a portion of their modern languages examination, and this year the Delegates of the Oxford and Cambridge local examinations are beginning a *viva-voce* test for their senior candidates. If modern languages are to be of real practical use, students must know equally how to read, write, and speak them, and it is quite time that no one should be permitted to pass an examination in a modern foreign language who is unable to satisfy the examiner that he can both read, write, speak, and understand the spoken tongue.

MR. JOHN JACKSON, of "upright penmanship" fame, is actively engaged in the formation of a committee for the promotion of ambidextral culture and teaching in schools. Already a great many well-known educationists have expressed their willingness to co-operate with him, and there seems every reason to believe that the movement will result in an improvement in current methods of teaching writing and drawing.

MESSRS. MACMILLAN & Co., Ltd., have added to their illustrated pocket classics "Tom Brown's School Days." The excellent illustrations are by Mr. Edmund J. Sullivan.

THE Civil Service Commissioners have announced that an open competitive examination will be held in London, commencing on the 3rd August next, for admission to the Civil Service of India, for higher division clerkships in the Home Civil Service, and for Eastern cadetships. The number of vacancies in the Home and Indian Civil Services have not yet been announced,

but at present ten appointments to Eastern cadetships are offered for competition. The twenty-six subjects from which a choice may be made include classical and modern languages and literature, mathematics and science, ancient and modern history, philosophy, economics, politics and law. The same examination and fee (£6) cover competition for any or all of the three services. The limits of age for candidates for the Indian Civil Service are 21 and 23 on the 1st January last, for the Home Civil, 22 and 24 on the 3rd August next, and for Eastern cadetships, 21 and 24 on the 1st August next. For examinations after the one appointed to be held in August, 1903, the limits of age for the Home Civil Service will be 22 and 24 on the 1st August in the year in which the examination is held. Entry forms are obtainable from the Secretary, Civil Service Commission, Burlington Gardens, S.W., and should be returned to him not later than 1st July next.

SCOTTISH.

A VALUABLE book of 100 pages, entitled "Scottish Education Reform," by Dr. Douglas and Prof. Jones, of Glasgow University, embodies the considered views of eminent politicians of both parties, as well as of men who are directly interested in the future of Scottish education. The suggested scheme of reform bears no trace of bias, and seems a praiseworthy effort to solve the problem on purely national considerations. The authors insist that whatever solution is finally adopted should embody two main ideas: first, to secure that all education—primary, secondary, and technical—shall be continuous, and therefore under one authority; second, to provide means whereby the Scottish people shall have power to create and control their own system, and take the whole responsibility for public education into their own hands. They would create a special education authority, elected directly by the people, and ruling over areas coterminous with the "districts" into which counties are divided for local government. They would remove the Education Department from Whitehall to Edinburgh, and would create an Advisory Council, representative of educational interests, for the guidance of the Department on questions of general educational policy. These latter proposals will doubtless arouse determined opposition, as they certainly demand most careful consideration. The excellence of the administration by the Education Department during the past decade will assuredly and rightly be the strongest argument for maintaining the *status quo*.

A MEETING of the Modern Languages Association was held in Glasgow on April 15th, when Dr. Kirkpatrick, of Edinburgh University, in his presidential address, referred to the conflict between the advocates of the study of classics and of modern languages, and contended that the University Commissioners by assigning double marks to classical subjects as against modern subjects in the bursary competition had intensified the controversy. It was maintained that the classical languages were more efficient instruments of education than the modern, but this contention was largely based on the fallacy that because more time and attention were devoted in most countries to classics than to modern languages, the former was, therefore, more educative than the latter. He urged classical supporters to study carefully the Frankfort system, under which it was found more natural and rational to begin linguistic study with a modern than with an ancient language.

THE following motions were afterwards agreed to:—(i.) That absolute equality of status be accorded to ancient and to modern languages, both in school and university; that, wherever possible, the Frankfort principle of basing classical study on a thorough training in one modern language be brought into

practice; and that that principle, so successful in Germany, and so beneficial both to classical study and to general education, be strongly recommended to the notice of the Scottish Education Department and of the public generally. (ii.) That the committee be instructed to investigate the cause of the sudden reduction in the number of students of German in the training colleges, and to communicate with the educational authorities concerned, with a view to remedying this serious state of matters. (iii.) That, while acknowledging the liberal attitude of the Carnegie and Heriot Trusts in offering post-graduate scholarships and fellowships in modern languages, this association would strongly urge the desirability of founding also smaller travelling scholarships for the benefit of students wishing to spend a summer abroad in the interval between the ordinary and honours courses in our Scottish universities.

THE half-yearly meeting of the Classical Association of Scotland was held in the Grand Hotel, Aberdeen. Prof. Ramsay, who presided, justified the existence of the Association at this time when the question of higher education was so prominently before the country, and when the claims of classics to a place in that education were being considered and canvassed by many who were not well qualified to give any opinion on so important a subject. Papers were afterwards read by Mr. Coutts, Secretary of the Association, on the examination system of the secondary school, and by Prof. Harrower, Aberdeen, on the teaching of Greek. An interesting discussion followed which brought out general agreement on the following points: (1) that the number of examinations should be diminished; (2) that the number of subjects demanded for the bursary competition should be diminished; (3) that a pass with distinction should be substituted for the Honours Grade in the Leaving Certificate Examinations; (4) that the questions on grammar and accident should be curtailed, and questions set regarding the habits, customs, literature and history of the Greeks and Romans. The marked success of the Scottish Association is likely to lead, at an early date, to the formation of a Classical Association in England.

At a meeting of the Scottish Class Teachers' Association, a discussion took place on the steady diminution in the number of male teachers entering the profession. In 1894, out of every hundred certificated teachers, 46 were men, and 54 were women. In 1902, out of every hundred certificated teachers, 39 were men and 61 were women. If the decrease continues at the present rate the extinction of the male teacher in elementary schools is within measurable distance. In America, where this result has already been achieved, the prospect of the whole youth of the nation being entirely left at their most impressionable years to the training of women is received in many quarters with serious concern. The emotional and sentimental faculties may possibly be developed at the expense of those more robust qualities which go to the making of true manhood and even womanhood. Whether this view be right or wrong, one would like to see the question decided practically in America before accepting with equanimity its introduction into this country. Dr. Douglas, M.P., who was present at the meeting, remarked that this was the only meeting of professional men whom he had ever heard lamenting the lack of professional competitors, and it showed that they were looking at the matter not from the personal but the national standpoint.

IRISH.

THE Report of the Royal Commission on University Education, which we have summarised elsewhere, has already given rise to a good deal of controversy. This is but natural, for if

the Commissioners could not agree, how can agreement be expected from others? The most important pronouncement is that which issued almost immediately after the publication of the Report from the Board of Trinity College. The Provost and Senior Fellows consider that it would be most injurious that there should be incorporated in the University of Dublin any denominational college where appointments would depend either in theory or in practice not merely on literary and scientific attainments, but also on religious denomination. The Board stand by the Fawcett Act of 1873, but are so far willing to make overtures to Roman Catholics that they are ready to provide facilities for the catechetical and religious instruction of Roman Catholic students by lectures, examinations, and supervision of their religious observances by clergymen of their own Church.

THE Higher Education Committee of the General Assembly, meeting in Belfast, protested that scarcely any solution of the university question could be so injurious to the educational interests of the country at large as that set forth in the scheme of the Royal Commission. It will tend, in the opinion of the Committee, to perpetuate divisions and animosities among the young of different creeds, and involves a State endowment of religion in contravention of the Irish Church Act of 1869. The Committee further protests against the proposed exclusion of Magee College, Londonderry, from all university privileges. Similar criticism has been made by Professor Leebody, the President of Magee College.

THE Council of the Royal University Graduates' Association express their pleasure that the Report condemns a Roman Catholic university for Ireland and ignores completely the creation of a northern university. They condemn, however, the proposal to establish a Roman Catholic college, and object to any college being controlled by the clergy or nominees of the clergy, and to the appointment of Crown nominees on the governing boards of the Queen's Colleges as likely to lead to the continuation of the Castle intrigues which have been so ruinous in the past.

ANOTHER matter which has aroused intense interest has been the question of the so-called Equivalent Grant. Mr. Wyndham has succeeded in having its amount determined on the score of population as shown by the last census. The sum, therefore, amounts to £185,000 per annum. *Prima facie*, this grant should be given to Irish education. But, says Mr. Wyndham, Irish education is not yet ready for it, which means that Mr. Wyndham's scheme for the reform of Irish education is not ready. It has been several times hinted in this column that the Government are anxious to co-ordinate primary and secondary education in Ireland, and to establish a single Board of Education for the whole country. This may now be taken as certain. For the present, the Land Purchase scheme is to have a first charge of £50,000 and the Congested District Board a charge of £20,000. Then come the claims of education; and lastly, part of the grant will be used for the promotion of the economic development of transit facilities in Ireland. The alienation of any of the money from education is sure to cause strong protests, which will only be appeased if it is made clear that eventually all of it will go to education, either primary or secondary.

It is a curious coincidence that on the very day that Mr. Wyndham was reported to have said in the House of Commons that "money has been lavished upon intermediate education in Ireland," a memorial was published, addressed to him by the joint committee of all the Irish secondary educational associations of all denominations, which showed clearly how very inadequately endowed intermediate education really is, and

pointed out that, even if all the equivalent grant were given to it, its endowment would fall short of the provision for secondary education already made in Scotland. There is no greater delusion in the minds of some of the responsible authorities of this country than the belief that intermediate education is well provided for. A parliamentary return of the salaries of Irish secondary teachers would soon undeceive them.

IN the meantime the Castle authorities have brought over an English inspector—not of a very large experience—to inquire into and report on Irish education both primary and secondary. As this has taken place without consulting those who are responsible for the conduct of education, Dr. Bernard, the Dean of St. Patrick's, has resigned his seat on the National Board as a protest. The Government have treated the Board with scant courtesy, but seem bent on taking an independent line of their own.

THE Intermediate Examinations will this year begin on Tuesday, June 16th, and conclude in the following week. The only new feature is that separate papers of an hour in length will be set in Greek and Latin verse for honour candidates in Greek and Latin respectively.

It was recently stated in the House of Commons that technical difficulties have arisen on the construction of the College Statutes, which have caused delay in issuing a King's letter giving power to the authorities of Trinity College to confer degrees upon women. It is, however, expected that the matter will soon be satisfactorily arranged.

THERE is this year an increase of £23,254 in the estimated cost for the coming year of the Department of Agriculture and Technical Instruction, the total estimates being £181,499. The largest increase is in the grants to secondary schools, the figure mounting from £7,000 to £18,000, a difference of £11,000.

WELSH.

AT a meeting of the South Wales District Union of Elementary Teachers held last week it was stated that in Carmarthenshire 42·8 per cent. of the teaching staff was totally unqualified; in Pembrokeshire, 46·5 per cent.; and in Cardiganshire, 52·6 per cent. No wonder, therefore, that the meeting adopted a motion for the better staffing of the schools. The following were the terms: "That the Board of Education be requested to utilise the opportunity afforded by the passing of the Education Act, 1902, to improve the staffing arrangements of schools by requiring that a qualified adult teacher be provided for every forty scholars on the roll in town schools and thirty in rural schools; that this provision be exclusive of the principal teacher, and after April 30th, 1905, teachers under Article 68 and pupil-teachers be no longer recognised for the purpose of this article."

AT the annual meeting of the Welsh County Schools Association of Headmasters and Headmistresses of the Intermediate Schools of Wales, recently held, a motion was submitted asking the Central Welsh Board to establish a sub-junior certificate on similar lines to the preliminary Oxford and Cambridge local certificates. It is true that the motion was eventually withdrawn, but it is indeed extraordinary, in view of the recent tendency of the Central Welsh Board to reduce the amount of examination in the schools, to find any headmasters wishing to make the reactionary movement towards increase of examinations. On the other hand, it is pleasant to notice a forward movement of the Association. The Executive Committee re-

ported that "they cordially approved of arrangements being made for the interchange of views between elementary and secondary teachers in South Wales, and suggested a committee to arrange a conference," and "that it was desirable that a similar conference should be arranged in North Wales." It was reported at this meeting that nine out of the sixteen counties and county boroughs in Wales had accepted the pension scheme.

THE headmaster of the Carnarvon County School has lately explained to his governors his views of the teaching of Welsh in county schools. We venture to quote from a report of his remarks. He stated that on coming to the school he made inquiries and "found that Welsh was not taught in eight or nine elementary schools in the district, and the boys came to the intermediate schools with an indifferent knowledge of English. English and Latin had to be taught together with one other language. Should that be French or Welsh? Looking at the failure of the boys under his charge who had no knowledge of their own language, he tried to discover which would be of greater educational value to them—Welsh or French—and he decided that the right course, except in special cases, was the study of a foreign language."

ON March 26th the University College of North Wales arranged for a lecture delivered in French by Dr. Friedel, lately Professor of Romance Languages at the University College of Liverpool, and now of the French Education Department, on French dramatic and lyric poetry. The lecture was illustrated in a very brilliant manner by M. Baillet, of the *Comédie Française*, who read, in excellent style, selections from Corneille, Racine, Molière, Coppée, and Rostand. The masterly delivery of the famous actor gave great pleasure. This, we believe, the first time that such a lecture has been arranged in connection with a university college. No better means could be adopted for rousing the enthusiasm of students and for giving many—especially teachers—who have not the opportunity of seeing the plays performed, or of hearing the masterpieces of French literature expounded by those who have devoted their lives to the stage, an idea of how they should be rendered.

THE following interesting account has been given of the method of teaching law by the Professors of Law in the University College of Wales, Aberystwyth. In the lectures great importance will be laid on law reports—a method of proceeding from facts to principles, which, while it affords an intellectual discipline of the highest order, at the same time gives the student a grasp of the actual rules of law which is unattainable by any other method. The value of work in the class-room in common with other students and under the guidance of a lecturer cannot be disputed. It is, in fact, incalculable. This is especially the case where the work is supplemented by conferences with a lecturer, and by such organisations among the students themselves as law moots and law debating-clubs. The course of instruction in law is rendered still more effective by the adoption of historical and comparative methods of study—methods which serve the double purpose of broadening the student's point of view, and of deepening his insight into the meaning of those rules which he will be subsequently called upon to apply in practice.

No county school probably has had to contend with greater difficulties than that at Bethesda. The clerk has reported at a meeting of the Local Governing Body that, notwithstanding the adverse circumstances of the last two years (*i.e.*, with strike after strike in the district), the number of scholars is well maintained (*viz.*, 65 pupils in regular attendance), and on the present financial year there is a balance in favour of the school at the bank.

CURRENT HISTORY.

SIR H. CAMPBELL-BANNERMAN fears that the inclusion of the chiefs of the Army and Navy in the proposed Defence Committee "may weaken the responsibility of the Cabinet, which is the foundation of our system of government." What exactly is this "responsibility of the Cabinet" to which Sir Henry refers? Who are "responsible?" Are they so individually or only collectively? To whom are they responsible? and what are the penalties to which they are liable? Are these penalties such as members of the Cabinet really fear? We remember a *Punch* cartoon of 1880 in which Beaconsfield's "failure" was pictured as lolling in a hammock with a cigar and a novel. Did he not say that he "would now be able to watch the primroses?" The Tories who inserted the constitutional clauses in the Whig Act of Settlement, 1701, disliked the then new Cabinet system and wanted every member of the Privy Council to sign their recommendations, so that, if it was desired, they could be impeached for "criminal" neglect of the country's interests. But impeachment is now as dead as Queen Anne. When some one proposed to impeach Beaconsfield for bringing troops from India in 1878, the House of Commons laughed.

VISITORS to London are sometimes shown the Lancashire window in the Guildhall. It is the memorial of the kindness shown by Londoners to the cotton manufacturers during the great famine that arose in the sixties of last century out of the American Civil War—the war which established the unity of the United States and brought about the abolition of American slavery. It was even then remarked that as much kindness and more wisdom would have been shown in finding for the operatives of Lancashire an alternative industry than in maintaining them in idleness, and certainly no such fund will be raised now that, owing to *permanent* causes, the supply of cotton from the United States is again more than threatening to cease. Partly because the area of cotton growing is shrinking, partly because the United States are beginning to manufacture their own products, Lancashire is looking round for new sources of her necessary supply. Raw cotton has long come from India, and now West Africa, and even some of our West Indian islands in despair about sugar, are thought of as likely fields for the growth of the cotton plant. So the world changes, and our geography text-books have to be constantly re-written so as to be up to date.

THE question of the unemployed in London has given rise to much discussion in the papers and elsewhere. The local authorities have been recommending the Government "to undertake immediately extensive works of public benefit, so as to keep people employed for whom private industry could not find work." We cannot, of course, here discuss the economics of the question, nor enquire whence the capital is to come to provide this public employment, much less indicate the disturbance of business all this would cause. We would merely remind our readers of two parallels. In India and Cyprus, among comparatively primitive agricultural peoples to whom we have introduced an artificial civilisation beyond their understanding, paternal government, even to the extent of providing food in famine time, may be so great a good as to be regarded as necessary. But in Paris, in 1848, such methods proved only disastrous. It is true that our London authorities intend to warn the provinces; but if public work is provided in the capital for out-of-works, what is to prevent further congestion? In such cases, a knowledge of history, if full enough, will give wisdom and power.

WE wonder what Alexander the Great, if he is aware of what goes on among us, is thinking of the condition of his country at

the present time. The work which he effected by his union of Hellas and his eastward expedition has been signally avenged by Asia. Rival religions, each world-wide in aim, have complicated the problem since his time. Greek Russia and Roman Austria, after long years of jealousy, have united to demand reforms for Christian Macedonia from Mohammedan Stamboul, only to find that the Kaliph Sultan cannot even promise to submit to their will without incurring the wrath of Mohammedan Albanians. What a welter of warring nationalities exists in the Balkan Peninsula! The problems of the Near East are not to be understood, even in an elementary way, without a knowledge of the history of Bulgars, Serbs, &c., who inhabit the territory south of the Danube. Such knowledge is to be gained from Gibbon or Finlay, or at least from those chapters of manuals of European history which deal with South-eastern Europe. Here at least we must acknowledge the unity of history. Greek story, for instance, is continuous from Troy to Navarino.

"THE priests, being *State* officials, can legitimately be obliged to employ the French language in their religious instruction"—(M. Combes, the French Prime Minister). "The *State* has the power of moulding the minds and aptitudes of its future citizens. That power it derives from its control over the national education. Nor can it reasonably be denied that the State has every right to exercise that influence in any direction that may be considered useful for the Commonwealth"—(Articles in the *Times* on the Problem of the Army). The conditions on which Boer emigrants will be permitted to settle in German South-West Africa include the necessity of sending their children for two years to a Government school. They may have other schools of their own, but these two years are obligatory, as is also military service. "The right of judging what doctrines are to be taught the subjects is in all commonwealths inseparably annexed to the *Sovereign* power civil, whether it be in one man or in one assembly of men"—Hobbes' *Leviathan* (1650). We know, too, from Plato's "Republic" how the ancient Hellene lived for the State, because in the *polis* he saw the only full development of the individual man. The nineteenth century, at least in its middle period, was the great era of individualism. Earl Russell, in his "English Government and Constitution" (1865), said, "There was a time when it was supposed to be the duty of Government to inculcate religious truths, but these errors are fast passing away. It is now known that the *utmost* liberty of thought and expression should be not hampered with restriction, but protected . . ." In which direction are we now tending? Towards *liberty*, or a growth of *State* control, even in matters of religion and education?

TEST EXAMINATION PAPERS IN ENGLISH HISTORY.

London Matriculation.

1485-1900. (3 hours.)

- (1) What were the difficulties of Henry VII.? How did he meet them?
- (2) What was the policy of Wolsey, (a) at home, (b) abroad?
- (3) Describe the Reformation as it was settled under Elizabeth. What were its domestic opponents?
- (4) What were the principal points in dispute between James I. and his English subjects?
- (5) How did England come to be under military rule in Cromwell's time? What were the ideals of the Army?

(6) Sketch the relationships between England and the United Netherlands during the latter half of the seventeenth century.

(7) What were the principles of the Whigs till 1745? Sketch the fortunes of the party in that period.

(8) Describe the world-war between Great Britain and the Bourbons. How far were we helped by Continental Powers?

(9) What gains and losses did the British Empire experience in the latter half of the eighteenth century?

(10) Why was Reform desirable in 1830? What considerations were advanced against it?

(11) Mention some of the more important events in which Englishmen were interested during the first half of Victoria's reign.

(12) Trace the growth of British Imperialism.

Scotch Leaving Certificate.

HIGHER AND LOWER GRADES. (40 minutes.)

(1) What did any *three* of the following do in history: Augustine, Canute, Robert of Normandy, Thomas Becket, Simon de Montfort, Robert Bruce, Wat Tyler, Henry Hotspur, Joan of Arc, Caxton, Perkin Warbeck, Sir Thomas More, Lord Burleigh, Earl of Strafford, Titus Oates, Marlborough, Clive, Wilkes, Washington, George Stephenson, Canning, Gladstone?

(2) What do any *two* of the following phrases mean in British history? Write a few lines about each of the *two*: Witan, Feudalism, Jury, Constitutions of Clarendon, Knights of the Shire, Crusade, Lords Ordainers, Model Parliament, Lollardy, Benevolences, Star Chamber, Head of the Church, Propheysings, Hampton Court Conference, Impeachment, Solemn League and Covenant, Cabal, Whig, Calendar Act, Economic Reform, Extension of the Franchise, Imperialism.

(3) What wars has this country waged with the French or Dutch? Mention the principal results of each.

College of Preceptors.

SECOND CLASS, 1066-1603 A.D. (1½ hours.)

(1) What part did the following persons play in English history: Robert of Normandy, Thomas of Canterbury, Stephen Langton, Simon de Montfort, Piers Gaveston, John Duke of Bedford, Cardinal Wolsey, Cranmer, Sir Francis Drake?

(2) Write briefly what you know of: Domesday, Magna Charta, the Black Death, the Peasants' Revolt, the Star Chamber, the Statute of Appeals.

(3) Give a short account of the Wars of the Roses.

(4) How or why did the following kings come to the throne of England: Stephen, Henry II., Henry IV., Edward IV., Henry VII.?

(5) What foreign possessions were held by (a) Henry II., (b) Edward III., (c) Henry V.?

THIRD CLASS, 1066-1603 A.D. (1½ hours.)

(1) Write not more than three or four lines about each of the following: Henry I.'s daughter Matilda, Thomas Becket, Llewellyn, Piers Gaveston, the Black Prince, the King Maker, Perkin Warbeck, Thomas Cromwell, Lady Jane Grey, Sir Francis Drake, Shakespeare.

(2) When and where were the following battles fought? who won and who lost them? Tenchebrai, Standard, Evesham, Bannockburn, Sluys, Agincourt, Wakefield Green, Stoke, Flodden.

(3) Write short accounts of Magna Charta, the Peasants' Revolt, Mary Queen of Scots, and the defeat of the Armada.

Oxford Locals.

SENIOR. 1399-1603 A.D. (1½ hours.)

- (1) Describe the powers and privileges of the House of Commons under the Lancastrian kings. What was the effect on them of the Wars of the Roses?
- (2) What were the reasons of Henry V.'s success in France? and of the subsequent failure of the English there?
- (3) What persons is Richard of Gloucester believed, rightly or wrongly, to have "removed"? Why were they in his way?
- (4) What part did England play till 1603 in the exploitation of America and the Indies?
- (5) Summarise the work of the Reformation Parliament 1529-1536.
- (6) Give some account of social changes in England in the latter half of the sixteenth century.
- (7) What parties opposed Elizabeth's government at home? State shortly their respective principles.

JUNIOR. 1399-1603, A.D. with special reference to "Elizabeth." (1½ hours.)

- (1) State briefly the importance of the following in English history: Sir John Oldcastle, John Duke of Bedford, Caxton, Perkin Warbeck, Cardinal Wolsey, Cranmer, Burleigh, Drake, Raleigh, Sir Philip Sidney, Shakespeare.
- (2) Give a general account of the Wars of the Roses.
- (3) What do you know of Elizabeth's Acts of Uniformity and Supremacy and of the High Commission Court?
- (4) Write a life of Mary Queen of Scots.

Cambridge Locals.

SENIOR. 1215-1509 A.D. (1½ hours.)

- (1) From what evils did England suffer in the reign of Henry III.?
- (2) Describe the composition of the Model Parliament of 1295.
- (3) Summarise the campaigns in Edward III.'s wars with France.
- (4) What were the relations between "Burgundy" and England in the fifteenth century? Illustrate by reference to specific events.
- (5) Give some account either of Wiclif or the Lollards or of the causes of the Peasants' Revolt.
- (6) Show by genealogical tables and otherwise the claims of Henry IV., Edward IV., and Henry VII. to the English throne. What rivals had they respectively?

JUNIOR. 1215-1509 A.D. (1½ hours.)

- (1) Explain briefly the following phrases: Provisions of Oxford, Lords Ordainers, Model Parliament, Lords Appellant, Peasants' Revolt, Benevolences, Star Chamber.
- (2) Where and when were the following battles fought? who won and who lost them? Lincoln, Lewes, Falkirk, Sluys, Shrewsbury, Agincourt, Wakefield Green, Barnet, Stoke.
- (3) Make a genealogical table, introducing all the Kings of England from Edward III. to Henry VII.
- (4) State briefly what the following did in English history: Hubert de Burgh, Piers Gaveston, the Black Prince, Wiclif, Caxton, Archbishop Morton, Perkin Warbeck.

RECENT SCHOOL BOOKS AND APPARATUS.

Classics.

Clement of Alexandria. Miscellanies, Book VII. The Greek Text, with Introduction, Translation, Notes, Dissertations, and Indices, by the late F. J. A. Hort, and Joseph B. Mayor. cxi. + 455 pp. (Macmillan.) 15s. net.—We offer a hearty welcome to this able book, both on its own merits and because it may serve to call attention to a much neglected writer. In this country, hardly anything has been done for Clement since the time when Potter, nearly two centuries ago, brought out what is still the standard edition. We do not wish to disparage articles in cyclopædias and reviews, but we speak now of serious work, which should always be an attempt to make the way easier for future students. And since all study of Clement must be based upon the text, until that is placed on a satisfactory basis no scholar can be sure that his work will last. Mr. Barnard in 1897, with his text of "Quis dives," made a good beginning; and if Prof. Hort had lived he might have done something substantial. But the upshot of all is that Germany has taken the opportunity, and a writer who seemed peculiarly an English possession will shortly pass away from us. Future students of Clement, however, and of patristic Greek generally, will find much help in Mr. Mayor's excellent analysis of certain syntactical peculiarities of his author, such as the use of *ὄν*, which is treated in an appendix, and other topics less fully examined. An Introduction discusses the relation of Clement to Greek philosophy; and if Mr. Mayor is not prepared to place Clement so high as some authorities (e.g., De Faye, for whom Clement is *le véritable créateur de la théologie ecclésiastique*), he recognises the wide philosophical and religious interest of his author, and his influence on the Church. He is hardly less important for the ecclesiastical archaeologist. The student will find light in the notes on the Agape, Presbyters, and Deacons, and other such matters; but this is only one of Clement's many books, and the whole body of them is of high importance. We hope this book will lead some young scholars to make a serious study of Clement as a whole. There are full indices of quotations, and of all the important Greek words.

Livy. Book XXII. By G. G. Loane. xix. + 221 pp. (Blackie.) 2s. 6d.—The notes in this edition are commendably brief, but many of them are unnecessary: e.g., "*cui = ei a quo, a dat. in com.*" (p. 110, cf. p. 98); "*iugis isdem, ablative of way by which*" (p. 117), and others. We do not like the author's style in the introduction, nor his allusions to Kruger (p. 104). No references are given for the illustrations. The enquiring schoolboy will probably gather from that opposite p. 76 that there were fourteen Vestals.

Caesar's Gallic War. Book VII. Edited by John Brown. xlv. + 130 pp. (Blackie.) 2s. 6d.—We have nothing to add to our remarks on Mr. Brown's editions of the earlier books. This is of the same character, above the average of modern schoolbooks. The Introduction is good, and so are the notes generally; there are some useful illustrations.

Quintus Curtius Rufus. VIII. chaps. ix.-xiv. Edited by C. J. Phillips. xxiii. + 79 pp. (Macmillan.) 1s. 6d.—The book is well chosen for its purpose, and the notes on the whole good; but there are some of them which seem to be rather meant for the teacher than for the taught. For schoolboys the references to McCrindle's excellent book on Alexander are not suited. The teacher ought to have the book, and to read out of

it to his boys; but all the schoolboy needs in the way of notes would be just sufficient help where the Latin is too hard for his powers.

Thirteen Satires of Juvenal. Translated into English by S. G. Owen. xix. + 120 pp. (Methuen.) 2s. 6d.—Many scholars on reading Prof. Mayor's versions of Juvenal given in his notes must have regretted that he has not published a version of the whole in his vigorous English. But that apparently is not to be; which is a pity, because just that command of the vernacular which is necessary is very rare in these days of journalese. The student has to be content with J. D. Lewis, whose rendering is wonderfully accurate but generally bald and without pretensions to literary style. Another translation mentioned by Mr. Owen in his preface, by S. H. Jeyes, and commended by him, is not known to us. But Mr. Owen's is undoubtedly an improvement on Lewis's; if not trenchant and strong like Mayor's work, it is at least pleasing to read, often clever, and correct. Mr. Owen's ear for rhythm and assonance seems to be defective, and this robs the style of distinction: take this, almost at random—"recalling forcibly the lolling Maecenas, some signatory to a forgery;" or, "the steward securing his pickings." It is easy to see how these might be improved. "Lyonesse" seems rather an affected rendering of "*Lugulunum*." We noted one vulgarism, "*like one models*" for "*as*" (p. 46). But Mr. Owen's scholarship is beyond question, and his critical judgment sufficiently shown in his edition of the text in the Oxford *Bibliotheca*. There is a short Introduction, where Mr. Owen estimates Juvenal's place in literature. The estimate is, we think, too high: he thinks Juvenal the chief satirist of the world, and "a poet in the highest sense of the word."

T. Lucreti Cari. De Rerum Natura, III. Edited, with Introduction, Notes, and Index, by J. D. Duff. xxiv. + 111 pp. (Pitt Press Series.) 2s.—This is a very good book. Mr. Duff knows his Lucretius, and does not bow unreservedly even to Munro. He has, moreover, used the labours of that capable scholar, Giussani, and his notes are not a mere *réchauffé* of other people's. We are not sure, however, that he was well advised to follow Giussani in transposing 526 ff., which here come after 669. No doubt they are better fitted for that place; but editors have been too anxious to find perfect logic in a work which the author left incomplete. Hear Mr. Duff's own words (p. xviii.): "I am more inclined to believe that, if Lucretius had lived to finish and revise his poem, we should not now find all these arguments in their present shape and order." But we are glad to be able to commend a scholarly and interesting edition.

The Memorabilia of Xenophon. Book I. Edited by G. M. Edwards. xliii. + 80 pp. (Pitt Press Series.) 2s. 6d.—If Mr. Duff is original, Mr. Edwards is not; and his book shows the same fault which we noticed in his edition of Book II., an over-great fondness for quotation in his notes, and too much translation. He cannot resist a passage "well rendered by Dakyns." As a whole, the notes are too long. In the *Memorabilia*, a work so important for the understanding of Socrates, a full comparison with Plato is necessary; but the notes might otherwise be confined to real difficulties, of which there are a good many in the book. *πράττοντος* (p. 41) is better regarded as a genitive absolute than as governed by *εἶδεν*. The interesting introduction is repeated, with a few changes, from that of Book II.

Edited Books.

Hamlet. The Picture Shakespeare. 210 pp. (Blackie.) 1s.—Somewhat more interesting from a pictorial point of view than previous plays in this series, and very charmingly presented as a

whole. The notes are useful, especially for young people, and the appendix is fairly serviceable, especially in the concluding critical section, which is really carefully done. Altogether this edition appears to have a distinct use as it proceeds, for the appeal to the eye of young children cannot fail of having due effect, and the explanatory matter is never cumbersome.

St. Matthew. The Revised Version. Edited with Notes for the use of Schools. By Arthur Carr. xx. + 168 pp. (Cambridge University Press.) 1s. 6d.—This is a useful educational attempt to abridge the labour of teachers and pupils in divinity where the Revised Version has already led the way. Mr. Carr's previous work upon the Gospel of St. Matthew is well known, and therefore this volume needs no exhaustive criticism. It is beautifully printed and bound, and arranged in paragraphs, which is a great improvement in the presentation of the text followed in the larger "Cambridge Bible." The most approved results of recent biblical criticism are embodied in the splendid notes; but independent of its intrinsic value, there are three artistic maps incorporated in the text. An edition as remarkable for its elegance as for its high utility.

Macbeth. By M. J. C. Meiklejohn. 164 + xxxi pp. (Holden.) 1s. 3d.—The number of editions of Shakespeare is evidently on the increase. This one is quite up to the average. The introductory matter is very good, the "notes on old or unusual grammar" are worth attention, and the examination papers are serviceable.

Scott's Lord of the Isles. By W. M. Mackenzie. xxxiii. + 161 pp. (Black.) 1s. 4d.—If we remember rightly, this is the third edition of this poem which has passed through our hands quite recently, and it must be said that this is a good one. The introductory matter is really well done, and the notes are somewhat more numerous—and somewhat better, too—than in previous volumes in this series. Eminently a compact, "handy" edition.

Macbeth. By Fanny Johnson. xliii. + 169 pp. (Blackwood.) 1s.—The aim of this series generally involves an interesting and attractive treatment of the story of Shakespeare's plays; and in this case the end is achieved with remarkable success. A more instructive edition of Macbeth has not come into our hands for some time. The notes are numerous, and are adapted to young children rather than to middle or upper forms, but they are well done, though more might have been made of some of them; e.g., "Dollars" on p. 80. The philological element, generally so unnecessary in all but university preparation, is happily not obtruded in these comments. The glossary deserves praise.

Chaucer's Indebtedness to Guido delle Colonne. By G. L. Hamilton. 159 pp. (Columbia Press.) 5s.—This volume is another fine example of the careful and comprehensive nature of American literary scholarship. It is a study of one of the important though little-known aspects of Romance literature. It is but an extended essay or a small monograph, yet it is of great value to Chaucer students.

Thackeray's Esmond. With Introduction and Notes. xxviii. + 479 pp. (Black.) 2s. 6d. *Thackeray's Esmond.* With Introduction and Notes. xxxi. + 444 pp. (Macmillan.) 2s. 6d.—Another novel turned into a reading book. It must be admitted that the attempt to make Thackeray a school subject is not so successful as is the case with Sir Walter Scott. The novel of manners or of character by its very nature is somewhat beyond the comprehension of schoolboys and schoolgirls. These particular editions of "Esmond," which is, however, not primarily a novel of manners, have been in both cases commendably well

done. The volume issued by Messrs. Black has the same characteristics as the numerous Scott volumes to which it bears an outward resemblance. It has a map, some engraved plates, and a well-written introductory section in which Thackeray himself figures somewhat too little. The general matter upon the novel as a literary form is rather pretentiously put. Two appendices to this volume are well done. The notes are slight. Messrs. Macmillan's volume gives great attention to Thackeray himself, and devotes a whole section to a sketch of his literary history. The plot and characters of the novel are likewise well done. The notes are numerous and excellent.

Scott's Lord of the Isles, Canto VI. 40 pp. Also, *Canto II.* 32 pp. *Couper's Task, Book V.* 40 pp. (Blackie.) 2*d.* each.—Three trifles presenting in a highly condensed form a large amount of matter. The notes are chiefly simple explanations of antiquated words and usages.

Kingsley's Heroes. By E. H. Blakeney. 231 pp. (Blackie.) 2*s.* 6*d.*—Yet another edition of this celebrated book! The editorial additions are limited to some very simple notes. Fairly good as a reading book.

King John. Picture Shakespeare. 156 pp. (Blackie.) 1*s.* 6*d.*—Excellent illustrated; the notes good; and for the rest, well up to the standard of previous plays issued in this series.

History.

A First History of England. By Mrs. Cyril Ransome. xxiv. + 408 pp. (Rivingtons.) 2*s.* 6*d.*—Mrs. Ransome here tells the story of our country from prehistoric times to the present day in a pleasant and easy style, on the usual lines. The constitutional aspects of the story are treated rather fitfully, some points being taken in detail and others all but totally omitted. Either because of, or in spite of, the many years the book has been in preparation, some passages are not in accordance with the latest information, while others show acquaintance with recent research. There are genealogical tables, an index and some forty illustrations, either portraits of sovereigns and others, or reproductions of historical paintings.

Days and Deeds. By S. W. Howson. xvi. + 182 pp. (Rivingtons.) 3*s.* 6*d.*—This is a "Calendar of Anniversaries with short explanatory notes." The events thus arranged calendar-wise are mainly, though by no means entirely, from English history, and besides the notes there is an index. It is the embodiment of a quaint idea, and may interest many of our readers.

Analysis of English History. By W. C. Pearce, S. Hague, and W. F. Baugust. vi. + 232 + 30 + 40 pp. (Murlby.) 1*s.* 6*d.*—We believe this book has already been through several editions, and this, its latest, has been enlarged and revised. It is, we should think, the best of its kind. Nearly all the passages which we have examined are correct according to the latest information. It is provided with tables, maps, biographies, and selected questions. And if teachers are content to put such "Analyses" into the hands of their pupils, or are able to supplement their pages with teaching in history, they cannot do better than provide their pupils with this little volume.

History for Graded and District Schools. By E. W. Kemp. xiv. + 537 pp. (Ginn.) 4*s.* 6*d.*—This book is apparently intended for the teacher only, not for the scholars. The subjects treated are those events in world history which have affected the growth of American institutions. Thus, after speaking of early Aryans, Greeks, Hebrews, &c., it gradually narrows down to the settlement of the New World and the growth of the "American

nation." From the preface we gather that the children are to act out the life of their ancestors, to understand why and how, e.g., the Aryans progressed in the arts of civilisation. As the course is intended for scholars "from six to fifteen," we take leave to doubt if the average six-year-old can live up to such ideals. But, as the writer assures us it has been done, we can only wonder at the precocity of his pupils.

An Introduction to the History of Western Europe. By J. H. Robinson. x. + 714 pp. (Ginn.) 7*s.* 6*d.*—We noticed the first part of this work in our April number. Prof. Robinson has now continued the story to the present day. While it was not possible to give much detail in the space afforded, this will prove a useful "introduction" for beginners, and suggestive for all.

Mazarin. By A. Hassall. xv. + 187 pp. (Macmillan.) 2*s.* 6*d.*—We do not think this biography maintains the high level of the series of "Foreign Statesmen" of which it is a part. Mazarin's early career is dismissed in less than two pages. There is much strange repetition; sometimes the same information or comment is given twice over in succeeding paragraphs. The construction is often careless, and once, at least, a sentence is hopelessly ungrammatical. It is true that it may be difficult to tell in a clear way the internal and external policy of Mazarin, with their constant interaction, but Mr. Hassall apparently makes little attempt to do so, and the want of an index leaves the reader in a hopeless state of confusion.

Report on the Teaching of History in the Schools of Germany and Belgium. By M. E. Woods. (Macmillan.)—In its seventy pages will be found an abundance of information, specially as to the teaching in girls' schools. It is interesting to see the effect of the difficulties of continental countries, with rival religious creeds, rival languages, &c., on the teaching of history. While English teachers will not need to imitate their methods, they will find here many useful hints and suggestions.

Macmillan's New History Readers, Primary. viii. + 136 pp. (Macmillan.) 1*s.*—Here we have twenty-eight stories told us for children of eight or nine, with pictures. We do not look in such books for exactness, and the stories range from Arthur to the recent Coronation.

Messrs. Cassell send us "Books" 3-7 of the *Scholar's Companion* to "Things New and Old." 2*d.* each. They consist of summaries of the lessons in the corresponding large books. (32 pp. each.)

Geography.

Europe. By F. D. and A. J. Herbertson. xxiv. + 299 pp. (Black.) 2*s.* 6*d.*—Our readers are probably familiar by this time with the characteristics of this series of geographical anthologies; if not, they ought to be. The present volume contains 146 extracts from the works of well-known travellers and writers dealing with Continental Europe—though, by the way, we have found no reference to Denmark. The editors have displayed considerable judgment in the selection of illustrative passages and in the proportion of space devoted to the several regions. Most of the pieces will be found suitable for teaching purposes, but a few, descriptive mainly of bits of natural scenery, will not make a very strong appeal to the average schoolboy. On the other hand, such descriptions as those of Paris, Madrid, the Föhn Wind, Russia in Europe, some characteristics of the North German Plain, and many others, provide abundant material for the due recognition and appreciation of causal sequences which is one of the chief values of geography as a science.

Descriptive Geography from Original Sources. By F. D. and A. J. Herbertson. xxxvi. + 298 pp. Illustrated. (Black.) 2s.—The latest volume of this well-known series commences, like its predecessors, with an introduction, which is an accurate and concise geographical description of the continent; it serves as a key to what follows. The body of the book consists of carefully selected extracts from the works of well-known, trustworthy writers. Such names as Brehm, de Windt, Freshfield, Sven Hedin, to mention a few, will give a good idea as to the extent to which the anthology can be relied upon. To the enthusiastic teacher of geography, probably one of the most welcome features will be the exhaustive bibliography at the end of the book. He is there shown the whole field upon much of which the copyright laws have prevented the authors from trespassing. The editors, in their modesty, prefer not to indicate to teachers the best method of using the book; a reviewer may be more daring, and we have no hesitation in saying that most teachers will find it necessary to familiarise themselves with the facts before deciding how best to present them. They cannot have a greater inducement to do so than is afforded by this capital book of extracts.

A Short Commercial Geography. By L. W. Lyde. viii. + 287 pp. (Black.) 3s.—A commercial geography without columns of statistics is something to be grateful for, but Prof. Lyde deserves more than this commendation for the book he has written. From the first page to the last it bears evidence of being the work of a teacher, especially in its continuous demand upon a boy's powers of reasoning. The products of each country are shown to be primarily dependent upon climate and slope, and the connection between the location of towns and harbours and the centres of activity is clearly exhibited. We are inclined to think that Prof. Lyde enters into detail too much occasionally, as, for instance, when, on p. 210, he says, "Metal work is a speciality in Tokyo (gold, silver, and bronze), and Osaka (bronze); china in Nagoya (and its 'suburb' of Seto), Kyoto, Osaka, Kagoshima ('Satsuma' ware), and Arita ('Imari' ware); cloisonne enamel in Kyoto and Nagoya, and tortoise-shell in Nagasaki."

Globe Geography Readers. Introductory. vi. + 119 pp. 1s. Junior. vi. + 194 pp. 1s. 4d. By V. T. Murché. (Macmillan.)—These two readers will interest very young children, for whom they are intended. The smaller one deals with common out-of-doors phenomena, the other with the various forms of land and water. By the time they have finished the Junior Reader the children are ready for an explanation of the meaning of "geography." There are numerous illustrations, both plain and coloured, some of the latter being very gorgeous.

Several "Up-to-date" *Annotated Commercial Maps.* By W. H. Breeze. (Leicester: Midland Educational Company.) 2s. per dozen.—Each is printed on a card, 8 × 9½ ins., and includes descriptive letterpress. On the reverse side are tables of the metric-system, foreign coinage, and post-office charges.

Science and Technology.

Practical Exercises in Light. By Dr. R. S. Clay. 183 pp. (Macmillan.) 2s. 6d.—These exercises are suitable for candidates working for the advanced stage examination in Light of the Board of Education, and also, with a little supplementing, for those taking the pass B.Sc. of London University. The various chapters deal with pin experiments, mirrors and lenses, the optical bench, optical instruments, deviation and dispersion, photometry, the eye, interference and diffraction, Newton's rings, and polarised light. Experimental work in optics has hitherto been handicapped in many institutions by the elaborate and expensive nature of the apparatus required. Dr. Clay is

to be congratulated on introducing so many important experiments for which the apparatus is extremely simple and yet efficient; for example, the demonstration of interference bands with a bi-prism and a simple wooden optical bench would have been regarded a few years ago as impossible. It is also remarkable how many phenomena can be observed fully by means of a few pins and simple glass appliances. An interesting graphical method of solving the equations for the focal lengths of lenses is given in chapter iii., and it would have been advantageous if a mathematical proof of the method had been inserted. The illustrations (155 in number) are excellent, and have been drawn specially for this book. The volume is a most successful piece of work, and fills a conspicuous gap in our literature on experimental physics.

Official Report of the Nature Study Exhibition and Conferences. 307 pp. (Blackie.) 2s. 6d. net.—The work of the Nature-Study Exhibition Association has already been described at some length in these columns, so that it is unnecessary to give the contents of this useful book in detail. The report of the Executive Committee, which runs to 62 pages, will prove of great assistance to teachers anxious to acquaint themselves with the different ways in which the study of Nature has already been taken up in schools of different grades in various parts of the world. The addresses delivered at the five conferences held in connection with the exhibition will serve admirably to explain what directions should, in the opinion of some of our highest authorities on the subject, be given to future efforts to make the education given in schools less bookish and of more direct practical value to children in after life. We recommend all teachers of science in schools to procure a copy of the volume.

Agricultural Geology. By J. E. Marr, F.R.S. xi. + 318 pp. (Methuen.) 6s.—A perusal of this book convinces us that there is little difference between agricultural and ordinary geology. Leaving on one side the introduction and an occasional paragraph at the beginning of chapters, there is little difference between Mr. Marr's treatment of elementary geology and that of many other writers. It is almost needless to say that the information is always correct and conveyed in easily understood language—Mr. Marr's reputation is guarantee enough for this. The illustrations are very unequal. Some are little more than would serve as rough blackboard sketches, while others are well-reproduced and helpful pictures. The two chapters on geological maps and sections will prove of the greatest assistance to students. The title may prove misleading to teachers.

Chemical Exercises for Class-room and Home Study. By R. P. Williams. (Ginn.) 1s. 6d.—This book takes the form of a reporter's notebook. At the top of alternate pages about half-a-dozen questions are printed, and the rest of this page and the whole of the next are blank for the insertion of the pupil's answers. The pages can be easily detached, so that the teacher may collect them and take away the answers for correction. The weird spelling common in many American books of chemistry—e.g., "sulfur," "sulfid," "iodid," "carbide," "sulfates," &c.—will interfere with the use of the book in this country. Moreover, it is doubtful whether the trouble of indicating exercises in the text-book is great enough to warrant the introduction of another special book into schools.

Quantitative Chemical Analysis. By Frank Clowes and J. B. Coleman. xxiv. + 602 pp. (Churchill.) 10s.—It is unnecessary to praise this book, which has now reached its sixth edition and is well known in most chemical laboratories. It is, however, worth while to point out that the opportunity of a new edition has been taken to revise the section on organic chemistry and to add paragraphs on the processes for determining mole-

cular weight by elevation of boiling-point and for the analysis of aluminium alloys. Tables of four-figure logarithms have also been introduced.

A Short Manual of Inorganic Chemistry. By A. Dupré, F.R.S., and H. W. Hake. xv. + 391 pp. (Griffin.) 6s. net.—This is a re-issue of the third edition of an already popular manual of chemistry. In its less expensive form the number of students to whom the treatise will serve as an introduction to an important branch of science should be much increased.

Real Things in Nature. A Reading Book of Science for American Boys and Girls. By Dr. Edward S. Holden. xxxviii. + 443 pp. (New York: The Macmillan Company.) 3s. 6d.—It is true that science cannot be taught by reading alone, and Dr. Holden fully recognises this fact, for by frequent hints he seeks to encourage the reader to experiment for himself. After some preliminary study the young student of science cannot make much progress without reading widely and wisely. In this part of his work the pupil will find the book before us an entertaining and helpful guide. It is profusely illustrated, clearly printed on good paper, and altogether attractive.

A Course of Simple Experiments in Magnetism and Electricity. By A. E. Munby. 90 pp. (Macmillan.) 1s. 6d.—This book is intended as a laboratory guide for junior boys preparing for the Lower Certificate of the Oxford and Cambridge Board or similar examinations. The author, while apologising for the addition of a text-book to the legion of existing text-books on practical physics, maintains that the possibilities of reducing the cost of apparatus have not hitherto been exhausted. This idea has evidently been borne in mind in all the experiments described, but there is a danger of carrying it to excess. In any case, the instruction given is on proper lines, and would afford a sound knowledge of fundamental facts. The text describes eighty-six experiments, and is illustrated by seventy-two reproductions of diagrams and photographs: the latter are somewhat small and not always distinct. It is dangerous to instruct a student to make use of the terminals of an electric-light supply in order to observe the potential difference by means of a gold-leaf electroscope (p. 48). Also, it is doubtful whether the magnetic field round a wire carrying a current from a single primary cell can be satisfactorily detected by means of iron filings (p. 76).

Mathematics.

Short Cuts and By-ways in Arithmetic. By C. Burch. x. + 108 pp. (Blackie.) 2s.—Evidently written as a labour of love by an amateur arithmetician. It is quite refreshing to read a book of this kind, so rare nowadays. The author's methods are not so new as he thinks; but they are good, and well explained, and the illustrations and digressions are humane and entertaining. Thus the personal anecdote (p. 33) about the conversion of Egyptian to English money shows the occasional practical value of a simple arithmetical "dodge." Again, we have an account of Horner's method, and a chapter on magic squares. This is not a school-book, but would both amuse and interest a school-boy fond of arithmetic, and even his mathematical master, if he is not a superior person. The short chapter on circulating decimals is very ingenious, and probably the most novel part of the book.

The Elements of Geometry. By R. Lachlan and W. C. Fletcher. xii. + 208 pp. (Arnold.) 2s. 6d.—The order of treatment is as follows: angles and parallels, triangles, parallelograms, proportion and similar figures, the circle, areas, analysis of problems, maxima and minima. Parallel lines are defined to be those which have the same direction. The

difficulty of incommensurables is simply ignored by assuming that any two quantities of the same kind have a common measure. This, we think, is a serious mistake: in other respects the book may be recommended. Some of the text and some of the examples are only suited for exceptional boys: but there are numerous easy and practical exercises. The answers are sometimes given to a degree of accuracy which could not be obtained by actual measurement (e.g., II., 16, 18). In the proofs abbreviations are used rather freely. The print and figures are good. Altogether this is a book which represents the attitude of the advanced reformers.

An Elementary Treatise on the Mechanics of Machinery, with special reference to the Mechanics of the Steam-engine. By J. N. Le Conte. x. + 312 pp., and fifteen plates. (Macmillan.) 10s. 6d.—Part I. is introductory and treats of instantaneous centres and centrodes. Part II. deals with kinematical gearing—links, friction wheels, belts, toothed gearing, bevel wheels, cams, &c. This is all very interesting, especially the chapter on toothed wheels. Part III., in two chapters, is on the steam-engine. Chapter I. is kinematical, and gives both graphical and analytical discussions of the motion of the piston-crank chain and of the valve-gear. Chapter II. discusses the stresses at the principal connections, the theory of the fly-wheel and governor and (in outline, with simplifying assumptions) the problem of counterbalancing. The results of theory are illustrated by tables and graphs constructed from data supplied by actual engines. The author's explanations are quite clear, if read with attention, but he does not waste words; similarly the figures are well-drawn and engraved, but the scale is rather small sometimes. Undoubtedly this is a good book, which engineering students of the better class will find very helpful and suggestive.

The Elements of Plane and Spherical Trigonometry. By T. U. Taylor and C. Puryear. 160 + 68 pp. (Ginn.) 5s. 6d.—A practical work of a very good type. The text and examples seem admirably adapted for the technical student who is going to be an engineer, astronomer, or surveyor. More attention than usual is given to the details of computation: there is a chapter on land-surveying; and the five-figure tables at the end (Wentworth & Hill's, reprinted by permission) supply all data necessary for most practical applications. It may be noticed that the authors believe in the value of Napier's rules of circular parts.

A Short Introduction to Graphical Algebra. By H. S. Hall. Second edition, revised and enlarged. 50 pp. (Macmillan.) 1s.—This is a great improvement on the first edition, which was rather a poor thing. Figures and examples of the proper type have now been inserted, and Mr. Hall's tract may be recommended without reservation in its present form.

Solution of the Examples in "The Elements of Hydrostatics." By S. L. Loney. 146 pp. (Cambridge University Press.)—Will doubtless be welcome to the teachers and private students for whom it is intended.

Miscellaneous.

Education Law, incorporating the Education Acts, 1870-1902, and other Acts and Sections relating to Public Education, with introductory Statement and Notes. By T. A. Organ and A. A. Thomas. x + 599 + 34 pp. (Butterworth.) 12s. 6d. net.—This is certainly one of the most complete of the numerous manuals dealing with the new Education Act with which we have recently made acquaintance. It contains, in addition to the full text of the Education Acts, 1870-1902, all other Acts relevant to the subject of education. Not only will it be of the greatest

assistance to officers of school authorities and members of local education authorities, but to teachers themselves. Among other matters of vital interest to acting teachers contained in the volume are important rulings in courts of law respecting such matters as the expulsion of pupils for grave offences, the infliction of corporal punishment for out-of-school misdemeanours, similar punishment at the hands of prefects, and other questions of domestic school policy.

The Local Authorities' and Managers' and Teachers' Guide to the Education Acts. By H. C. Richards, M. P., and Henry Lynn. viii. + 341 pp. (Jordan.) 7s. 6d. net.—In view of the number of able and exhaustive treatises concerned with the most recent Education Act and those preceding it which have recently reached us, it is clear that any person called upon to assist to administer the new Act who is not thoroughly acquainted with its provisions has only himself to blame. The book before us takes up every detail of each section of the Act of 1902, and discusses them fully. This particular guide can be recommended with confidence.

The "Tick-Tack" Nursery Clock. (Philip.) 4s. 6d.—All the parts of a simple pendulum-clock are provided, with instructions for putting them together to form a timekeeper. The works are of brass, and fit into a wooden case having a plain but attractive face on which the hours are clearly marked. A weight hangs from one end of a chain passing around the chain-wheel, and to wind up the clock this weight is pulled up once a day. The clock can be put together in half an hour by an intelligent child, and when so constructed it will be of permanent interest to the maker. No better present could be given to a boy, and information as well as pleasure will be derived from it. The instructions for putting the parts together have been printed in Germany and need revision, especially the paragraphs referring to the fitting of the minute and hour wheels. It is a pity to let such an interesting piece of work as the construction of a real clock be under the disadvantage of a badly-composed set of instructions.

J. O. Jones, and How He Earned his Living. By R. S. Warren Bell. vi. + 344 pp. (Black.) 3s. 6d.—J. O. Jones is an athletic young man—six feet, broad shoulders, fourteen stone—who after an unsuccessful year as a medical student, and another as a tea-planter, obtains a post as assistant-master in a proprietary school where boys are received without any questions being asked. He is appointed at a salary of £100 a year and at the end of the first term is appointed headmaster at £300 a year, the proprietor and former head having lost his reason as the result of nervous collapse. J. O. wins the hearts of the boys by good play in the semi-final for the local cup, and by being selected to play against Scotland. He also wins the headmaster's daughter in the last chapter. The other assistant-masters are of mixed characters and degrees of refinement, and there is a remarkable parlour boarder who does many improbable things. There is, however, no lack of incident in the story, which is just the kind approved by boys.

Teacher's Handbook of Manual Training. Metal Work. By J. S. Miller. xii. + 147 pp. (Whittaker.) 3s. 6d.—This book contains thirty-eight model lessons suitable for instructing boys in ordinary workshop-tools and processes. A collection of drawings of examples to be executed is included. A preliminary acquaintance with scale drawing is recommended, and should be insisted on, as well as the proper methods of dimensioning drawings, a point in which some of the examples given could be improved. On pp. 41 and 67 are illustrations of machines which have dangerous parts unguarded. On p. 36, in describing the action of a fly-press, a statement is made that "the ball is simply a weight which gives additional power to the

lever." Surely the function of the ball could be presented in a less misleading way. Instructions for marking-out and for drawing the exercises are promised in an additional volume. Many teachers will find the hints contained in the book useful.

Macmillan's Story Readers. By Evelyn Sharp. Book I. vi. + 123 pp. 10d. Book II. vi. + 151 pp. 1s.—Miss Evelyn Sharp certainly knows how to secure the attention of young children. These "Story Readers" will transform the reading lesson into a periodical treat to be anticipated eagerly. The interest of the stories and the exquisite charm of the illustrations will at once secure the enthusiastic attention of the pupils.

Macmillan's Spelling for Promotion. Junior: Parts I. and II. By R. F. Macdonald. 2d. each.—The child who learns to spell with the assistance of these booklets of Mr. Macdonald will accomplish the task with a minimum of trouble.

The Reform of Moral and Bible Education on the Lines of Herbartianism, Critical Thought, and the Ethical Need of the present day. By F. H. Hayward, D. Litt. i. + 248 pp. (Swan Sonnenschein.) 4s. 6d.—This book, as we should have expected, is interesting from cover to cover; and the best way of giving the reader a notion of its contents is to summarise them and to keep our criticism for the last sentence. Dr. Hayward's motto (printed) is *nec temere nec timide*, and he acts up to part of it. A long preface sets forth the writer's standpoint, which seems to be this. Notwithstanding thirty years of board schools and a hundred years of voluntary schools, the good manners of children are non-existent, and their morals are no better than they should be. This is due to three things: (1) Our total neglect of the science of education (which to him means Herbartianism); (2) our unwillingness to try ethical teaching in the schools; (3) our "monstrosities," *i.e.*, our Scripture syllabuses. Believing that virtue can be taught and that a reformed teaching of the Bible is the only way to save the Bible, the writer gives very interesting suggestions on ethical and Biblical work. He would not separate the two, but he would use only those parts of the Bible which can safely be considered to be good both for the moral and religious nature. He would go to Germany for model Bible work, and to Birmingham for ethical syllabuses. We hope Dr. Hayward will not consider us as belonging to the enemy. There was, indeed, room for his book, and with the main contentions we are wholly in agreement. The book is a thorough fighting book, and would, if read at a Church congress or Wesleyan conference, produce a useful uproar. But would not the book gain by being greatly condensed; and (here we come to an important point) is it wise to disgust fair-minded opponents, as we fear this book will do, by fighting without the gloves?

Dante and Beatrice. A Play. By Emily Underdown. 48 + xviii. pp. (Swan Sonnenschein.) 2s. 6d. net.—As "Norley Chester" Miss Emily Underdown is well known by two previous books to Dante lovers. The idea of this play, as a means of still further stimulating interest in Dante, is by no means ill-conceived. It is founded on incidents taken from the "Vita Nuova" of the great poet, and these are clothed in graceful English and then supplied with a great mass of stage-manager's information, whereby the acting of this little play should be rendered somewhat easy. Full directions (with diagrams) are given as to the stage, its lighting, the necessary costumes and properties of every description, and (handiest of all) diagrams mark the positions in each tableau. At the end, some suggestions are given for incidental music, which probably could be improved upon; though this is a question of personal taste, and the number of persons gifted with literary perceptiveness who are also sound judges of musical matters is rather small. The whole is a complete and delicate tribute to Dante

done with scholarly skill and loving care. The figure-plates are numerous and excellent; and altogether every possible trouble is saved to those who would produce the play.

Philips' Comprehensive Object-Lesson Cabinet. Arranged under the direction of Prof. R. A. Gregory and J. A. Humphris. Over 100 specimens in twelve separate sets, or complete in box for £2 15s. Polished wooden cabinet, with drawers for same, £1 5s. net.—It is impossible to attach too much importance to the value of suitable material with which to illustrate object teaching. In this collection the teacher has the advantage of the help of experts in making his selections. In twelve well-considered sets, each complete in itself, will be found what is necessary for giving many good object-lessons. Various general and specific properties, as well as the nature and uses of common mineral, vegetable, and animal substances in a raw and manufactured state, may be demonstrated. Judging from the specimens before us, the whole collection may be confidently recommended.

Interest and Education. By Charles DeGarmo. xi. + 226 pp. (Macmillan.) 4s. 6d. net.—Professor DeGarmo's motto is "Interest is the greatest word in education," and throughout this very American book we never lose sight of enthusiasm. The book might be called an antidote to educational dullness. It is impossible, perhaps, for the writer on such a subject to say anything new; but here we have the old truths put so convincingly that a teacher might rise from a perusal of the book and solemnly swear never to give another dull lesson. "Don't teach so much," "Don't question foolishly," "Expound well." The most striking passage in the book is that relating to the difference between drudgery and work; and the most revolutionary is that in which this enthusiastic educator condemns the town life for children. One is reminded again and again of the eloquent and indignant words of M. Gustave Lanson: "Ainsi tout ce qui facilite l'instruction affaiblit l'éducation; et mieux on s'instruit aujourd'hui, moins on s'élève." The author falls into a curious mistake in reference to the numbers that play in each side at football in England; but Tom Brown has misled him. The tone of the book does not seem to be very confident in the matter of American education; but hope shines on every page, and makes the whole volume "interesting."

Practical Book-keeping for Commercial Classes. By Walter Grierson. viii. + 124 pp. (Blackie.) 1s. 6d.—This is a well-written little book, though it is hardly what its title asserts it to be. It is too concise in the matter of examples. Forty-seven examples and twelve examination papers are not nearly enough practice on the subject-matter of the book.

Modern Book-keeping and Accounts. By W. Adgie. Part III. Advanced. viii. + 136 pp. (Macmillan.) 2s. 6d.—This volume completes the work on Accounts, which finds a place in Messrs. Hooper and Graham's excellent series of Modern Manuals of Commerce. We can give the work no higher praise than to say that it is worthy of a place in that series. The first part of the volume is devoted to an explanation of, and the mode of recording transactions with reference to, the various classes of a company's capital, ordinary, preference and loan, and the dividends thereon. The distinction between capital and revenue is very well drawn, and the important questions of provision for depreciation, redemption of debentures, &c., by means of reserve and sinking funds, are ably dealt with.

Royal Prince Readers (Fifth Book). 288 pp. (Nelson.) 1s. 6d.—A nicely printed, well-illustrated reader which will un-

doubtedly succeed in interesting boys in the higher standards. The selections are judicious and varied.

Outlines of Metaphysics. By John S. Mackenzie, M.A. Glasg., Litt.D. Camb. x. + 172 pp. (Macmillan.) 4s. 6d.—In studies of philosophy, it is usual, in England and Wales at any rate, to begin with logic and psychology, and to consider metaphysics either last, or often enough, not at all. Hence the name metaphysics gathers a mystery or obscurity which makes the subject regarded as an obsolete investigation somewhat similar to astrology or alchemy. Dr. Mackenzie does not claim that his book will attract the general reader who may be interested in philosophical enquiries. We rather hope that it may. Nothing, it seems to us, is more desirable for the young student than to catch a glimpse of the various problems and fields of enquiry which belong to the philosophical domain. The student who begins with logic and psychology might well know what the province of metaphysics is, and it is to an introduction to the subject precisely that his attention ought to be called. However, Dr. Mackenzie's aim seems rather to be to state for the professed student of metaphysics, as simply as may be, the nature of metaphysical problems in the light of recent constructive work, particularly in England. The writer has, as he states, endeavoured to avoid alluding to the various problems as if they were "specimens in a museum," and avoids any suggestion that his book can be anything but an adumbration of the works to which it is an introduction. His aim has been "to produce a book which is a living unity within itself, and yet points continually outwards to the larger life of the speculative thought of the world." Perhaps no subject is more difficult to deal with than metaphysics in such a spirit. For it is emphatically concerned with criticism, and yet what is wanted by the student accustomed especially to scientific enquiry is a definite body of systematised facts. He has to learn to be contented with mental discipline as a result of his labours. Yet here we have an introduction which attempts in a short space to lay open the ground, which can only bring about the reward of mental discipline by traversing that "larger world of the speculative thought of the world." The method of treatment adopted is genetic, as to which Dr. Mackenzie says: "I am more and more convinced that we cannot hope to understand any living thing except by considering how it grows; and I am also more and more convinced that nothing is more truly alive than human thought." The book is a compact, helpful, and, we may add, that Dr. Mackenzie shows himself an earnest guide for the student of metaphysics.

The Teaching of English. xxi + 411 pp. By Percival Chubb. (The Macmillan Company.) 4s. 6d.—It is an indisputable fact that the teaching of the mother-tongue is systematised far more thoroughly in America than it is at home; hence we have read with interest what Principal Chubb has to say on the subject. It is, of course, impossible to do justice to any work of this kind in a short review, but we may at once say that this book is one that should be read and re-read by every teacher of English in the country. The author's main contention is the essentially organic process involved in the teaching of the subject. For instance, if we interpret him correctly, the fault lies with the teacher or the system when Tommy, aged four, revelling in "Ride a cock-horse" on his mother's knee, develops into the Thomas of fourteen who finds Shakespeare boresome and cannot hear the funeral knell in Tennyson's "Ode on the death of the Duke of Wellington." In the light, then, of organic unity, the teaching of Reading, Composition, and Literature in all grades—from kindergarten to high school—is reviewed, and he will be a poor teacher who will not find Principal Chubb's book a complete storehouse of information, illustration, and suggestion. We have found the chapters on Reading, Writing, and Composition in the lowest grades most interesting and suggestive.

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.

French Pronunciation.

MR. DE V. PAYEN-PAYNE is doing good service in calling public attention, through the medium of THE SCHOOL WORLD, to the shortcomings of examinees in the matter of their pronunciation of French, and I do not think I can do better than follow such a good example.

(1) To begin with the alphabet, a very important matter, and scarcely receiving the attention it deserves. With my own pupils I make a point of always giving the letters of the alphabet their French names, insisting throughout on spelling French words as a Frenchman would do. Of course the greater number of letters offer no difficulty, *q* and *u* being the only really foreign sounds, and even here the *u* sound is the same in both letters.¹ Much practice is required before this sound is correctly reproduced, but the time devoted to it is well spent from the pronunciation point of view. Practice with the *l mouillé* and the nasal sound comes afterwards. It seems to me self-evident that the more nearly the pronunciation of the letters themselves assimilates to that of a Frenchman the pronunciation of the words will be improved.

(2) A source of great difficulty to English students of French is to be found in the *liaisons*. As everyone knows in English the pronunciation of a word is fixed, whatever its position may be in a sentence; but with many words in French it is not so (with a few exceptions), and very often the pronunciation of a given word varies according to whether the following word begins with a vowel or *h* mute. Practice is the best teacher in this respect, but I should like to quote here a few lines from that useful annual, the "Almanach Hachette" for 1903 (p. 308). Students will do well to learn them by heart. They come with none the less appositeness and authority because not specially addressed to foreigners; on the contrary, I think. Nor is it to be expected that the whole subject can be condensed into half-a-dozen lines, but many important points are dealt with, and almost anyone—possibly even some natives—may benefit by the advice given.

"Les liaisons des mots entre eux appartiennent à la science de l'articulation. De nos jours les artistes dramatiques ont une tendance à éviter les liaisons: ils prétendent, par là, donner du naturel à leur diction. Il ne faut rien pousser à l'extrême. Le juste milieu est la mesure qui convient en art, et le bon goût prime tout.

"Il faut faire presque toutes les liaisons du D, de l'N, du T, de l'S, du Z et de l'R. On dit: Un grand enfant (grant-enfant); —Il n' en est pas question; —C'est à vous d'en sortir; —Les beautés éternelles; —Pensez à moi; —Finir ainsi!

"Lorsque l'R est suivi d'une ou de plusieurs consonnes finales, la liaison se fait avec l'R et non avec la ou les consonnes finales. Exemples: L'art est difficile, un remords indicible.

Deux ou trois exceptions: Pareuphonie on dira sort heureux,

la mort-aux-rats, et l'adverbe fort fait la liaison avec le *t* toutes les fois qu'il est suivi d'un mot commençant par une voyelle.

"Il y a des cas où il faut éviter la liaison; ainsi lorsqu'un mot doit être mis en valeur, en relief, on le détache."

E. LATHAM.

Viva-Voce Examinations in French.

I THINK teachers and students owe a debt to M. de Payen-Payne for his useful article on *viva-voce* French in your March issue. With regard to his sidelight on the teaching of French in "a well-known public-school," one is tempted to ask whether that also was where the battle of Waterloo was won (*cf.* mythical remark of Duke of Wellington).

But it seems to me that M. Payne might have indicated a principle in his list of common errors, and one might almost say the principle is that the French which examinees speak is English with occasional knobs stuck on at well-known places—like metal tops on wooden railings.

May I suggest that the additional explanation subjoined might be a further assistance to those who are already benefiting by the article.

Head II. Apropos of Nasals. I never heard before coming abroad that the *m* and *n* were not actually pronounced at all, but only by means of a ring given to the vowel preceding. (Delille's French Grammar gives the actual vocal movement.)

Head III. Liaison. I saw the other day a useful hint on liaison, which I venture to reproduce:

"Dans la lecture de la poésie, on fait toutes les liaisons; la prose oratoire en exigeant plus que la prose familière et il y en a plus dans la prose lue ou récitée que dans la conversation.

"M. Francisque Sarcey dit dans ses Chroniques théâtrales du Temps:

"Toutes les fois qu'on peut décentement, entre un mot et un autre, introduire un petit temps, mieux vaut, même dans les vers, supprimer les liaisons.

"Toutes les fois qu'un mot se termine par deux consonnes dont la dernière ne se prononce pas, il est absurde, il est hideux, il est abominable, de faire sonner cette dernière lettre pour la lier la voyelle qui la suit: "mort Taffreuse, cours Zau trépas" sont des prononciations cruellement vicieuses."

"Une histoire. Dans une pièce de Mme. de Girardin, la jeune actrice chargée du rôle de l'ingénue dit les mots 'Nous les avions plantées ensemble,' en faisant sentir l's. Mme. Girardin bondit sur sa chaise.

"Pas d's, Pas d's,' s'ecria-t-elle, "Planté ensemble." Vous n'avez pas le droit de faire de pareilles liaisons à votre âge. Je me moque de la grammaire. Il n'y a qu'un règle pour les ingénues, c'est d'être ingénues. Cette affreuse s vous vieillirait de dix ans. O, l'affreuse s."

I have taken the above from the wonderfully systematic and thorough "Treatise on French Pronunciation" by Prof. André, University of Lausanne. Published by Payot et Cie., Lausanne (price 4 francs), which I believe many would be glad to know.

Ouchy,
Lausanne.

W. M. CONACHER.

International Correspondence.

THE SCHOOL WORLD has always taken an interest in the Scholars' International Correspondence scheme, and I think its readers will be interested in a proposed change in its organisation. Many teachers both in France and England share the opinion

¹ The letter *r* gives a little trouble. I tell pupils to sound the *r* in the English word *air*, and thus obtain the sound of the French *r*.

that the time is now ripe for the teacher to take a larger part in arranging the correspondence than has hitherto been the case.

The reasons for suggesting a change are these :

(1) In the five or six countries chiefly concerned there are *now* a large number of teachers who have adopted the plan of an exchange of letters between scholars, and find that the scheme conduces to progress in the study of the foreign language.

(2) To a certain extent the simple scheme, by which from London, French and English scholars were enabled to correspond and their names printed in France, has done its work, and it is time for individual teachers to arrange to do this work without any intermediary, if a suitable plan can be devised.

The plan suggested is this :

Let the *Revue Universitaire* gather names of teachers as before. I will do the same. Twice a year, in November and May, a list of the names and addresses of those teachers who are interested in the Scholars' International Correspondence will be published, classified as far as possible, and perhaps a small sum would be charged for copies of the list to pay for printing.

Each teacher would then be able to communicate with any other teacher. Supposing a teacher has ten pupils needing correspondents. He should send out five reply postcards, one to each of the schools which he chooses, asking the teacher of it whether he, or she, has a boy (or a girl) willing to correspond with one of his pupils, giving ages within prescribed limits, say, from thirteen to sixteen, or fifteen to eighteen, for instance, and asking about social position and ability in languages. On receipt of replies, he will be able to make some suitable selections at least. He can then send out other reply cards to other teachers, and fill up the remaining vacancies. My experience of the difficulties has suggested this plan. For example, it may happen that I need a correspondent for a boy of thirteen, the son of a doctor; I have in a suitable school a suitable boy, but he is sixteen, and, therefore, will not do. If the whole ten postcards were sent at once a difficulty of this kind would of necessity arise. Two correspondents would then be found suitable for two or three of the ten, and for two or three no suitable ones would turn up. If later on correspondents did not suit, a courteous intimation could be given to the teacher that such and such a scholar preferred a change; but, as a rule, such changes should only be made at the end of the year, or for downright unsuitability. In this way the principle that the letters should be from a *variety of places to each school* could be maintained.

This plan would not mean entire decentralisation, for it would be better that each teacher should send in lists to the central offices to be filed as before, and in various other matters the Central Bureau would have full participation. For example, supposing a teacher, not hitherto interested, desires to make a trial of the plan, it would be better that he should send to the Central Bureau; or if a teacher goes to a new school and wishes to start forty or more at once.

The reply card might be worded thus :

"Dear Sir (or Madam),—Have you a boy (or girl) willing to correspond with one of my pupils? Age from fourteen to sixteen; Form IV.; modern side; fair ability.

"If you have such a pupil, will you kindly send on accompanying card the name, age, and school address?"

This plan would also greatly facilitate an exchange of homes.

I earnestly ask all teachers kindly to answer this letter, telling me, first, if they agree to this plan; secondly, if they can suggest any improvement; thirdly, whether they wish their names to be placed on the list.

E. A. LAWRENCE,

Secretary for International Correspondence.

Mowbray House,

Norfolk Street, London, W.C.

An Addendum.

IN your March issue, the reviewer of my "Elementary Geometry" complains of the excessive price of 4s. The price was changed to 2s. last October, and has been advertised regularly since then, though a few copies were sold previously at 4s. As the criticism referred to would, if unexplained, largely detract from the value of an otherwise favourable opinion, I should be glad if you would insert this correction in your next number.

J. ELLIOTT.

PRIZE COMPETITION.

No. 18.—Most Popular First-Year Books in French.

WHICH six books are most widely used in schools at the present time for the first year's work of pupils beginning the study of French? Answers to this question are required in the competition for this month. Each competitor must send a list of the titles, &c., of **six first-year books in French** that he considers are the most popular ones now in use in schools.

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

We offer two prizes of books, one of the published value of a guinea, the other of half-a-guinea, to be selected from the catalogue of Messrs. Macmillan and Co., Limited. The prizes will be given for the two lists which most resemble that drawn up as a result of the voting of the competitors.

In naming a book, its title, author, publisher and price should be given. Each list of books sent in must be accompanied by a coupon printed on page vi., though a reader may send in more than one list provided each has a coupon attached. Replies must reach the Editors of THE SCHOOL WORLD, St. Martin's Street, London, W.C., **on or before Monday, May 11th, 1903.** The decision of the Editors in this, as in all competitions, is final.

The result will be published in the June number, when the successful list will be published.

The School World.

A Monthly Magazine of Educational Work and Progress.

EDITORIAL AND PUBLISHING OFFICES,
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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.

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SIXPENCE.

A NATURE-STUDY LIBRARY.

By OSWALD H. LATTER, M.A.
Charterhouse.

I AM asked to discuss the question of how a teacher with the sum of five guineas to spend in equipping a library may get the best return for his money. Nature-study is capable of so wide a meaning that some sort of definition is necessary. We shall probably be not far wide of the mark if for our present purpose we limit its scope to those branches of natural science which are, or ought to be, to a large extent conducted out-of-doors; the subjects that usually claim the attention of school natural-history clubs. These are geology (using the term as inclusive of physical geography), botany, and zoology, or the natural history of animals. Nevertheless, it must not be forgotten that it is impossible to proceed more than a very short distance with any one of these three without at least an elementary knowledge of physics and chemistry. They are, in fact, the sciences which deal with the physical and chemical phenomena of the earth and its living inhabitants. There is a type of nature-study which appears to have for its ultimate aim merely the training of the eye to see, the awakening of a more or less æsthetic taste for the beauties of Nature. Far be it from me to disparage the cultivation of these faculties; they are the source of much innocent pleasure and pure enjoyment. The possession of a seeing eye is a prize not to be lightly esteemed. An unsympathetic classical master was recently heard to define nature-study thus: "Oh, they see a beastly bird on a bough and call that nature-study!" Well, it is something to see the bird; many do not. It is more to see it and not throw a stone at it; some do. But it should not be enough to know its name. Its habits, nest, eggs, food, song, enemies; all these and more fairly come within the range of nature-study. Even then how much more is the living thing appreciated by one who has examined a feather, or endeavoured to master its physical characters, and has grappled with the problem of flight and the entire mechanism of the bones, muscles, air sacs, and other organs of the body.

The teacher in charge of nature-study must be

a sort of Jack-of-all-trades, able to point out and lead his pupils to simple problems that require investigation, and to put them on the track of the solution. His mastery over some one particular subject will very properly induce him to make this especially prominent, for in it he will undoubtedly achieve most success. But the more he can link the other subjects to his special favourite the greater will be the number of young minds in which he will touch a responsive chord.

The library must be of the same general character. It, too, is a teacher, but with the advantage that it can include the works of masters of all trades. Geology or physical geography claims first attention. The nature of the soils, the courses of the streams and rivers, the lie of the hills, to a great extent determine the biological features of any district. It is necessary to understand the general principles of geology, and to be able to apply them to the particular set of phenomena within easy distance of the school. For this purpose both maps and text-books are required. Excellent maps, coloured stratigraphically, are published by the Geological Survey in separate sheets at 8s. 6d. each, and Messrs. Bartholomew and Co. have produced cheap (1s.) but most useful maps, reduced from the ordnance survey on a scale of two miles to the inch, coloured to show at a glance the heights above sea level. The colours employed denote altitudes only within certain limits—100 feet or 200 feet, but in addition to the 100-foot contour lines, actual benchmarks are so freely introduced that, with a very little practice, an accurate idea of the configuration of the land is quickly obtained. These two maps may well serve as guides for a series of excursions into the surrounding country, and will give a new interest and purpose to every walk. "Open Air Studies in Geology," by Prof. Grenville Cole, is a model of what such work should be, while Geikie's "Class Book of Geology" and Mackinder's "Britain and the British Seas" open out a wider horizon than that which necessarily bounds the view from the school.

In passing from one geological formation to another there will be a more or less well-marked change in scenery. This is due partly to the lithological differences of the strata themselves, partly to differences in their flora. This leads us on to botany. The study of the distribution of species

of plants in accordance with geological outcrop is almost sure to yield a few interesting results. Hence it becomes necessary to be able to identify plants—*flowering* plants, with the possible addition of ferns, will be a wise limitation. Bentham and Hooker's "Flora," or its more recent equivalent by the latter author, "The Students' Flora of the British Isles," is the book to use. The student is compelled to examine his specimens and learn all their structure before he arrives at the identification. In books where coloured or plain figures are given the name is often obtained from the figure, and the beginner is satisfied. He is apt to forget that he has learnt only a name, and perhaps nothing of the nature of his specimen.

In dealing with flowering plants a host of interesting questions arise relating to the means by which pollination is effected, by wind or by insects. Wind-fertilised flowers are often much neglected: they are seldom conspicuous and have no scent, yet there are many most attractive features in their structure, and nearly all of these can be observed with the unaided eye, or with an ordinary hand-lens. Lord Avebury's "British Wild Flowers in relation to Insects" contains particulars of a number of common flowers and might be made the foundation of a series of most instructive garden experiments. In sowing the seeds and growing the plants from cross- and self-fertilised plants one is necessarily brought into touch with the structure of the seed, its germination, the conditions of its growth, its manner of feeding and breathing—in short, with the whole of plant-physiology. Here we come to work much of which can and must be done on the school premises, perhaps even in boxes in the class-room windows. Two small books, Farmer's "Botany" and Scott Elliott's "Nature-Study" (Plant Life), will be sufficient to provide a very thorough course in this part of the subject, and others germane to it, and much enjoyment will be derived from the botanical chapters of Miall's "Round the Year." A very wide field is open to us when we come to deal with animal life. The local fauna undoubtedly should have first attention. It is influenced both by the geological and botanical character of the neighbourhood, so that there is a real organic connection between all three out-door studies. The selection of books presents great difficulty on account of their numbers and varied modes of treatment. For an intelligent study of animals, some knowledge, at least, is necessary of the working of the animal machine. It is, perhaps, a misfortune that text-books deal chiefly with human physiology and have a *quasi*-medical atmosphere about them. Nevertheless, in the absence of any book devoted to the physiology of the lower animals, Huxley's "Lessons in Elementary Physiology" will give what is required. The pitfall to be avoided is the encouragement of mere collection. I do not say that collections are to be tabooed. There is an instinct for collecting in most children, and that instinct should be guided into rational paths. The chief reason for so many collections being abandoned lies in the

fact that they have been nothing more than unintelligent accumulations of possessions. By all means let children collect whatever animals may interest them, but let them study the living creatures, their habits and life-histories. In the subjoined list I have endeavoured to include those books which will foster this habit. The mere identification of species is of minor importance, and would by itself exhaust the whole of our funds were we to provide books for enabling collectors to name their butterflies and moths, their beetles, bees, shells, birds' eggs, and all the rest. Specialists and museum curators are always most ready to name specimens, and, of course, names are necessary. Kearton's books are admirable examples of bird study, and the camera provides a safety-valve to the egg-hunting mania; while Headley's "Structure and Life of Birds," which goes more deeply into the structure and mechanics, is the work of a successful leader of a school natural-history club, and a book that is not so well known as it deserves. Miall's "Aquatic Insects" should be used by every nature-student. I know no book that better points the way to study living animals. The life-histories, the difficulties of insect life, the contrivances for breathing, and many more most fascinating pursuits are here indicated. It is on lines such as these that all study of animals should run.

We have not mentioned by name all the books given in our list, and have relied on obtaining from the bookseller a reasonable discount which would permit the purchase of the nearest geological section published or (as might be necessary if placed at the corner of one sheet) a second geological map. I may add that I by no means wish to exclude or in any way condemn books not named in this list. It is impossible for one man to know all the books dealing merely with his own subject. What is here given is based on my own experience.

	£	s.	d.
Geological Map. (Stanford) net	0	8	6
Bartholomew's Reduced Ordnance Map (Coloured for Elevations) net	0	1	0
"Class Book of Geology." Geikie. (Macmillan) ...	0	5	0
"Open-Air Studies in Geology." Cole. (Griffin) ...	0	8	6
"The Scenery of England." Lord Avebury. (Macmillan)	0	15	0
"Britain and the British Seas." Mackinder. (Heinemann)	0	7	6
"British Flora." Bentham and Hooker. (L. Reeve) or "Students' Flora." Hooker. (Macmillan) ...	0	10	6
"British Wild Flowers in relation to Insects." Lord Avebury. (Macmillan)	0	4	6
"Practical Introduction to the Study of Botany." Farmer. (Longmans)	0	2	6
"Nature Study" (Plant Life). Scott Elliott. (Blackie)	0	3	6
"Round the Year." Miall. (Macmillan)	0	3	6
"Lessons in Elementary Physiology." Huxley. (Macmillan)	0	4	6
"Familiar Wild Birds." Swainsland. (Illustrated by Thorburn and others.) (Cassell)	0	10	0
"Birds' Nests, Eggs and Egg Collecting." Kearton. (Cassell)	0	5	0
"Wild Life at Home." Kearton. (Cassell)	0	6	0

	£	s.	d.
"Structure and Life of Birds." Headley. (Macmillan)	0	7	6
"Aquatic Insects." Miall. (Macmillan) 3s. 6d. and	0	6	0
"Life in Ponds and Streams." Furneaux. Or "The Outdoor World." Furneaux. (Longmans)	0	6	0
*Geological Section. (Stanford) net	0	5	6
Or			
*2nd Geological Map. (Stanford) net	0	8	6
(Inclusive of alternatives marked *)	6	9	0
Less 2d. in shilling discount on £5 5s. 6d.	0	18	3
	<hr/>		
	£	5	10 9

very small error will spoil the picture. This difficulty is entirely avoided by using a slow plate. The best for the purpose are those known as photo-mechanical plates, but lantern or transparency plates make good substitutes. With such a plate and the stop mentioned above the exposure will, of course, vary according to position in the sky, hour of the day, and season, from the shortest the shutter will allow up to a second or more. If the sun is actually included in the picture give the shortest exposure, but if it is well outside the field

THE PHOTOGRAPHY OF CLOUDS AND LIGHTNING.

By A. W. CLAYDEN, M.A.

Principal of the Royal Albert Memorial College, Exeter.

FEW branches of nature-study are so fascinating, or of such constant and general interest, as the study of clouds, and few bring the student into touch with so much that is beautiful. Yet it is rare to meet anyone who has a real knowledge of their forms, or of their relations to each other and to the weather. Reasons are not difficult to find. In the first place, many of the most beautiful clouds are so brilliant that they can only be observed with comfort by looking at their images reflected in a black mirror. Secondly, no code of cloud names has yet been invented which will explain exactly what is seen, so that two students cannot easily discuss their observations.

The camera, however, has altered this. It is now possible for each student to record what he sees, and the pictures so obtained are not only of scientific interest, but are beautiful in themselves. Moreover, if the attendant and subsequent weather is carefully noted, they form a firm foundation for weather prognostics. Cloud photography has the reputation of being difficult, but if set about in the right way it is just as easy as any other branch of the art.

Anyone can photograph heavy clouds, or those which stand out dark against the background of an evening sky. All that is necessary is to give from one quarter to one-half the exposure necessary for the landscape beneath them, and then develop as will presently be described.

For the brighter and more delicate clouds a different method must be followed. The object is so brilliant that it is hard to avoid over-exposure, and, what is worse, the background of blue sky has almost the same actinic value as the white cloud. Exposure and development must therefore be so adjusted as to exaggerate this difference, and so reveal the delicate detail of cloud form as it appears to the eye. If a small stop is used, say $f/32$, and a plate of ordinary rapidity, the exposure will be some very small fraction of a second, and a

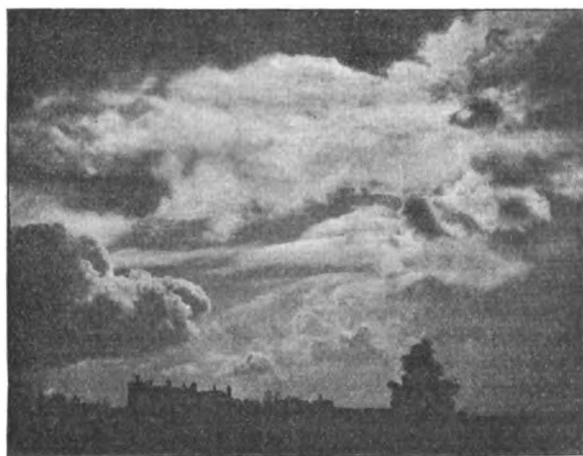


FIG. 1.—"Thunder showers probable."

of view, or is hidden behind a cloud, the best rule to adopt is to give about one quarter the exposure you would give for an ordinary plate and the same stop to get a picture of the landscape. Be sure to err, if you must err, on the side of giving enough exposure. Unless it is very greatly overdone an excess can easily be dealt with in development. For this all-important process, one advantage of the slow plates is that plenty of light may be enjoyed, and for most plates of the kind a good yellow is sufficiently safe.

Any of the ordinary developers may be used, provided only that it consists of two parts—the developer proper and the accelerator. Pyro and ammonia, or pyro and soda, prepared according to the usual formulæ, are at least as good as any of the new introductions. Whichever is selected the application must be methodical and cautious. First, pour on to the plate a sufficient quantity of the developer proper (say pyro) without any accelerator (ammonia or soda). Place one-quarter of the normal quantity of accelerator in a glass, pour the developer from the dish into this, and return the mixed liquid on to the plate. Rock the dish gently for half-a-minute, and if the brightest lights begin to appear leave the image to form. If the image makes too slow progress, or fails to appear, add another quarter of accelerator, and again wait for thirty seconds. This should be repeated until the lights appear within thirty seconds after the last addition, and the negative is steadily forming. Make each addition in the same way, and never yield to the temptation to pour the accelerator into

the liquid on the plate. The great thing is to remember that the initial difference between the images of the cloud and the sky is very small, and it is essential that the brighter parts of the cloud should have gathered decided density before the developer attacks the image of the sky. This means a nice adjustment of the developing agents, which can only be found by a step-by-step procedure. Any excess of accelerator will cause rapid action all over the plate, and the image will be thin and flat, or the cloud will be hidden in a general veil.

Anyone who studies clouds is sure to go on to study lightning. Nothing is simpler or easier to photograph, and the process is a complete contrast to what has been advised for clouds. Use always the largest stop the lens will bear (nothing greatly under $f/8$ is much good) and the most rapid plates you can get. Ordinary landscape plates will give images of flashes, but fail to catch the fainter

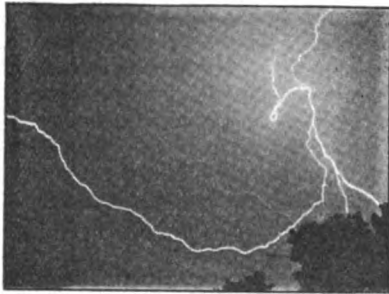


Fig. 2.—A Lightning Flash.

branches. Wait for a thunderstorm at night, and when one comes, set up the camera on its stand, or other rigid support (do not hold it in the hands), focus as for a distant object, place it at an open window or door, and point it to the part of the sky in which flashes seem most frequent. Expose the plate and leave the camera until a flash comes into the field of view. If while waiting thus the sky should be brightly lit up two or three times by other discharges, the plate will be fogged and must be changed. When a flash does come in the right position cover the plate at once, for a strange phenomenon is that if it is left to be acted on by the glare of subsequent flashes the image will probably be reversed, and may even be obliterated. Develop as for an ordinary snap-shot, beginning with the normal mixture, and, if necessary, adding some extra accelerator.

Success with clouds is a matter of the right method and care in its application. Success with lightning is a question of getting up at night, and good luck when you have done so.

OUR aim is to make school-life as interesting to the children as possible, to cultivate their faculties, and to enable them to take an intelligent interest in the world about them. I trust that I am not too sanguine in saying that this form of study is to be a recreation for pupils and teachers. Primarily the object we have in view is not the acquisition of facts, but to give the children an opportunity for accurate observation.—Lord Balfour of Burleigh.

CONSTRUCTION OF A HORIZONTAL SUNDIAL.

By R. A. GREGORY, F.R.A.S.

Professor of Astronomy, Queen's College, London.

AS nature-study probably commenced with observations of the sun, moon and stars, these objects ought not to be neglected when attention is being directed to the things around us. The daily rising, southing and setting of the sun, the varying direction of the shadow of a fixed object during the day, the points on the horizon at which the sun rises and sets at different times of the year, and the noonday altitude of the sun at various seasons, are examples of changes which can be easily and accurately observed. The relative positions of the sun and moon during a lunar month and the corresponding phases can be noticed, and the apparent movements of the sun and moon among the stars can be followed. Many other observations may be made without the aid of instruments, and used to cultivate the highest faculties of the mind. To know the names of bright stars or planets is of little value, but to discover the motion of a planet amongst the stars is an observation to be proud of; and to trace the path of a planet upon a chart is an intelligent and instructive exercise.

In schools having shops for metal work, the construction of a sundial should be a favourite task. The division of the dial provides a simple exercise in geometry, and if the dial is made in metal or marked upon a hard horizontal surface of ground, it stands as a permanent record of work. A horizontal sundial is the most useful form, because it can always be illuminated when the sun is shining. Two methods of making the drawings for such a sundial are here described.

GEOMETRICAL CONSTRUCTION FOR A HORIZONTAL DIAL.—Draw a line AB (Fig. 1), passing through the centre of the plate which is to form the dial. Take two points CC' on each side of the centre, separated from one another by the thickness of the arm which is to form the style. If the style is to be made of metal, $\frac{1}{8}$ to $\frac{1}{4}$ inch is a convenient thickness. From CC' draw the lines CD, C'D' at right angles to AB. Take any point E on AB and draw EF with the angle FEC equal to the latitude of the place for which the sundial is required. In the accompanying figure the angle taken is 52° .

With radius EF and centres CC' draw the semicircles shown in the figure. With radius CF and centres CC' draw the quadrants shown. Divide each of the four quadrants above AB into six equal parts, and number them as in figure (a convenient way to do this is to use a protractor and mark off every 15° from AB, with the centre of the protractor at C and C' respectively). Draw lines parallel to AB through each of the numbered points on the outer quadrants. From corresponding points on the inner quadrants drop perpen-

diculars upon these lines, or what amounts to the same thing, draw lines parallel to CD, C'D'.

Now from the centres CC' draw a line through the foot of each perpendicular to the edge of the plate. These are the hour lines, and can be numbered to represent the hour of the day from 6 a.m. to 6 p.m. For the three hours before six a.m. draw three lines below AB corresponding to the first three hour-lines above it. The hour-lines after six p.m. can be constructed in the same way by drawing lines below AB on the right-hand side corresponding to lines above it.

If it is required to divide the hours into halves

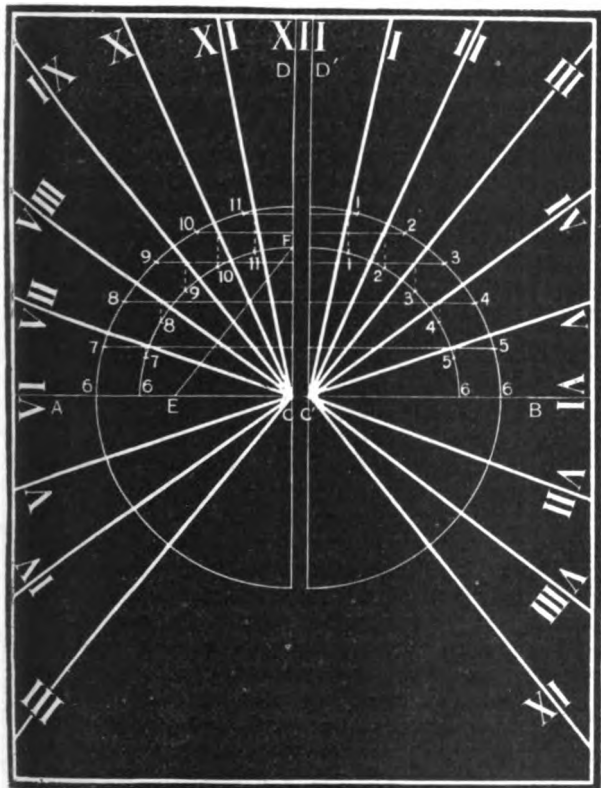


Fig. 1.

or quarters, each of the six parts into which the quadrants are divided should be sub-divided into two or four parts, and the points through which to draw the lines from CC' obtained as before. For a small dial, however, it is sufficiently accurate to divide the angles between the hour lines into two or four equal parts by lines from C and C'.

To make the drawing for the style, draw a right-angled triangle ABC with the angle at B equal to the latitude of the place for which the sundial is intended, and BC equal in length to CD of the dial. The style must be fixed at right angles to the dial with the latitude angle at CC', and the right angle over DD'. The right angle of the style is usually cut away for decorative purposes, but this is unimportant so long as the hypotenuse of the triangle is inclined to the dial at an angle equal to the latitude. The sundial is now ready to

be placed in position with the dial horizontal. The meridian lines CD, C'D' must lie in a true north and south direction, with the hour XII. towards the north and the point of the style at CC' towards the south.

DIRECT METHOD OF DIVIDING A HORIZONTAL DIAL.—Another way to construct a horizontal dial is to calculate the angle which each hour-line must make with the meridian line, and then draw the lines at these angles from the centre of the dial. The formula connecting the latitude, hour-line (or angle between the hour-line and the meridian line), and hour-angle (or angle which the sun describes between the given time and noon) is

$$\tan. \text{hour-line} = \tan. \text{hour-angle} \times \sin. \text{lat.}$$

The following table shows the angles calculated in this way for each degree of latitude from 50° to 57°:—

Angles between Hour-Lines and Meridian Line on a Horizontal Sundial.

Latitude.	I. XI.	II. X.	III. IX.	IV. VIII.	V. VII.	VI. VI.
50°	11½°	24°	37½°	53°	70½°	90°
51	12	24	38	53½	71	90
52	12	24½	38	54	71	90
53	12	25	38½	54	71½	90
54	12	25	39	54½	71½	90
55	12½	25½	39½	55	72	90
56	12½	25½	39½	55	72	90
57	12½	26	40	55½	72½	90

By means of this table it is easy to draw the hour-lines for a horizontal sundial by proceeding as follows: Draw a line AB (Fig. 2), as before and

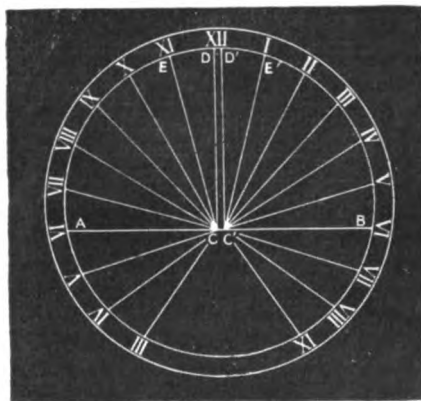


Fig. 2.

meridian lines CD, C'D' at right angles to it. The distance between CD and C'D' should be equal to the thickness of the style to be used. From C draw CE at an angle to CD equal to that given by the first column of hour-lines for the latitude of the place. From C' draw C'E', making the same angle with C'D'. The two lines thus drawn are the hour-lines for XI. and I. o'clock. The other hour-lines can be drawn in the same way by using a protractor to set off the angles given in the accompanying table for various latitudes. As it is not easy to set off an angle nearer than half a

degree with an ordinary protractor, the angles are given to the nearest half degree, which is sufficiently accurate for the present purpose.

Either of these constructions is independent of the shape of the dial, so that a circular or a rectangular plate can be used. If the dial is to be a large one, such, for instance, as might be drawn in an open court or playground, it is, of course, necessary to determine the angles of the hour-lines with the meridian more accurately than with a small dial.

THE YOUNG NATURALIST'S OUTFIT.

By HUGH RICHARDSON, M.A.
Bootham School, York.

IN the morning Z. had told his schoolfellows that he intended to study botany in all its branches. But the seven-and-sixpenny pocket lens he bought in the city was returned to the shop in the afternoon, and by nightfall his ivory-handled dissecting knife had been tested on a slate pencil! If Z.'s study of botany seemed to end there, his schoolfellows have not forgotten the eloquent object-lesson in the uselessness of apparatus without persevering enthusiasm.

All would-be naturalists should keep a diary. A sixpenny quarto note-book will do; a ruled margin and interleaved drawing-paper are advantages; further elaboration stifles originality. The late John Hancock once showed me his beautiful field notebooks full of outdoor sketches of birds. To-day boys want to emulate the Keartons and their wonderful photographs of birds and nests. A simple two-guinea Lancaster's camera for quarter-plate and time exposure will do for a beginner. By-and-bye he will want an instantaneous shutter (18s. 6d., Thornton-Pickard, Altrincham) and a telephoto lens. But let the keen and penniless boy learn the art of taking cover and moving quietly until he can sketch, at six yards' range, the wary sandpiper.

Those who have no cameras may still use sensitive paper to obtain sun-printed records of the shapes of leaves, or ferns, or seaweeds. The blue ferro-prussiate printing paper is fixed by simply soaking in water. It costs 6d. per packet, quarter-plate size; it spoils on keeping, and is not always in stock at the shops, but can be got to order. A printing frame (6d.) would also be wanted.

Lantern plates $3\frac{1}{4}$ in. square (1s. per doz.) may be used in the same way; and the plain glass $3\frac{1}{4}$ -in. lantern-plate covers (9d. for 3 doz.) can be used for mounting the real objects.

Butterflies, flowers, bird's eggs, induce a wish to paint. The existence of wishing books and fairy godmothers bids us be heedful of the best as well as the cheapest. If a boy makes good use of a shilling box of colours, he will greatly esteem

a japanned tin case with a dozen half-pans of moist colour and a good brush (Windsor and Newton, 13s. 6d.).

On excursions a tin box is invaluable. For the pocket I prefer a metal-polish box round and seamless, for the post a rectangular box. A kitchen cupboard contains both sorts. At school it may be better to obtain a gross of suitable boxes through some friendly manufacturer of their contents. The Melyn Tin-plate Decorating Works, Neath, offer round seamless boxes, 4 in. diam. and 1 in. deep, at 7s. 6d. per gross, but not in quantities less than ten gross. These tin boxes will bring home all sorts of things. I have seen an epidemic of natural history follow upon their retail distribution.

A naturalist's pocket should also contain the 1-inch ordnance-survey map of his district (1s.; better mounted on linen, 1s. 9d.; short catalogue 1d., from Stanford, Long Acre, London). A map is a constant stimulus to the spirit of exploration.

Within the school grounds small boxes fixed to trees or buildings will encourage the nesting of sparrows, tits and starlings, whilst giving our scholars something to protect instead of to pillage.

The advertisements of dealers in naturalists' specialities will be found in the *Entomologist*, *Science Gossip*, *Knowledge* and *Nature*. Frequent reference is made below (by initials W. D.) to the price list of Messrs. Watkins and Doncaster, 36, Strand, London, W.C. Two other firms in similar business are: Mr. Jas. Gardner, 29, Oxford Street, London; and Mr. W. Marsden, 40, Triangle W., Clifton, Bristol. For microscopes and accessories reference is made to: Messrs. R. and J. Beck, 68, Cornhill, London, E.C.; Carl Zeiss, 29, Margaret Street, Regent Street, W.; W. Watson and Sons, 313, High Holborn, London, W.C. (referred to as W.W. Their catalogue contains at page 134 a special list of apparatus for collecting and nature teaching).

Provincially the general dealers in scientific apparatus supply many of our wants; for instance, Messrs. Brady and Martin, Northumberland Road, Newcastle (referred to as B.M.); Messrs. Reynolds and Branson, Commercial Street, Leeds; and Messrs. Wooley, Market Street, Manchester.

Chip ointment-boxes and pink pill-boxes are too frail for the pocket, but in great demand for collections indoors. From a wholesale chemist, 2-oz. chip boxes cost 1s. 6d. per gross, or less direct from Messrs. Robinson, Wheat Bridge Mills, Chesterfield.

Steel egg-drills cost 2d. to 9d. (W.D.), glass blowpipes 2d.; but from steel wire and glass tubing I have made my own for half the price. If eggs are taken let them be blown on the spot, if only with a thorn from the hedge and a straw from the bank. Lightened of their contents, wrapped in tissue paper and packed in cotton wool, they rarely break *en route*.

Field glasses mark the advance from collecting eggs to studying birds. A telescope has more magnifying power, but its narrow field of view makes it hard to follow a bird on the wing. A

good pair of glasses costs 15s. to 25s. They should be chosen by the user to avoid double vision. Improvements in definition, achromatism and magnifying power can be found up to £3.

Some tadpoles absorb their tails and develop into frogs, others remain newts all their lives. Sometimes the boy collector is an embryo philosopher; he is worth encouraging for what he may become; but his development may be arrested, he may remain a stamp collector or a sportsman. Be patient with the collector, but in spending money try to lure him on. Himself a larva, let him study larvæ. A breeding cage with glass front and perforated zinc sides costs 2s. 6d. (W.D.) But an effective substitute is made from a cardboard box, with overlapping lid and a scrap of muslin. A window is cut in the lid, and the remaining rim serves to hold the muslin in place. An umbrella and a walking stick collect the caterpillars. The stick beats the bush whilst the umbrella is held below it. The caterpillars come home in a tin box, preferably with perforated lid. In winter a garden trowel is used for pupa digging; and cotton wool should be ready for packing the finds, if any. Living pupæ are sold by W.D.; and a present of a few chrysalises of eyed hawk, poplar-hawk or swallow-tail will greatly encourage a keen boy. Advertisements of living eggs or larvæ appear in the *Entomologist* (West, Newman, and Co., 54, Hatton Garden, E.C.; 6d. monthly).

Two books, each a shilling, Green's "Insect Hunter's Companion," and Knagg's "Lepidopterist's Guide" (Gurney and Jackson), will be found most helpful.

Collecting is more expensive than observing. A butterfly net, ready made, costs 2s. to 3s. (W.D.), or it may be laboriously put together from green lino for the bag, a strip of calico round the rim, a ring of rattan cane, a tin or brass Y-tube (W.D., 2d. to 8d.) and a stick of stiff ash or bamboo cane. The butterflies may be brought home alive, each in a separate chip box; but generally they are killed within the net by the sharp nip with the finger nails across the thorax. Pinned forthwith, they are put into a corked zinc pocket box (W.D., 1s. 6d.). In a wooden box the wings would dry and stiffen. A pocket box may be cheaply made from a flat tin box with hinged lid, on to the bottom of which a sheet of cork (W.D., 2d.) has been fixed with paper clips. If the cork is kept damp the insects remain limp. W.D. sell silvered pins in mixed sizes at 1s. per oz. They are no cheaper direct from the manufacturer, Messrs. D. F. Taylor & Co., New Hall Works, Birmingham, whose sizes 11, 12, 13 and 16 are best for beginners. The oval section cork setting boards 3 in. wide and 14 in. long are satisfactory (W.D., 1s. 2d.). But I made my own of soft yellow pine, cutting them into short cross-sections just large enough for one insect, which was held in place by a thread wound lightly round. Instead of sheet cork, beginners may try scraps of linoleum or cork carpet.

Chloroformed insects are rigid and difficult to set. The poisoned stab with a fine glass blowpipe

charged with oxalic acid is not always easy to administer. Potassium cyanide is only obtainable by signature from a qualified chemist. But the cyanide bottle is far the best. One oz. of the deadly potassium cyanide (2d.) is placed in the bottom of an 8-oz. wide-mouthed bottle (with cork, 3d.) and covered over with a paste of plaster of Paris (3d. per lb.) and water. Let the chemist cover it down out of harm's way.

The badge of a botanist is his vasculum or plant-tin. A "sandwich-tin" is much the same, but smaller. The real thing is sold by W.D. & W.W.; price with strap, about 4s. Let the beginner take a tin box, which once held biscuits or Mazawattee chocolate, put a hole through each end above the centre of gravity, pass a cord through and sling this over his shoulder. But a piece of string and a newspaper are enough. The flowers are placed in the angle of the paper, which is wrapped round spirally as the bundle grows. The stalk ends are cut on reaching home, and plunged in warm water. In the morning they are fresh enough.

I learnt the names of the commoner flowers from a "plant stand" which stood in our school-room. It was like a big test-tube stand, two or three times as big each way; a row of a dozen medicine bottles each carried a spray of flowers; and on tin tacks in front explanatory labels hung. The designer, my old master, B. B. Le Tall, is far away, but the plant stand still keeps his memory green. It cost some shillings, and does more good than all the rest of our botanical apparatus.

A mounted needle will dissect flowers almost as well as a knife, and a needle may be easily mounted by pushing it, eye first, into the pith of an elm twig. But dissecting knives at 1s., and mounted needles at 2d., are most useful, and the knife can find a place afterwards in a proper box of dissecting instruments (12s. to 15s.).

Making flowers into hay is sorry work for a naturalist, but our pupils should know how to preserve flowers so that they may still look beautiful. Great pressure and plenty of very dry paper are essentials of success. Two stout, hard wood boards (W.W., 2s. 6d.) are used. The pressure may be obtained by strong screws, as in a trouser press. For travelling the boards are girt by double leather straps, strung tight by wedges. A loaded coal-scuttle or a rockery of bricks and boulders will greatly help. A wire frame covered with cotton wool, or some other ventilating device, may be inserted. Further hints are given in Professor Oliver's "Lessons in Elementary Botany." Nothing is so important as frequent changing and drying of paper.

White blotting-paper is said to contain slight excess of bleaching agents; hence the use of a special unbleached drying paper, sold by West, Newman and Co., or through W.W. and W.D., 1s. 1d. to 2s. 2d. per quire, according to size.

For collecting such forms of pond life as live on water weed or need to be washed free from mud we use a shell scoop (2s. 3d., made by Mr. Kilvington, wire worker, Stonegate, York). But a perforated saucepan, or frying basket, or kitchen

drainer fixed to the end of a long stick, would make a substitute. The habits of the creatures may be observed in glass jam-jars of 2 lb. size, or still better in gardener's bell jars (2s. to 3s. each) used as aquaria. A wide, squat jam-pot of brown ware, or a gardener's flower-pan filled with sand, will make a stand for the inverted belljar.

A small glass bottle for the waistcoat pocket will bring home minute water-creatures. Test tubes are too fragile unless enclosed in a flat case like homœopathic medicine-bottles. Stronger glass-tubes may be obtained from W.D. at 10d. per doz.

Geological hammers are made in Sheffield, but may be obtained through B.M., W.D., W.W., Messrs. J. R. Gregory and Co., 1, Kelso Place, Kensington, W., or Mr. W. J. Shaw, 78, Newgate Street, London, E.C. A good pattern has square head at one end and edge at the other, weight $1\frac{1}{2}$ lb., price 4s. 6d. But the shape may depend on the rock to be attacked, the weight on the user. Household-carpet hammers are of too soft a metal. In mine or quarry the loan of a workman's pick or sledge hammer will help with heavy work. A strong satchel and a bountiful supply of newspaper are wanted in the field. Indoors the first demand should be for labels and something very sticky to fix them on with—secotine or diamond cement (= glue + acetic acid) will do, gum is disappointing. The school might provide a geological survey-map (3s. per sheet, from Stanford).

Label lists are convenient for recording localities. Several of these are catalogued by W.D. The most celebrated is the "London Catalogue of Plants" (7d., interleaved 1s. 2d.). It serves for the first draft of a local flora, or an index to the School Herbarium, and the co-efficients of rarity indicate which flowers need not be collected. Messrs. Gurney & Jackson, 1, Paternoster Row, publish Saunder's "List of British Birds," 6d.; Messrs. West, Newman & Co., lists of Lepidoptera; and shell lists may be obtained from Mr. W. E. Hoyle, Owens College, Manchester.

The school should, if possible, provide the naturalists with some room where they can follow their hobbies in peace. There should be tables in a good light, lockers, water-tap and sink, and a radial gas-burner permanently fixed to an iron pipe.

Let me suggest, too, a small museum the contents of which are frequently changed; a shop show-case, plate glass, with lock and key, to stand in a corridor window-sill; also a picture frame with movable back, large enough to carry the sheets of the ordnance survey. These, with the plant stand described above, might all be obtained for £2.

A magic lantern is invaluable at Natural History Club meetings. Messrs. Newton & Co., 3, Fleet Street, Temple Bar, E.C., would provide everything and really good for £20. Of accessories we have made considerable use of the aphengoscope (15s.) for showing butterflies on the screen in natural colours, and the lantern microscope

(£4 14s. 6d.) for pond life. This will carry the ordinary objectives, and for most schools is probably a much more profitable investment than an extra dozen microscopes. Small water-creatures like cyclops are mounted in dished glass slips (1s. 2d. a doz.), which are cheaper than the regulation live box (4s.). For tadpoles and larger creatures, we have used rectangular glass-tanks made to order by the York Glass Company (about 1s. 6d. each). A little drop in price would make the lantern live-trough (2s., B.M.) still more useful.

Boys often want to buy microscopes, but I persuade them to be content with a shilling lens until they can command £8 to £10, for which sum a strong stand with good lenses may be obtained from Beck or Zeiss. Plenty of work is found for a microscope belonging to the school, if a short list is posted of boys found competent and allowed to use it.

If boys and girls will take some pains when young to acquire the habits of a naturalist, they will when older find joys in the simplest country lane denied to those who lack the best of all equipment, eyes to see.

THE USE AND CARE OF AQUARIA AND VIVARIA.

By R. B. J. LULHAM.

The Froebel Institute, West Kensington.

"NATURE study should be carried on out-of-doors." To this we all agree in theory, but in practice how often it is found to be impracticable. How can a teacher in London, for example, with a class of twenty-five or thirty children, arrange for many field expeditions? there is so little time and less money! Of course, there are the school gardens; but these, when present, are often small and their possibilities limited, and in any case they are generally only suitable for the observation of plant life. Yet living *animals* have a special interest for children, and they offer valuable opportunities for training in observation and reasoning. It is because we feel this that at the Froebel Institute we have paid special attention to the construction and management of aquaria and vivaria in which the animals can be kept indoors, and yet under, as far as possible, natural conditions and in a healthy and vigorous state.

In starting an AQUARIUM, the first thing to remember is not to be in a hurry, and not to overstock it with live creatures. The best time for starting one is in April or May, but it can be begun at any time of the year. A cheap and, on the whole, satisfactory form of aquarium is the inverted bell-jar. Rectangular tanks are better in some ways, but cost three or four times as much, and often give trouble by leakage. The bell jar should be at least twelve or fourteen inches in diameter,

and the height may be the same or a little more; (such a one complete, with a black wooden stand, may be obtained from Whiteley, Bayswater, for five to six shillings). It should be filled with gravel or pebbles to a depth of two or three inches, the water put in, and then the weeds should be arranged. It is of great importance to have a good supply of healthily growing weeds, as they not only supply food and shelter to the inmates, but also keep the water fresh by means of the oxygen they give off. In this respect *Vallisneria*, the Italian water-weed, is quite the best plant to have, but it needs to be rooted in a little patch of soil below the stones, and should be left to take root well before any animals are introduced; also, it has to be bought, as it is not indigenous. Other weeds which are very good and easily obtained from our own ponds are the Canadian Water-weed (*Anacharis*), the Hornwort (*Ceratophyllum*), the Milfoil (*Myriophyllum*), Starwort (*Callitriche*), and others; these grow well either floating freely or just tied in a bunch and sunk by means of a stone. The Water Soldier (*Stratiotes*), which is found plentifully near Cambridge, and can always be bought in London for a few pence, is very ornamental; it must also be tied down to a stone, and flourishes better if provided with a little sand or mould in which it can take root. The Water Crowfoot should be treated in the same way, care being taken that the undivided floating leaves just reach the surface of the water; the broken lower end of the stalk will soon throw out roots.

Having thus prepared the aquarium, it is now ready for the inmates. These may be at first a few water-snails, and as well some fish perhaps, or water-beetles, or newts; but it is not well to try to introduce more than *one* kind of these creatures at a time, and there should not be more than two or three of the kind chosen. If more are put in they will be at such close quarters that they will annoy each other, and a tragedy may speedily result. Also they will use up the oxygen in the water more rapidly than it can be produced by the plants, and so constant artificial aëration or changing of the water will be needed, whilst if only a few are put in they will quickly settle down, and to some extent resume the natural habits of their pond life, and the water will not need to be changed more than once a term, if even as often as that.

The following are suggestions as to the animals that might be kept in such an aquarium and their treatment:—

NEWTS, OR TRITONS.—If obtained in April or May, these will breed readily, and the hatching of the eggs and gradual development and metamorphosis of the young are most interesting to watch. Plenty of Starwort or Canadian water-weed should be introduced, and the eggs will be found laid singly, each wrapped in a leaf of the water-weed; they should be at once removed to a shallow dish of water. A broad flat piece of cork should always be floated on the top of the water in the aquarium, and another curved piece rested on this, so as to make a little dark cell into

which the newts can creep when they come out of the water. They must be fed either on blood-worms or on threads of raw meat, which should be held just in front of them until they snap at it. A better home for newts is shown in Fig. 1, which is so arranged that in the autumn, when they like to leave the water, they can crawl up into the box above and hibernate amongst the earth, grass, and moss with which it is provided. This box is made so that the bell jar fits easily into a hole in its floor, consequently it can, without difficulty, be lifted off when necessary. A detachable zinc cover fits over the top.

SILVER WATER BEETLES (*Hydrophilus piceus*).—These beetles are fairly common in ponds, and very handsome. They must be supplied with plenty of some common weed such as *Anacharis*, for they are vegetarians, and eat voraciously. They will often breed in captivity if the aquarium is well stocked with plants.

THE CARNIVOROUS WATER-BEETLE (*Dytiscus marginalis*) forms an interesting subject for comparison with *Hydrophilus*. It must be kept in a tank by itself, as it speedily kills fish or larvæ of any kind; it must be well fed on raw meat. The larvæ of this beetle are amongst the commonest in ponds; the eggs are laid by the female in the stems of water-plants, but are not very easy to rear to maturity.

WATER BOATMEN are easily obtained, but as they too are carnivorous they must be kept alone; they need plenty of room for exercise, as they are very active.

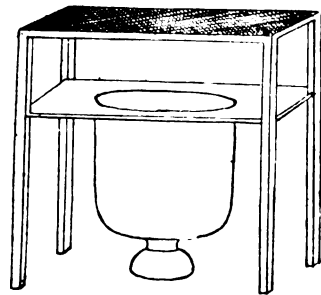


Fig. 1.

WATER SPIDERS are common in ponds, and are delightful to watch, as they make their little dome-shaped web under the water and then fill it with air and take up their abode in it. They can be fed on raw meat or dead flies.

FROG AND TOAD TADPOLES.—The spawn is obtainable at the end of March; the tadpoles should be given plenty of weed, and after two or three weeks a piece of raw meat tied to the end of a piece of cotton should be hung in the water every day. As soon as all four legs are developed, the tadpoles should be removed to a shallow tank, in one corner of which there is a mud bank or large stone into which they can climb. A more elaborate but convenient home for them now is shown in Fig. 2. An ordinary pie-dish full of water is sunk through a hole in the floor of the vivarium, and all round it is fresh-growing grass

or moss. This home is also a suitable one for adult frogs, toads, or salamanders.

FISH.—Minnows or gold fish live well, but perhaps the most interesting fish to keep are *sticklebacks*. If in April one male and several females are taken and put into an aquarium very well stocked with weeds there is every chance that shortly the male will be seen making his curious little nest, and we shall be able to watch how, when once the eggs are laid, he assumes all further care of them, and very well he performs his nursery duties! The adult fish may be fed on tiny pieces of raw meat, but the small fry will only thrive on the almost microscopic animal life which is always plentiful amongst the weeds in a pond, so that the weed in the aquarium should be frequently renewed for them with fresh weed straight from a pond. Sticklebacks should be returned to their native pond after keeping them for some weeks, as they will not live very long in captivity.

AQUATIC INSECT LARVÆ are best kept in a shallow tank; the water should not as a rule be more than four to six inches deep; an ordinary pie-dish serves the purpose, though glass dishes are better; for class purposes we have found it very convenient to have a number of cheap glass finger-bowls (3s. 9d. a dozen in Tottenham Court Road), in which the children can keep the special larvæ they are watching. In each bowl there should be a little sand or gravel, a few pieces of *Anacharis* and perhaps a little duckweed. Under such conditions the curious habits and wonderful metamorphoses of a number of larvæ can be watched. We have kept successfully all the following:—Caddis worms, dragon-fly larvæ, the aquatic caterpillars of the China mark moths, blood-worms (*Chironomus*), gnat larvæ, the chamaeleon-fly larva (*Stratiomys*), the rat-tailed larva (*Eristalis*) and many others.

A SEA-WATER AQUARIUM is not difficult to set up and sea-water may easily and cheaply be obtained from the Great Eastern Railway. However, without special means of aerating the water, we have found it difficult to get any creatures to live long except sea anemones and small crabs, but these by themselves prove very interesting.

LAND CATERPILLARS are easy to get and to keep in any of the breeding cases sold by the dealers, or in a simple one which can easily be constructed out of a shallow wooden box, a few sticks and two yards of coarse transparent net. The box must be filled with earth and moss which must not be allowed to get too dry; a fresh twig of the leaves needed by the special caterpillars kept should be put in every day; as soon as the caterpillars begin to cease feeding, it should be seen that the earth is not too dry for those that wish to burrow in it; and also, for the butterfly caterpillars, a few bare twigs should be fixed up, on to which they can bind their chrysalids, otherwise they will do this on the roof of the case, where it is difficult to see them. When the perfect insects begin to emerge a little jar of flowers should be stood inside the case, or a small sponge soaked in honey hung from the roof. After the children have watched the

insects feeding on this, they should set them free in the garden and watch them there.

To turn to Reptiles, **WATER TORTOISES** can be well kept in a rectangular tank with water three or four inches deep in which there are some flat pieces of rock or a mud bank projecting above the water, for tortoises should have plenty of room for a swim and yet be able to get out of the water. Like other reptiles, they will sometimes feed on raw meat, but if they refuse this, they must be fed on live meal-worms or small earth-worms.

LIZARDS and **SLOW-WORMS** must be kept in a dry sunny place, with, however, plenty of earth, moss, and also a piece of curved Virginian cork under which they can hide. They should be fed when they come out to bask in the sun, and a little dish of water should always stand ready for them.

A FORMICARIUM is easy to make out of a large photographic printing-frame (size about 16 in. by 14 in.) and two sheets of glass fitting into it; these should be kept apart by a narrow strip of felt all round the edge of thickness about one-eighth of an inch; a slit should be cut in the frame at one point, reaching down to the space between the two glasses, and so forming an outlet for the ants. Then the whole frame should be stood on a little wooden stand, the legs of which are under water in a big baking dish; this prevents the ants escaping into the room, as they cannot cross the water. A good species of ant to keep is the little yellow meadow ant; the specimens are best taken in the early summer and should include some pupæ, larvæ and eggs, and, if possible, a queen and some males as well as twenty or thirty of the ordinary workers. The earth used should be fine earth from the neighbourhood of the nest taken, and it should be moistened occasionally. When put on

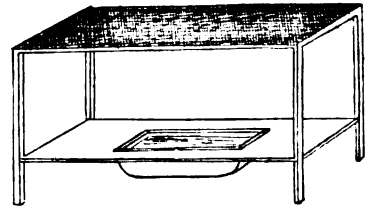


Fig. 2.

the lower sheet of glass and covered with the upper sheet, covered with a dark cloth and left to themselves, the ants will soon set to work, some will excavate passages, nurseries, &c., others will attend the queen or care for the eggs and larvæ, others hunt for food; in fact, they prove exceedingly interesting to watch, specially if they can be supplied with a "herd" of aphids from near their original nest, when they will be seen stroking them to obtain the drops of liquid which is known popularly as ants' "milk." If the aphides cannot be got, the ants can be fed on drops of honey, which may be put outside the frame, where they will soon find it and come regularly to fetch it. An occasional dead fly seems also to be much appreciated by them.

Suitable homes for all the animals mentioned

can be made very inexpensively by anyone with a knowledge of carpentering, or can be bought at various naturalist shops, such as Willson (37, New Oxford Street), Green (Covent Garden), or Pither (Aquarium stall, Crystal Palace). These dealers will all supply aquaria and vivaria, and also nearly all the animals named, except perhaps the insect larvae. Caterpillars and pupae can often be obtained from Messrs. Gardner (52, High Holborn).

Those teachers who have scant time for country expeditions, either with or without their classes, need not therefore consider it impossible to introduce the study of animal life into their schools. As we have proved by experience, very valuable and interesting work of this kind can be done even indoors, though of course, wherever possible, each course of study should include at least one expedition in which the animals studied can be seen in their natural habitat.

A valuable book of reference is Bateman's "Book of Aquaria," in which are given some practical directions as to the construction of aquaria, as well as much information as to the care of them. For more advanced work on insects and insect larvae, Professor Miall's book "Aquatic Insects" is very helpful and delightful reading.

BOTANY AS A BRANCH OF NATURE-STUDY.

By LILLIAN J. CLARKE, B.Sc.

Member of the British Association Committee on the Teaching of Botany in Schools.

I HAVE been asked to write a short account of the teaching of botany as a branch of nature-study, and to describe the various methods we have found most successful in our work at the James Allen's Girls' School, Dulwich. In this school the girls study botany by studying Nature, and instead of using text-books, diagrams, &c., observe plants indoors and out of doors, draw what they observe, experiment with living plants, and write accounts of their own experiments. Before describing the laboratory work I will say that until lately we have had no special botanical laboratory, but have used one laboratory for chemistry, physics and botany. This room is 25 ft. by 20 ft., and is fitted with gas, water, sinks, &c. There are benches 2 ft. wide round two sides of the room, and two large tables in the centre. Most of the time in the laboratory is spent in studying the following subjects:—

STRUCTURE AND GERMINATION OF SEEDS.—Numbers of seeds are sown in sawdust by the girls at different times, and each girl draws to scale the seed and several seedlings at different stages of development. The following seeds are

useful: peas, beans, wheat, maize, barley, mustard, cress, buckwheat. It is better to plant some seeds (as peas and beans) in deep pie-dishes to allow room for the roots, but many seedlings grow well in shallow dishes, such as saucers, soup-plates, &c. When the girls are studying seedlings they make experiments in connection with respiration, influence of gravity, influence of light, &c. Very simple experiments can be arranged. For example, in order to show the influence of gravity on the direction of growth of roots and stems, some mustard seeds are placed in a glass jar, and when the seedlings are developing the jar is placed on its side in the dark, and in a short time the alteration in the direction of the stems and roots can be seen.

STRUCTURE OF BUDS.—Different buds are kept in the laboratory, and each girl draws the same bud week after week until all the chief stages are represented. Great attention is paid here, as in other cases, to drawing. Careful drawings are made of the buds of horse-chestnut, sycamore, lilac, beech, oak, ash. Very often it is possible for the girls to see the nature of the bud scale—a modified leaf base, as in the horse-chestnut, or a stipule, as in the oak. Other points noticed are the shape of the bud, the way in which the leaves are protected, the folding of the leaves in the bud, and so on. A few of the girls draw different stages of the buds on the plants in food solution, and a few have drawn them when growing on the trees. Next year we hope that *all* the girls who study buds will do so in the garden, and draw the different stages of development while the buds are still on the trees. On some of our excursions we devote the time to studying structure and position of buds, &c., and the girls soon learn to identify trees in winter by means of the buds, nature of branching, &c.

STRUCTURE OF FLOWERS AND USES OF THE PARTS.—Numbers of typical flowers are examined by the girls and careful drawings made. We find dissecting microscopes most useful in examining flowers. A good kind is one made by Leitz. It consists of a white enamelled stage (price 5s.) and lens (price 3s.). The girls themselves often bring specimens, and many specimens are obtained from the school botany gardens.

In trying to find out the use of each part of the flower the girls are led to make experiments in pollination. Some of these are made in the laboratory, and in window boxes outside the laboratory, but the majority are carried on in the garden.

STRUCTURE OF FRUITS AND DISPERSAL OF SEEDS.—This part of the work comes naturally after studying the parts of the flower and their functions. Attention is given to the structure of fruits, and the different ways in which seeds and fruits are fitted for dispersal. In the order-beds many fruits are formed, and excellent examples are seen of seeds fitted for dispersal by wind, by animals, by mechanical contrivances, and so on. The owners of the beds are often eager to find out how it is that plants never planted by them are found in their beds.

EXPERIMENTAL PLANT PHYSIOLOGY.—This forms the most important part of the course, and many experiments are made by the younger as well as the elder girls. Experiments are made in transpiration, respiration, assimilation, nutrition of green plants, &c., and no special apparatus is required. The great thing is to devise simple arrangements, and not allow the children to be confused by elaborate apparatus. The test-tubes, jars, glass tubing, corks, retort-stands, &c., used in chemical work are quite sufficient. In connection with the food of green plants we find that to grow plants in different food solutions is of the greatest use and interest. Seven years ago, before our laboratory was fitted up, the girls grew plants in jam jars filled with food solution, but now they use the ordinary gas-jars found in all chemical laboratories. Of course balances are necessary in order to weigh out the ingredients, but most schools possess good balances, and even if they do not it is still possible to make food solutions. During one summer the chemicals for food solutions were weighed in a hanging pair of scales, the cost of which was 2s. 6d. The girls are greatly interested in these experiments, and are quite excited when flowers and fruits appear. Plants grown from seeds produced on plants in solutions are much prized, and many of our plants have quite a pedigree, the laboratory history going back for four generations.

So far the indoor work only has been described, but much is done by means of school-gardens and nature rambles.

BOTANY GARDENS.—Six years ago the gardens were arranged to help the girls in studying classification, and different girls had charge of the order-beds. Each year something has been added, and now there are more than one hundred girls possessing gardens. Besides the order-beds there are gardens in which pollination experiments are being carried on, and gardens in which soil experiments are made. No school time is allowed for gardening, and the girls dig, weed, water in the dinner hour and after school. No girl is obliged to have a botany-garden, but many are eager to own them and show great enthusiasm in looking after them. In fine weather a class often spends the lesson time in the garden. For example, the girls may be studying pollination, and it is quite easy to divide a class into detachments, so that only a few girls at the same time watch a particular clump of flowers.

THE RAMBLING CLUB.—About ninety-six girls belong to this club, and excursions take place throughout the year. A definite object is given to each excursion, and every girl has some particular work to do. Last December we went to a convenient place to study trees in winter; in March we studied the same trees when the buds were beginning to develop; and this summer we hope to study the trees with fully opened leaves.

By means of the work carried on indoors and out-of-doors we lead the girls to observe and experiment, and the botany really becomes a

branch of nature-study. A great drawback hitherto has been that in the winter months, when we were dependent on our indoor work, many plants died from the effects of cold, and it was exceedingly difficult to carry on experiments in germination, movements of plants, &c. It was also found most inconvenient to move all the experiments and growing plants whenever the benches and tables were needed for chemical work. These difficulties led to the building of a special botanical laboratory—the first of its kind, I believe. It is kept at a temperature of about 50° F. day and night during the winter, and consists mainly of glass. A more detailed account of this laboratory and its fittings will be given in a later number.

MATERIAL FOR NATURE-STUDY LESSONS.

By CLOTILDE VON WYSS.
The Training College, Cambridge.

THE power of looking at the world around with seeing eyes, and of acquiring knowledge independently and first-hand, is an immense acquisition, and we would fain ensure it for our children by way of an outfit for life's journey. The most direct way of attaining this end would be to bring the child into contact with nature in earliest childhood, to let him have scope for the keen interest he naturally takes in his surroundings, and to cultivate the genuine sympathy most children have for animals and plants, which is generally crushed out of them when lace pinafores have to be kept spotless, and little creatures are said to be unclean and flowers to make stains.

But all this is sooner said than done, and it is no use ignoring difficulties. The goal may be safely reached if the children are educated in the country. Must we, therefore, give up all hope for the little city-sparrows and street-urchins? Had we not better make the best of a bad case and try to bring some of nature's treasures to our town-children, biding the time when the latter shall be let loose in the country?

Let the materials for nature-lessons come from the neighbourhood of the town, and let them be studied in seasonal succession. At once we are confronted with a very real difficulty. The over-worked teacher exclaims that he cannot himself provide specimens for his large classes, and funds are not forthcoming to ensure their being sent from the country.

Where there is a will there is a way. I believe that every teacher could arrange to go to the outskirts of the town on three Saturday afternoons every term. If this is done the problem is easy to solve. Let him bring home from his excursions material for the nature-lessons of the coming month. To be able to do this naturally requires some care-

ful selection. From every summer expedition sufficient specimens of some wild flower may be brought home. Add to this a bunch of bluebells, of cowslips, and of oxeye-daisies, obtained for a few pennies from a street-barrow, and your children may gain some knowledge of no less than six different flowers in one term; understanding not only their structure and arrangement of their parts, but also how the buds unfold and how the floral parts fade and drop, leaving the seed-box to ripen. But much more than this must be done. Far be it from me to suggest that our little ones should at once specialise in botany before broad foundations have been laid and a bird's-eye view of the realm of nature-study has been taken. Animals must be brought home and must be kept in captivity, so that the children have opportunity of watching them at play and at work, during meal time and sleeping hours.

It is easy to bring home some snails from the hedge-rows, a spider or two and a few beetles. All these may be kept in suitable boxes, plentifully supplied with green, which should be lightly sprinkled with water. A piece of glass should cover the box, and holes should be made into the sides to supply air. Similar boxes form suitable homes for caterpillars. Care must be taken, in the case of caterpillars and many beetles, that they are supplied with the leaves on which they naturally feed.

I cannot emphasise too strongly that, of all the animals which may be kept in captivity and form satisfactory material for nature-study in town schools, the creatures of the pond are by far the best. My reasons for this statement are the following: (a) Most of these animals are comparatively small, so that confinement in a 3lb. jam-jar does not mean complete loss of freedom. (b) The problem of food supply for most of them is easy to solve; a handful of weed contains food for the majority of them, either because they feed directly on vegetable matter, or because they prey on minute creatures hidden in the pond weed. Tiny pieces of raw meat will feed some of the bugs and beetles and the older tadpoles. (c) Among pond creatures there is an immense variety in form, structure and habits, and these often change during the span of life of any particular animal. It is, therefore, evident that the study of pond-animals implies keenest and most continuous exercise of the powers of observation.

Space does not permit me to go into details of keeping any one of the animals, but it may be of some use to mention a few of the pond creatures which have thriven in jam pots and have given delightful lessons to large classes of town children. They are: Silver beetle, large carnivorous beetle, water boatman, silver spider, caddis fly and dragon-fly larvæ. Besides these, newts, frogs and toads, in the various stages of their life history, are of never-ending interest, as they appear year by year. Needless to say, it is only the tadpole stage of these that can be kept in jam pots. For the adult creatures larger basins or tanks should be provided during the breeding season, and these should be

partly filled with water and should contain stones whose surface comes above the water. During the rest of the year deal boxes with moss and grass plants, cosy corners and saucers of water, form comfortable homes. Pieces of glass, cut the right size for tanks and boxes, may be obtained for a few pence. By way of a guide and reference-book for the understanding of the ways and changes of pond animals, I highly recommend Furneaux's "Life in Ponds and Streams."

Detailed information as to the keeping of all these creatures may easily be obtained by anyone interested in the subject; and interest it deserves, considering the excellent influence it has on the children. For, quite apart from training of the powers of perception and of accumulating first-hand knowledge, there is evident development of sympathy. By faithfully caring for and watching over one little animal, a greater love for all others is awakened; and, on account of this love for one creature, cruelty to many others is avoided. Of this fact one obtains convincing proof in the course of time. It is a matter of course that we reduce the cruelty of imprisoning animals to a minimum by (a) choosing animals which are not highly sensitive, and which thrive in captivity; (b) scrupulously attending to all their wants; (c) taking them back to their natural haunts after a longer or shorter period of time.

The argument is constantly brought forward that we have no right to be cruel to animals by inflicting upon them even only temporary imprisonment, and that the children would learn much more if they were allowed to watch the wild things in their free state. We are all agreed that the plan of work suggested involves a certain amount of cruelty, and that nature itself is a better teacher than our jam pots containing pets and ourselves behind them. But are we not in a transition state? Are we not trying to make the best of very bad conditions? There are many who paint before our eyes a picture in glowing colours of an ideal state of things, when our little ones shall receive the foundations of a naturalist's education, during their life in the country, guided by a wise, nature-loving mother. They make clear before our eyes the goal to make for. Would that they had a little more patience, before condemning us, with our struggles and strivings to reach that very same end.

THE chief interest of nature-study is life; and living objects, especially living plants, are found to be more stimulating than any others. We can observe them under all conditions, and experiment on them without cruelty or appreciable cost; we can vary their food, vary the stimulus of light, investigate the conditions necessary for fertilisation, and so on. The plant does the thing which is really hard: it grows. The many substitutes for the direct study of living nature, such as learning by heart, collecting, naming, drawing up lists, filling up schedules, are at best accessories, and may be positively harmful. Live natural history is what we want above all.—Prof. L. C. Miall, F.R.S.

THE DEVELOPMENT OF A CHICK.

A PRACTICAL LESSON IN NATURE-STUDY.

By ERNEST STENHOUSE, B.Sc.(Lond.)

Associate of the Royal College of Science, London.

A.—The Egg before Incubation.

THE SHELL.—Tap the egg gently at the middle of its broad end until the shell cracks. Then carefully remove small pieces of the shell and notice the *shell-membrane*, a tough skin which is closely applied to the inside of the shell. Snip through the membrane in the middle of the broad end; notice the *air-chamber* which lies beneath it. Observe the inner membrane which separates the air-chamber from the inside of the egg. Hold a small piece of shell up to the light, and notice the small, almost transparent dots. The shell is perforated by very small pores, through which the air can pass.

(2) **THE WHITE OF THE EGG.**—Tap the shell so as to crack it all round at its widest part; raise bits of shell carefully and see the membrane here. Tear through the membrane and notice that in this region there is no air-space, but the white lies just beneath the shell-membrane. Separate the halves of the shell, notice the position and shape of the yolk, and then let the contents of the egg fall gently into a basin. Observe the appearance, colour, and transparency of the white, and try to distinguish two tangled cords of firmer white—the *balancers*—arising close to the yellow yolk.

(3) **THE YOLK.**—What is the shape of the yolk as it lies in the basin? How does it differ from the shape of a yolk suspended naturally in the white? What is the cause of the change of shape? Notice carefully a small paler patch—the *germinal disc*—in the middle of the upper surface. This is the lightest part of the yolk, so that the yolk always settles with this part uppermost after any turning of the egg, and therefore the germinal disc is always more directly exposed to the heat of the hen's body (during incubation) than is any other part of the yolk. Prick the yolk and notice that the yellow fluid contents flow out. You have evidently pierced the thin bag which formerly preserved the shape..

B.—The Development of the Chick.

(1) **A SIMPLE INCUBATOR.**—Eggs are best incubated in the natural manner, that is, by the warmth of the hen's body; but, if a sitting hen cannot be obtained, an ordinary water-oven, such as is used in chemical laboratories, may be made to answer. It should be heated by a self-regulating burner, and kept at a temperature of about 40° C. The eggs should be turned two or three times a day, and the air of the oven should be kept moist by sprinkling water upon pieces of cloth, blotting paper, or hay, kept with the eggs. Spring is the most favourable time of the year for making the observations, as eggs laid at other seasons are not always in a condition to produce chicks.

(2) **HOW TO MARK THE EGGS.**—The most instructive changes take place during the first five days of incubation. If all the stages of the first five days are to form the subject of one lesson, an egg should be marked "5" with pencil, and then put into the incubator or under the hen five days before the lesson; a day later, an egg numbered "4" should be put in, and so on. The numbers will then indicate the lengths of incubation at the time of the lesson, and the eggs should be examined in order, from 1 to 5. If one egg is to be examined each day, five should be put in the incubator at the same time; no numbering will then be required.

(3) **HOW TO EXAMINE THE EGGS.**—Have ready a basin of water, heated slightly above the temperature of the hand (*i.e.*, to about 40° C.), and dissolve table-salt in it in the proportion of a level tablespoonful of salt to a pint of water. The young chicks will keep alive longer in this solution than in ordinary water. Tap the shell in the middle of its broad end, and open the air-chamber (*a*, Fig. 1) completely. Then crack the shell in the middle of the length and, keeping the length of the egg horizontal, cut round the middle of the shell with scissors in a vertical plane, until the halves are on the point of coming apart. Then lower the egg into the warm saline solution, pull the halves of the shell apart, and float out the contents. Examine the embryo carefully, making out as much as possible, and then snip round it with a pair of fine scissors to remove it from the yolk; float it into a watch-glass and cover it with weak alcohol (equal parts of spirits-of-wine and water). Examine it with a lens. After it has remained for a day in weak alcohol, put the embryo into strong alcohol in a small bottle (writing the age on a label), and preserve it.

Notice the gradual absorption of the white of the egg as development proceeds.

(4) **CHICK AFTER ONE DAY'S INCUBATION** (Fig. 1).—Notice that the embryo is now to be

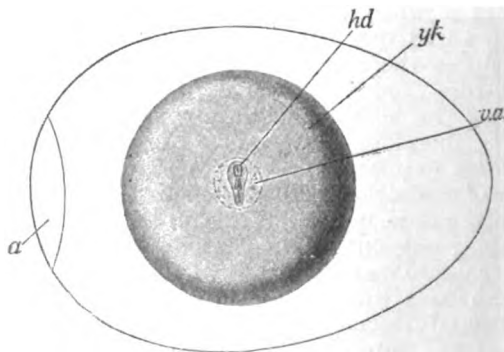


FIG. 1.—The hen's egg after twenty-four hours' incubation. *a*, air chamber; *hd*, head of embryo; *v.v.*, area in which blood-vessels will appear later; *yk*, yolk (natural size).

distinguished as a streak crossing the germinal disc in a direction at right angles to the long axis of the egg. Notice a rounded swelling at one end of the embryo; this is the *head*. Place the egg

before you with the broad end to your left, and observe that the head of the embryo points away from you.

(5) CHICK AFTER TWO DAYS' INCUBATION (Fig. 2).—Observe the increase in size of the

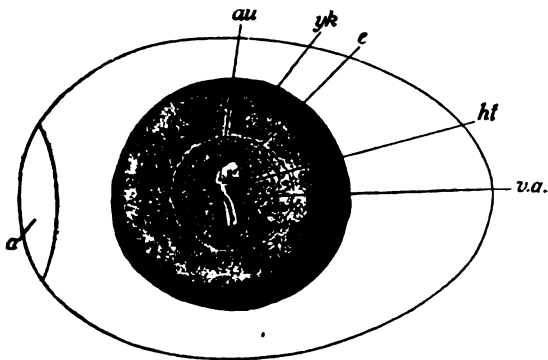


FIG. 2.—The hen's egg after two days' incubation. The amnion has been removed. *a*, air-chamber; *au*, commencement of right ear; *e*, right eye; *ht*, heart; *v.a.*, network of blood-vessels; *y*, yolk (natural size).

embryo; make a note of its length. The head and neck of the embryo are now almost covered by a very thin transparent bag which has grown over it from the sides. This bag is called the *amnion*; ¹

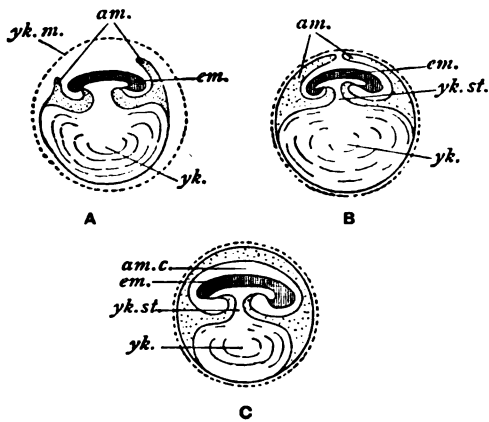


FIG. 3.—Diagrams to illustrate the formation of the amnion. The embryo and the rest of the yolk are supposed to be seen in median longitudinal section; the head is to the right. *am*, amnion folds; *am.c*, amniotic cavity; *em*, embryo; *y*, yolk; *y.st*, yolk-stalk. (After Foster and Balfour).

it is filled with fluid, and protects the embryo from jars. Remove the amnion and notice the large *head*; it is now twisted so that its left side lies against the yolk, while the rest of the embryo still lies "face-down." Observe the large *eye* on the right side of the head; the left eye cannot be seen without turning the head over. Notice the *heart*, a small red dot which by help of a lens can be seen to beat rapidly. Surrounding the embryo is a circular network of *blood-vessels* which bring food from the yolk to the heart, to be distributed to the

various parts of the body. How large is the circular area of blood-vessels?

(6) CHICK AFTER THREE DAYS' INCUBATION (Fig. 4).—The white of the egg is distinctly

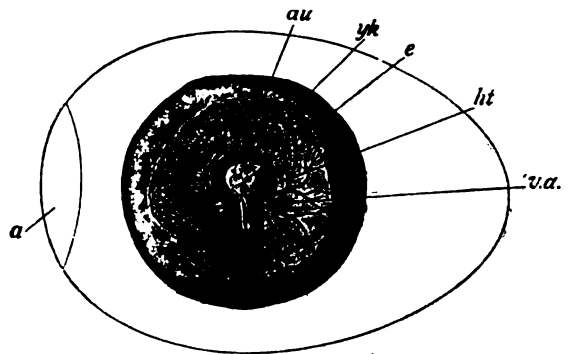


FIG. 4.—The hen's egg after three days' incubation. The amnion has been removed. References as in Fig. 2.

shrunken, and the network of blood-vessels is much larger than before. Remove the amnion and notice the marked increase in size of the embryo, especially of the *head*. The right side of the head and neck are still turned towards the shell. They are now quite free from the yolk, but the body of the embryo communicates with the yoke by a short, wide tube, the *yolk stalk*. Try to see a small pit, a little above and behind the large *eye*. This is the beginning of the right *ear*. Measure the embryo and the width of the surrounding network of blood-vessels. Watch, through a lens, the beating of the *heart*.

(7) CHICK AFTER FOUR DAYS' INCUBATION.—Carefully cut open the *amnion* to see the embryo better. Observe that the young chick is still more completely folded off from the yolk, and that the *yolk-stalk* is consequently narrower than before. The head is so strongly bent upon itself that the snout almost touches the tail. The body also has now turned over so as to lie with its left side on the yolk. Observe the two pairs of small buds which are the *rudiments of the limbs*.

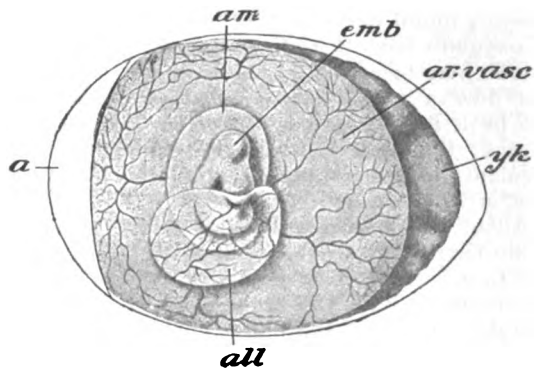


FIG. 5.—The hen's egg after five days' incubation. *a*, air-chamber; *all*, allantois; *am*, amnion; *ar.vasc*, network of blood-vessels; *emb*, embryo; *y*, yolk (natural size). (After Duval.)

(8) CHICK AFTER FIVE DAYS' INCUBATION (Fig. 5).—Cut open the *amnion*, and notice the great increase in size of the embryo, and especially the

¹ The amnion originates, early in the second day, as a double fold of the yolk-surface in front of the embryo. Similar folds arise round the sides and tail, forming a low wall (Fig. 3, A); the folds gradually grow over the embryo (Fig. 3, B) until, during the fourth day, they meet (Fig. 3, C) and enclose it in a protective transparent bag containing a watery fluid.

enormous development of the *head*. The *limbs* now show signs of division into segments. Observe the *allantois*, a thin, bladder-like structure, which has grown out from the lower part of the body, behind the yolk-stalk. Its mode of origin is well shown in Fig. 6. It rapidly increases in size, and soon

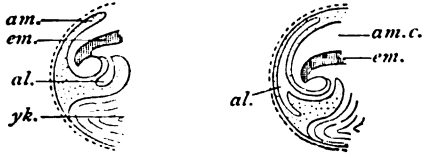


FIG. 6.—Diagrams illustrating the method of development of the allantois. *al.*, allantois; *am.*, amnion; *am.c.*, amniotic cavity; *em.*, embryo; *yk.*, yolk. (After Foster and Balfour.)

extends over the embryo (Fig. 5), and becomes closely applied to the shell-membrane. Air passes through the pores of the shell, and its oxygen is taken up by the blood which circulates in the vessels of the allantois. At the same time, waste carbon dioxide is able to escape from the blood to the outer air. The allantois is therefore the *breathing organ* of the developing chick.

(9) EFFECT OF VARNISHING AN EGG.—Varnish an egg, and leave it under the hen with unvarnished eggs for the whole period of incubation (twenty-one days). The varnished egg does not develop, because the varnish closes the pores of the shell and prevents the embryo from breathing.

The chief organs of the bird are now established. The later development is briefly as follows: by the end of the *ninth day* the white of the egg is almost used up; the yolk, however, is still large, and is connected with the chick's body by the narrow yolk-stalk. It thus appears that the white is not directly absorbed by the chick, but is first taken up by the yolk and afterwards passed on by the yolk blood-vessels which run to the heart. By this time, too, the allantois has spread at least halfway round the inside of the shell, that a supply of oxygen adequate to the increased needs of the animal may be obtained from the air. The chick has now a characteristic bird-like appearance; the beak has appeared; feathers have begun to sprout; the neck is long and slender; and the segments of the limbs, including the fingers and toes, are well defined.

About the *fourteenth day* the chick turns so as to lie lengthwise in the shell, with its head near the broad end. The yolk-sac dwindles in size, and at last, about the twentieth day, it is drawn into the interior of the body. Now the chick becomes restless, and, usually on the *twenty-first day*, thrusts its beak through the inner shell-membrane into the air-chamber (*a*) at the broad end of the egg. For the first time it draws refreshing air into its lungs, and is stimulated to break the shell by a knob on the tip of its beak, and to creep out into the world.

THE PRIVATE SCHOOLS ASSOCIATION, INCORPORATED.

THE Private Schools Association is the only educational society whose membership is confined to past or present private teachers. Those acquainted with its recent activities may be surprised to learn that it originated a quarter of a century ago, or to be more precise, on January 8th, 1878, when a dinner for headmasters of private schools, convened by the Rev. John Stewart, of the University School, Hastings, was held at the Holborn Restaurant. No definite organisation was then formed, but it was felt that such meetings should be held annually, if not oftener.

On the occasion of the second annual dinner, which was attended by about sixty schoolmasters, papers were read on "The Prospects and Responsibilities of the Private Schoolmaster," and "A Comparative Estimate of Public and Private Schools," which, with the subsequent discussion thereon, evoked a leading article in the *Times*. At this meeting it was resolved "That an Association be hereby formed, and that its name be 'The Association of the Principals of Private Schools.'"

Its objects were declared as "To unite the members in a common bond, to protect the interests of the profession, and to hold periodical meetings in London and elsewhere for the discussion of educational topics, more especially such as relate to the position and status of the private schoolmaster." A committee of twenty-four was chosen to carry out this programme. During the next twelve months, three gatherings took place in London, and a summer meeting was also held at Hastings.

The educational questions discussed at the third meeting were published in pamphlet form as occasional papers. In 1880, the society established a quarterly journal, *The Private Schoolmaster*, which superseded the occasional papers.

Space does not permit more than a passing reference to the next few years during which slow but definite progress was made in promoting professional comradeship, comparing notes on educational topics of mutual interest to private schoolmasters, and providing opportunities for pleasant social intercourse. In 1882, the scope of the Association was wisely enlarged by the admission of lady principals to membership.

The annual report of 1887 described some of the extraordinary difficulties encountered in welding together heads of private schools in professional union. The total number of members was but 139. The want of public spirit among schoolmasters was deplored and the committee made an urgent appeal to their *confrères* outside to join the Association, and give it that advantage of numbers without which it could exercise but little influence.

The desire for a Register of teachers, which the best private schoolmasters have all along felt was a *sine qua non* for the recognition of their profession,

and the exclusion of incompetent persons from it, was prominently referred to in this report. Despite these and other strenuous efforts the Association only numbered 177 members in 1891, in which year the Easter meeting was held at Cambridge, Oxford having been visited in 1890.

After this period the constant efforts of the pioneers of private school union began to bear fruit, and by 1895 the membership had increased to about 600. Then it was that a charter of incorporation was sought for and granted. On and after October 16, 1895, the Society has borne its present title, The Private Schools Association Incorporated. The prosperity of the Society represented by this step was largely due to the energetic honorary services of the late Mr. William Brown, who was president for 1895, and died during his year of office. Though the Association was unsuccessful in its attempt to obtain a direct



MR. W. W. KELLAND, M.A.,

Oakfield School, Crouch End, N., Chairman of the Council of the Private Schools Association, Incorporated.

representative of private schools on the Royal Commission on Secondary Education held at this time, it was invited to appoint delegates. Mr. Brown and Miss Allen Olney were chosen, and full opportunity was given to them of presenting their evidence in detail.

During the next five years the membership was stationary, internal dissensions and other causes preventing the realisation of the hopes which had been formed for more rapid progress. The usual terminal meetings and Easter conferences continued to be held, and branches were formed in many parts of the provinces, including Manchester, Liverpool, Bristol, Devizes, Harrogate and Southport. The financial position was such, however, that during most of 1901 the Society could not afford a paid secretary, and all clerical duties were performed by honorary officers. In the autumn of this year a renewed attempt which has met with considerable success was made to end this unsatisfactory state of affairs, and make the Society a real power in the educational and political world. An Or-

ganising Secretary was appointed, and a meeting held at the College of Preceptors to announce the re-organisation of affairs, at which the President (Sir G. C. T. Bartley, K.C.B., M.P.) defined the policy of the Association towards the proposed Education Bill.

The key notes of this meeting, which marked the commencement of a new epoch in the history of the Society, were the pressing necessity of adaptation to the spirit of association which distinguishes all successful modern enterprises, and the importance of justifying private-school education at the bar of public opinion. The promotion of conferences in various parts of the country to demonstrate the efficiency of the majority of private schools, the exercise of parliamentary influence, and the securing of direct representation on the new education authorities, were some of the means of impressing public and governmental opinion which were advocated on this occasion, and have since been most vigorously carried out. Meetings were organised in London and the provinces which resulted in the formation of many new sections and branches, and the adhesion of large numbers of heads of private schools. A guarantee fund was raised to defray extraordinary expenses. Questions were asked in Parliament by the President of the Association which revealed to many for the first time the existence of the movement. Communications were made to the Board of Education in the interests of private teachers and their pupils, and slowly but surely a greater spirit of comradeship and cohesion than had ever been exhibited before was developed among members of the profession. During the passing of the Education Act large numbers of M.P.'s were personally interviewed in the lobby of the House of Commons, and over sixty expressed themselves as favourable to the aims and objects of the Association. The principal concession secured by these exertions is that contained in the sub-section to clause 2 of the Act, to the effect that "A Council in exercising their powers under this part of the Act (Higher Education) shall have regard to any existing supply of efficient schools and colleges. . ."

The new organising activity was not allowed to obscure the more academic aims of the Association, which include the spreading of information on the improvement of educational methods. Apart from the work of local committees in this direction the Council appointed an Educational Committee, which convened a well-attended national conference of private teachers at South Kensington in October last year, which was addressed by leading educationists. Leaflets have also been published from time to time, from the private school point of view, addressed to parents, parliamentarians, and the general public, besides the regular issue of *Secondary Education*, the monthly journal of the Association.

These and other efforts have resulted in a great increase in the numbers and influence of the Association, which now admits assistant secondary teachers. Its proceedings are accorded consider-

able attention in the daily and educational press, and it is invited to send delegates to every important educational conference, such as the recent meeting at Cambridge University on the training of teachers and the Conference on "Technical and Secondary Education." Direct representatives on the Consultative Committee and the Teachers' Registration Council, though not yet secured, can hardly be much longer deferred. Since the passing of the Education Act, members of the Association have been co-opted on several Education Committees, including those of Hornsey, Hastings, Ealing and Blackpool.

The policy of the Association, far from being retrograde, includes strong approval of the principle of the Teachers' Registration Order (subject to certain modifications for the first three years in the case of teachers of experience and capacity, who may not possess the academic qualities required) and advocacy of inspection for the recognition of schools. It is opposed to all inefficient schools whether public or private, but contends that, when efficiency has been proved, private schools have a right to demand absolute equality and fair consideration at the hands of public authorities.

It would be most inappropriate to conclude this notice without referring to the Chairman of the Council, Mr. W. W. Kelland, M.A., of Oakfield School, Crouch End, whose portrait accompanies this article. It is impossible to exaggerate the debt which the Association owes this gentleman for its present prosperous condition. His public spirit and energy are mainly responsible for the progress it has made in a short period from a comparatively small and ineffective society to an organisation with nearly fifty local branches and fifteen hundred members. The detailed work has principally devolved upon Mr. H. R. Beasley, the General Secretary, and Mr. Henry C. Devine, the Treasurer, and Manager of *Secondary Education*, of which the Rev. J. B. Blomfield is Literary Editor.

and intelligible to the non-expert. Even the ordinary ignorant traveller, if he reads the more general portions of the book, will find them so expressed that he is enabled to understand what he will see at Pompeii. And there are very few students who will be able to say that the book tells them only what they know.

The book includes a short history of Pompeii up to the time of the eruption, and a sketch of the course of the excavations. Then the chief places and buildings of the city are taken one by one, each described and explained, and in some cases restorations offered. After the fora, theatres, temples, and houses have thus been passed in review, chapters are added on such allied topics as these: The Trades and Crafts of Pompeii, Inns and Wineshops, the Tombs, Architecture, Painting, Sculpture, the Inscriptions, and Graffiti. The last chapters, those which deal with ancient life, will be most interesting to the general reader. In particular, the inscriptions bring the old town very close to us. Election cries, houses to let, runaway slaves, curses, and love-messages, all sorts of oddities, are chronicled upon the walls, and live, now that *Restitutus* the Don Juan, or *Vatia* the would-be ædile, have been dust these two thousand years. A Greek bull, quoted by the author from the Palatine Hill at Rome, is worth recording: "Everybody writes something here, except myself." The more serious student will glean a great deal of information on various departments of antiquities. The account of the Roman House is of value for other places than Pompeii, although it is not a complete history. Religion and superstition are touched on, and there is a great deal of information about the less important *realien*, pots and pans, tables and utensils. There is new light on the *triclinium*. The schoolmaster who is alive to the importance of a knowledge of antiquities as illustrating his work should not fail to procure this book. It is not only the best short account of Pompeii, but a great deal more.

LIFE IN POMPEII.¹

ARCHÆOLOGISTS know that Prof. Mau is one of the greatest living authorities on all connected with Pompeii. He has spent a large part of his life in studying it, and has written a great deal on the subject. We are prepared, then, to find this book accurate, full, and sound. However, it is not every sound archæologist who can write a good book, and a book of the present type is apt to fall between two stools, to be either too learned or too shallow. Prof. Mau has to a remarkable degree avoided both these faults. His book is not only learned, but it is interesting

¹ "Pompeii, its Life and Art." By August Mau, German Archæological Institute at Rome. Translated into English by F. W. Kelsey, University of Michigan. With numerous illustrations from original drawings and photographs. xxv. + 559 pp. (Macmillan.) 10s. 6d. net.

EDUCATIONAL REFORM.¹

PROF. KARL PEARSON'S prefatory essay on "The Function of Science in the Modern State," in the eighth of the new volumes of the "Encyclopædia Britannica," is so full of matter of educational importance that this notice of the volume must almost be limited to a statement of some of the points presented by him. The essay is an analysis of the factors which constitute the modern State, with suggestions as to how each should be strengthened, with the object of promoting national progress. To some extent the essay may be regarded as dealing briefly with the same subjects as Prof. Pearson's "National Life from the Standpoint of Science," and the

¹ "The Encyclopædia Britannica." The eighth of the new volumes, Vol. XXXII. of the complete work. Pri.-Sto. xxxvii. + 856 pp. (Black and *The Times*.)

outlook is one which merits contemplation by all who are interested in the development of national life and character.

It is necessary for all of us to be scientific even if we are not professed teachers or students of any of the positive sciences. In educational questions, we ought to be able to rise above the claims of advocates of this or that branch of knowledge for a place in the school curriculum, and decide from our point of view the courses which should be followed by pupils whose school lives end at particular ages. There ought, in fact, to be sufficient material to construct a curriculum on scientific principles; that is to say, given a pupil and knowing the faculties it is desired to develop in him, the course he should follow should be clearly defined. At present we are far from realising this condition of things. Tradition has decided what subjects should be studied, and any attempt to depart from them is viewed with disapproval. Animate as well as inanimate nature possesses an inertia which offers resistance to any change, and it is only by persistent and strenuous influence that men are induced to deviate from the paths of their fathers.

For some years advocates of progressive education have urged that, for the good of the State, sciences and modern languages should be given greater importance in the curriculum. With few exceptions they acknowledge the value of the study of classical languages, but their friendly feelings are scarcely reciprocated. Any approach to the territory of ancient culture is resented by the guardians thereof with the alacrity displayed by Tibetan lamas towards foreigners. "As it was in the beginning, is now, and ever shall be," is the article of faith, and he who would revise this saying is regarded as a sacrilegious disturber of the peace.

Well, much can be said for the value of the study of Latin and Greek, and the reformer who thinks they may be neglected shows thereby that the essential principle of educational science is not in him. The primary object of education should not be to impart information; but if a scientific method is applied, it matters little whether classics or nature is given the greater attention. As Prof. Pearson remarks, "One man may learn how to use his reasoning powers from a teacher who adopts Greek grammar as a medium, another from a teacher whose material is provided by the hedge-row, and the powers gained in either way may be turned from one to another subject." Let us not, then, wrangle about subjects, but methods, and we shall be in a fair way to arrive at a place of mutual understanding between representatives of both science and the humanities.

Training in scientific, that is, accurate, habits of observation and thought must be the criterion of good education in the future. Merit must be gauged not by ability to pass examinations but by the power to overcome difficulties; and teachers will then be relieved from the necessity of forcing unwilling minds to absorb undigested material in order to make a creditable record for the school or

their form. "Not to know the capital of Servia, the tributaries of the Don, or the constituents of the atmosphere, is no sign of defective education. 'Facts' change from generation; but skill in manipulating facts is the fundamental sign of a trained intelligence, of a true education, which survives all modifications of its material." Examinations do not test the development of this faculty of adaptation to circumstances. Every practical teacher knows, or ought to know, that duffers at school work often become men of intellectual eminence, while pupils who win high places in examinations sink into comparative obscurity in later life. Examinations are useful in bringing pupils up to the scratch, to use a vulgarism, but as a capacity-catching machine they are certainly a failure. Prof. Pearson's experience upon this matter is worth reproduction here:

During the last few years the writer has come largely in contact with a large number of young men and women whom the county councils up and down the country are educating at the national expense. These county-council scholars are, on the average, not up to the mean middle-class intelligence. It is very rarely that one could not pick out for any given post better, often many better, middle-class candidates. In this case the meshes of the net are far too small; ten per cent. of the scholarships would have sufficed to procure the really capable men and women whom it was of social value to educate for intellectual pursuits. The rest want either the originality, the power of self-assertion, or the physique which would enable them to force their way forward in a new sphere. The bitterness of failure is upon those who, scholarships ended, sink to usherdom in small private schools, or to second-rate draughtsmen in engineering works.

To change all this means an educational revolution, which, though it would be welcomed by many teachers, is beyond the range of practical politics. Examinations provide a convenient touchstone by which work can be tested, and both governors and parents attach importance to positions in honours and scholarships lists. If the spirit and not the letter of the teaching is to count, if school work is to be entirely conducted on heuristic principles, then the number of subjects in the curriculum must be reduced by about one-half, and little progress can be shown in the others. It is good for pupils to learn by experience, but advance along all such roads to knowledge is necessarily slow; and while teachers were cultivating intelligence, parents would be impatient because their children would have little to show for their work. Book-keeping, shorthand and other showy subjects have only been introduced into the curriculum as a sop to parents who think schools should be nurseries for office boys. We hesitate to suggest what such parents will think when they are told that the whole work of schools is to be designed with the object of training intelligence and not to impart information or develop any kind of manual dexterity.

It will be necessary to educate parents to these ideals, or to make the teacher independent of their views, and of examinations, before any radical change becomes possible. And, if we may add it without offence, teachers themselves will have to

pay more attention to methods than has often been the case hitherto. It is to be hoped that the time is not far distant when knowledge of the principles of teaching, and experience in school work, will be judged of more importance than a high degree or the possession of holy orders in making appointments of teachers, whether assistants or heads. A man who appears as a high wrangler on the class lists usually receives several offers of teaching posts, though he may be supremely ignorant how to keep a form in order, while many a man who is an inspired teacher has to consider himself passing rich on fifty pounds a year and residence. Prof. Pearson's statistical investigations of the physical and mental characteristics of from 5,000 to 6,000 school children seem to show that it is really safer to select a University blue than a man from the Honours school. The athletic lad has associated with this character in a very sensible degree: good health, quick temper and intelligence; and the first and last of these are the best of attributes of a successful teacher.

Many more points are dealt with in the essay which has provided the text for this notice. All the prefatory essays in the new volumes have been full of interest, but none have appealed to us quite so strongly as this by Prof. Pearson. Limitations of space prevent us from describing any of the articles in the volume, but we can confidently say that every subject between the alphabetical limits of the Pribiloff Islands and Stowmarket is dealt with, and that the teacher or student who constantly refers to the volumes for information will be astonished at the response he obtains to his inquiries.

THE CASE FOR CO-EDUCATION.¹

THE object of this small but important volume is to advocate co-education in English secondary schools. The book consists of nine essays, contributed by writers who, with one exception, have had experience as teachers in schools where boys and girls have been taught together. Without attempting a theoretical justification of the plan of educating boys and girls under the same roof, they set down a record of actual experience—in some cases, in schools for young children, in others, in schools like Keswick and Bedales which have a more ambitious aim.

There is no desire to underrate the difficulties of the experiment, and the sceptical reader will find all the obvious questions he is ready to pose fairly faced in the volume. The modesty and straightforwardness of the papers add considerably to their value both as records and as arguments. Moreover, no attempt is made to defend co-education on the ground of its success elsewhere than in England. We have no feeling that some en-

thusiastic worshippers of American ideals and methods are trying to introduce a foreign system into English schools. The book is English throughout.

Mr. M. E. Sadler, who writes an introduction, confesses that he is impressed by the papers but not fully convinced. We need not wonder at Mr. Sadler's cautious attitude, seeing that the scope of the experiments in co-education has been so far limited. Up to the present time no institution of long standing has brought up together boys and girls beyond their early teens. It is true that the promoters of co-education schools, besides claiming that their efforts with younger children have been successful, firmly believe that no insurmountable obstacle will prevent them from carrying on co-education up to the university age. This may very well be, and we may in future see public schools in which elder boys and girls are taught and trained together with a common life, common discipline, and common games. But the feasibility of the project has yet to be fully established.

Co-education and co-instruction, which one of the essayists confuses entirely, may be usefully distinguished. Co-instruction, which means that boys and girls are taught the same subjects in the same class-rooms, is commoner than the editor supposes both in elementary schools and higher institutions. In some of the smaller technical schools, in the intermediate schools of Wales, in pupil-teacher classes, boys and girls are instructed together until they are almost adults. But the results—intellectual results mainly—are not so notoriously beneficial that the system can be defended by an appeal to them. It is mostly convenience which dictates whether pupils in such schools shall be taught together or separately. Moreover, these institutions do not satisfactorily answer the two points which Mr. Sadler raises. Is a curriculum which is suitable for boys in their teens also suitable for girls at the same age? Should a girl at the dangerous growing period work as hard as she will and as hard as a boy ought to do? Co-instruction implies a Spartan equality between the sexes. Now the writers of the book under review are defending co-education, the true aim of which is moral not intellectual. But their prime defect lies in this, that in order to obtain the moral gains which co-education, the common life of the sexes, is said to bring, they accept too readily and unquestioningly the system of co-instruction which is open to grave *a priori* criticism, and which they do not attempt to defend.

THE Teachers' Guild has again this year organised holiday courses in modern languages. French courses will be held at Tours and Honfleur, the preliminary meeting of students at the former place taking place on July 31st, and at the latter town on August 1st. A Spanish course has been arranged at Santander, the preliminary meeting of which is fixed for August 1st. Full particulars may be obtained from the office of the Guild, 74, Gower Street, London, W.C.

¹ "Co-education." A series of essays by various authors. Edited by Alice Woods. xiv. + 145 pp. (Longmans.) 3s. net.

THE PLACE OF NATURE-STUDY IN EDUCATION.¹

By JOHN C. MEDD, M.A.

BEFORE determining the sphere of nature-study in any well-ordered scheme of education, we ought clearly to understand what we mean by education. We are all agreed, I imagine, that in its full sense it is a preparation for complete living; that it is not confined merely to school life, but that it is a process which begins with our birth and ends only at the grave; and that its true aim is to enable every individual to realise his or her highest activities, and to find the chief happiness in the pursuit of the good. Education so viewed demands the development of every faculty, the power to discern and appreciate the beautiful in all things, the ability to distinguish the true from the false, the reverence which Goethe paints so finely in his "Wilhelm Meister," and the humility which flows from the confession of human limitations. To most of you in this room that masterpiece of Goethe's must be familiar, and you will remember how he there, in describing a school conducted upon novel principles, points out that there is one habit of mind which no child brings with it into the world—one habit of mind which only comes by training—namely, the spirit of reverence, and he shows how by his new system he trains children into reverence for God, reverence for man, and reverence for nature.

Of this education the study of nature forms a necessary element, and we have every reason to be gratified that the fact is now so widely recognised. At the same time the increasing attention directed to the subject is not without its danger. We must be careful not to exaggerate its importance. It is an invaluable handmaid to supplement and illustrate literary lessons, but it cannot supplant them. Reading, writing and arithmetic remain the first essentials of primary instruction, and we must not lose the sense of proportion. Much has been done of late for the comparative study of educational systems: no less important is the consideration of the relative value of different subjects.

Those identified with the present movement have made no attempt to define the scope of nature-study. The subject should be as free and unfettered as Nature herself, depending for its exact form upon local circumstances. To confine it within prescribed limits or to stereotype particular methods would destroy its vitality. It is really immaterial whether the study be based upon the life of plants, insects or animals, upon geology, or upon any kindred subject, provided the teacher is an enthusiast—for an enthusiastic teacher makes an enthusiastic pupil—understands what he is talking about, and selects that branch which is most appropriate to his environment and resources. Nor can modes of instruction be determined in advance. They must necessarily vary according to the grade and aim of each school, and the facilities which each town or rural district may furnish. These facts should not be overlooked for there is a tendency in certain quarters to engage in an endless discussion over what does or does not constitute nature study, and to exclude everything which does not conform to some arbitrary standard. We must be careful lest the faddist become master of the situation. The ultimate purpose is to give an impetus to a definite reform in all education, and without any thought of disparaging literary culture, to emphasise the importance of other than purely literary studies for the full development of the faculties of every child. Books alone leave untouched the powers of observation, they do little to stimulate the spirit of enquiry or to provoke an intelligent interest in the

world about us; their influence at school lies mainly in the region of memory. Accuracy of hand and eye, and correctness of judgment, which depends upon accurate observation, are the first conditions of a successful career in any industrial or commercial pursuit. This applies equally to every class in the community, and a system of education which neglects to promote these necessary qualities fails of its true object, and tends to become a dull mechanical process, wearisome to all who have to submit to it.

Nature-study, it must be remembered, has many functions to fulfil. In primary and secondary schools its mission is educational, to train the mind, the eye, and the hand, and to serve as an introduction to science as such. In continuation and agricultural schools the aim is technical and utilitarian. It is well to maintain these distinctions lest it should be imagined that some highly specialised form of instruction were advocated for the former schools, where it would be altogether mischievous and out of place. The lessons should be directed as much as possible towards *living* objects to trace the life histories of plant, animal or insect. As it has been feared that the scholars may be led to do irreparable harm by the wanton destruction of rare plants or birds for their school museums, it cannot be too strongly insisted upon that collecting for the sake of collecting is worthless, and one of the results to be looked for from nature-study is a greater reverence for all living things. The proper way in which to study a plant or an insect is in its living state. This may easily be done by cultivating a few plants in boxes or pots, or by watching the development of insects in breeding cages. Simple experiments may also be performed, the apparatus for which can be inexpensively constructed out of the most ordinary material without any special skill in handicraft. The instruction may be given partly in school, partly through walks, and partly by the cultivation of flowers and vegetables in gardens attached to the school, where such are available. Plants and flowers should be studied objectively, and their structure explained. Their life and habits should be illustrated from plants grown in bottles, pots and boxes, in water, sand, sterile or fertile soil. The effects on growth of light, air, warmth and moisture, should also be demonstrated. Lessons should in every case be appropriate to the season of the year, and neither teacher nor pupil ought to rely upon text books. Again and again the late Professor Huxley stated that, if instruction in the elements of natural and physical science were to be mere bookwork, it would be wiser not to attempt it. "Unless what is taught," he said, "is based on actual observation and familiarity with facts, it is better left alone." Everyone is aware how much the teaching of botany has suffered hitherto from this defect. Children should be led to make their own investigations; they should be told as little as possible and made to discover as much as possible. In other words, the process of education should, as one of our profoundest thinkers has said, be largely one of self-instruction. Any piece of knowledge which the pupil has himself acquired, any problem which he has himself solved, becomes by virtue of the conquest much more thoroughly his than it could else be. "*Savoir par cœur n'est pas savoir.*"

That nature-study should occupy an honourable place in all education, hardly admits of question. Instruction of every kind has two values: its value as knowledge, and its value as mental discipline. "We are all coming to be agreed," as Matthew Arnold said in 1878, "that an entire ignorance of the system of nature is as gross a defect in our children's education as not to know that there was such a person as Charles the First." And it is unnecessary to insist upon the importance of even an elementary knowledge of the principles of natural and physical science. As a mental discipline, nature-study perhaps more than any subject trains and strengthens common sense.

¹ Abstract of an Address to the West Ham Education Conference, April, 1903.

It stimulates the reflective faculties, for which books alone can effect little but from which spring intelligence and judgment. It utilises and guides aright that spontaneous education which begins with our earliest years, when the desire to investigate our surroundings is paramount. It has been truly said that man has a great deal of curiosity, but very bad eyes. The first business then of nature-study is to teach the child to open his eyes and how to use them. Every teacher is familiar with the child's restless observation, which, instead of being checked or ignored, should be diligently ministered to. Those powers of observation should be systematically cultivated. We shall thus be laying the foundations of that process of acquiring knowledge on which all subsequent knowledge ought to be based, and shall be whetting the appetite for information in proportion as we encourage, and direct the natural tendencies of the mind. This is to make the acquirement of knowledge pleasurable and is the secret of all successful teaching. It is the surest means of leading our scholars to continue through life that self-instruction in which we aided them as tiny children, and it will free us from the reproach of worshipping the symbols of knowledge rather than knowledge itself. "If there is a more worthy aim for us than to be drudges," Herbert Spencer tells us, "if there are other uses in the things around us than their power to bring money—if there are higher faculties to be exercised than acquisitive and sensual ones—if the pleasures which poetry, and art and science, and philosophy can bring are of any moment—then it is desirable that the instinctive inclination, which every child shows to observe natural beauties, and investigates natural phenomena should be encouraged."

FIRST LESSONS IN SCIENCE.¹

By A. T. SIMMONS, B.Sc., A.R.C.Sc.(Lond.)

THE late Prof. Clifford, in an address to the British Association in 1872, defined scientific thought as that which "enables a man to deal with different circumstances that he has never met with before;" so that, following this brilliant thinker, we may say that the teacher who relies upon didactic teaching alone is guilty of omitting to impart just that power of scientific thinking which is the most valuable endowment with which any person can start the battle of life. Now, bearing in mind that the business of education is to prepare us for the work of life, to train us that we may make the best use of all the faculties with which we have been endowed, it must be evident to everyone that, since success in life consists in successfully tackling each new difficulty as it turns up, the only form of science teaching which is justifiable in the school is just that development of an attitude, the cultivation of a habit of scientific thinking, which is the one thing that mere didactic teaching of facts of science will not give.

It may be said that the scientific method of thinking may be brought into existence by the study of subjects other than those of science. For instance, that new difficulties and combinations are met with in the solution of geometrical riders; that the constant succession of new arrangements met with in constructing Latin and Greek, or in translating from one modern language into another, gives a training of the same kind even if different in degree. There is no doubt of the great value of both these forms of mental exercise, but I believe science gives

a form of mental gymnastic which can be replaced by no other kind of human learning, and for the following reasons.

Science when properly taught differs as an instrument of education from all other subjects because, first, at one and the same time the observing faculties are in constant activity, with a resulting progressive improvement in the pupil's intelligence. The intimate contact with things instead of words leads unconsciously to the habit of reasoning only from ascertainable facts. Authority merely, be it never so respectable, is deemed insufficient ground for accepting the truth of any statement, without personal examination of the evidence for and against it. In the third place, the study of science cultivates habits of accuracy. It is impossible to follow a course of physical experiments of the kind which everyday becomes more common in our schools—a course, that is, in which measurement takes a prominent part, and where the great majority of the exercises are quantitative—without forming the habit of expressing precisely a condition of things without exaggeration on the one side, and without on the other discounting factors the absence of which is desired.

To secure these desirable results the science teaching must be of the right kind. There must be an intelligent selection of subjects; practical teaching arranged with the right object in view; teachers versed in the scientific method and able to experiment and to devise, if necessary, new experimental inquiries; and, fourthly, time enough.

There must be an intelligent selection of subjects.—In face of the fact that, as teachers, we have to deal with developing minds which at the outset are very immature, we must correspondingly graduate our lessons, beginning with those subjects which appeal to the childish mind and proceed systematically to those branches of knowledge which are only suitable later, and are indeed the only means of strengthening the maturer minds of older children. We must enquire: About what things does experience teach us, the ordinary, healthy child is first curious? Which of the multitude of new phenomena with which he comes into contact appear to interest him most? Even the casual observer is able to answer the questions with assurance. A child, if left to himself, proceeds first to observe and study his surroundings. The material objects making up his environment provide him ample opportunities for unlimited original research. These investigations begin even before he has any command of language. Bright or moving objects appeal to very young infants, and, just so soon as they are able to ask simple questions, they want to know about the colours, the shapes, and the general properties of a thousand and one things. A little later in life, when experience has widened, out-of-door objects command most attention. Flowers soon appeal to the youngster as being pretty. Familiar animals are, following Adam's example, duly named. We are all familiar with "moo-cow," "gee-gee," and so on. Very soon more distant objects and more difficult subjects of inquiry engage the growing child's attention. Parents are familiar with such questions as "Why does the wind blow?" "Where does the rain come from?" "What makes the moon shine?" "Where does the sun go at night?" and many similar inquiries. And though I may appear to have been a very long time arriving at a specific reference to nature-study, we have now reached a point where we may understand the value, from an educational point of view, of the introduction of nature-study into school work.

In my judgment, the nature-study in elementary schools will consist of a carefully selected, nicely graduated, series of lessons, which will, in an interesting way, deal with all those objects and phenomena about which the natural child has a healthy, spontaneous interest. Questions such as those I just enumerated will, in so far as they can, taking into account the state of mental development of the children, be answered by a personal

¹ Abridged from an address to the Ealing and District Branch of the National Union of Teachers.

appeal to the objects themselves, and by a careful repetition of observations of them by the children.

Here we come face to face with another important consideration. Much of this nature-study will, it is clear, not be given in lessons which figure on the time-table under the name of nature-study. Some will be given in the geography lessons. It is too often forgotten that a subject such as earth-sculpture is as much nature-study as is the examination of a flower. Other valuable nature-study work will be done in the drawing periods. It is impossible to draw a plant or an animal from nature without a very definite use of the observing faculties. Nor need we stop here. So frequent are the appeals to Nature in our literary masterpieces that the teacher who misses the opportunity afforded by the reading lesson will miss one of the most fruitful chances in school work of cultivating an intelligent appreciation of the beauty and grandeur of animate and inanimate Nature. It is only necessary to mention the composition exercise to remind you that it provides another excellent occasion which the alert teacher will turn to useful account.

But over and above these lessons by the way, there will, in addition, be other lessons occurring at stated times, and specifically devoted to the scientific study of natural things. They will not, I hope, constitute the whole of the instruction in the methods of science given during school life. They will largely give place, during the last two years at school, to more formal work in physics and chemistry, according to a plan I hope later to sketch. But it will be more convenient to consider the content of the lessons, and the way they should be given, under the second necessary constituent of rational teaching of science. I have now to insist :

We must have practical science-teaching arranged with the right object in view.—Everything the child learns he must know from his own personal, practical experience. Mere didactic teaching is altogether inadequate. Our chief business in this work is to discourage a facile reliance upon the authority of other persons. These three sentences provide tests by which to gauge the suitability of the science instruction in schools. Let us attempt to apply these criteria to working out, in view of what has already been said, a course of work for elementary schools. We already have the broad foundations of such a course. It is threefold. In its early stages a suitable course of work in science for the schools with which most of you are connected will be made up of object studies. These give place in the second stage to simple lessons in physics, which consist almost entirely of easy measurement and simple physical inquiries. The final stage, which follows quite naturally, consists of an examination of simple chemical changes, in which the child is the investigator finding out things for himself.

Now, what about the object studies? I shall most quickly get to the root of the matter by stating boldly at once that an object study is not an object lesson of the old type with which you are all familiar. It is an easy matter to give an orthodox object lesson, but to organise a proper object study taxes the ingenuity even of highly qualified men of science. I should say that unless you are prepared to take infinite pains and to give yourselves a great deal of trouble it is better to leave it alone.

Books on object lessons will not help you much. I know from my own experience that one is there provided with complicated notes of lessons on such things as a "post-office," "rail-roads," "whales," and other things which at least are unsuitable, if we want to place a specimen in the hands of each child. The selection of the subject should not be made by reference to any book or "code."

Provided the teacher has been trained in the ways of science, and without some such preparation he should not be entrusted with the science teaching, it matters little what text he is provided with, he will be quite able to develop the scientific

attitude of mind, whatever his subject and whatever the difficulties he has to overcome.

Nature-study must in a large measure give way, at about the age of twelve, to lessons in practical physics. It is exceptional for children to remain in the elementary school after fourteen years of age, so that to utilise the last two years of school life we must begin our physical measurements at about twelve. In advocating this course, one is usually met with the answer that the expense of equipment renders instruction in physics quite unsuitable for elementary schools. But this idea is born of a wrong conception as to what the teaching of physics in schools should include. It is easily possible with a few simple things, such as a ruler graduated into inches and centimetres, some squared paper, a balance, glass tubes, a few simple solids, and some amount of ingenuity in adapting the odds and ends of everyday life to useful account, to teach all that a boy need know about length, area, volume, density, and simple mechanics, and at the same time to train the child in habits of accuracy, observant alertness, and proper reliance upon the evidences of his senses. It cannot, however, be too often insisted that the information gained in these lessons is of secondary importance; the vital thing is the habits we help the children to form.

Similarly, in the work of the last year at school, when simple chemical inquiries make up the science lessons. Unless the teacher has a right ideal before him, the lessons in chemistry may become vain repetitions of the properties and preparations of substances, about which the children really know nothing worth knowing. That is, they know nothing of their own observation and from their own experiments. If some of you are still unacquainted with what Prof. Armstrong has said and written about the teaching of chemistry, I would strongly urge you, if you think of introducing science teaching into your schools, to read, mark, and inwardly digest his lessons. He has shown how that, beginning with some simple observation, such as the one that iron rusts if left in a damp atmosphere, it is possible to start the child on a succession of simple researches connected by an easily followed chain of reasoning; and that from such a training the child emerges a rational human being, able to test statements for himself, and not in the least likely to take *any* statement on trust.

We now come to the third necessary characteristic of satisfactory science-teaching.

The teachers must be versed in the scientific method and be able to experiment.—If science could really be learnt from books the whole matter would be simple enough, for I understand that the teachers in elementary schools are experts in mastering the contents of any volume. But science cannot be properly studied without practical experimental work, partly in the laboratory and partly out in the country with Nature herself as the teacher. To understand the lessons which the objects of the country have to teach, much help can be obtained from competent guides, who have themselves learnt the way to solve the riddles Nature seems to delight in. In this direction teachers anxious to become scientific exponents of nature-study must take advantage of any aid they can find. Among the organisations from which teachers can obtain help are "field clubs," and summer courses for teachers, like that arranged last summer at Cambridge in connection with the University Extension movement; or, on a smaller scale, that arranged at Shanklin, in the Isle of Wight, in connection with the Hartley University College. But, of course, meetings such as the one at Cambridge or Shanklin are special occasions; and the teacher will accomplish much of his own education privately, and I know of no better way than honestly and painstakingly to follow the pieces of work described by recognised authorities, such as the delightful studies by Prof. Miall in his book "Round the Year," or those in Prof. Bailey's "Lessons with

the Plants," to name two examples I am acquainted with. I know that in what I have recommended I am taking it for granted that the teachers recognise the obligations of their high calling. The man or woman who teaches merely with a view to the monthly or quarterly cheque will never make a good teacher of the scientific method, nor of nature-study which the former includes. There are many other ways in which a man can secure a substantial balance at his bank, but teaching is a calling for the elect of the world. It is a life of self-sacrifice, in which financial standards have no place. Fortunately, the teachers of England are generally men and women who appreciate the value of their profession and strive after ideals more exalted than the acquisition of money.

To secure satisfactory science teaching in our schools, *time enough* must be given to the work.

Speaking to the Liverpool Philomatic Society thirty-three years ago, the late Prof. Huxley demanded a minimum of four hours a week in each class of a school for this instruction in the scientific method. More recently, in his contribution "The Heuristic Method of Teaching," in the second of Mr. Sadler's "Special Reports," Prof. Armstrong has written "In all schools open in the afternoon, after the mid-day meal, I would only allow work to be done in the workshop or workroom—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." As many of you may know, by Prof. Armstrong's "workshop" is meant, in the language of everyday life, the school laboratory.

However reasonable and desirable it may be that these large amounts of time should be given to instruction in scientific method, I am bound to say that I believe it is just now a counsel of perfection. If, however, an attempt is made to give the ordinary lessons of the school, the geography lesson, the drawing lesson, the periods given to reading and composition, the scientific complexion which I hope I have shown is possible, we shall very nearly approach Huxley's demand, and there will be Prof. Armstrong's ideal to work up to, if we find the good results we anticipate follow from lessons of the kind we are thinking about.

What results may be expected from work of this kind? Both our politicians and our philosophers agree that in the future, so far as the competitions of the nations are concerned, "the race will not be to the swift, nor the battle to the strong." The efficient nations will do the work of the world. And the efficient nation will be the one which, with a faith in the methods of scientific education, has been content to forego present gratification, in order to train itself effectively in the methods of science, has become abreast of modern knowledge, and able to utilise recent researches wherever made; but that advantage may be taken of all advances in knowledge, we must have among us observant men, trained to test statements of every kind, and able themselves to extend the boundaries of science into the regions of the unknown. And it is men of this kind we *shall* train, if having first obtained capable teachers, we set them to work on the new lines and persuade them to attach more importance to trained faculties than to any amount of encyclopedic knowledge gained on hearsay.

WE have received from the Educational Supply Association, Ltd., Holborn Viaduct, specimens of an admirable series of Nature Note Books. Three books are supplied of varying numbers of pages consisting of alternate sheets of cream-laid ruled exercise paper and of cartridge paper, while a larger book contains only cartridge paper. The cartridge paper will serve excellently for water-colour drawings and the ordinary alternate sheets for the purpose of the student's notes.

MATHEMATICAL REFORM AT CAMBRIDGE.

THE PROPOSED NEW COURSE IN GEOMETRY.

THE Syndicate appointed by the University of Cambridge last December to consider what changes, if any, are desirable in the regulations that affect the mathematical portions of the Pass Examinations of the University, in particular of the Previous Examination, have sent to the Senate a report, which was discussed on May 21st and will almost certainly be accepted. The following extracts from the report will be read with interest by all who are engaged in mathematical teaching.

The Syndicate are convinced that a modification of the requirements of examinations is a necessary preliminary to any substantial improvement in teaching. The subject in which the influence of the examination schedule has been most felt is that of geometry: in arithmetic and algebra no text-book has been prescribed, but the examination in geometry has been dominated by the sequence and text of Euclid. To this predominance may be traced many of those features in the present state of geometrical teaching to which attention has been called of late. In the first place, the text of Euclid contains a considerable amount of matter which is of slight importance in the development of the subject; on this account much time has been spent in carefully learning propositions which are of small interest. In the next place, the freedom of teachers has been much restricted by the condition at present imposed of adherence to Euclid's sequence in the proofs of propositions. Another effect has been to limit the study of geometry to formal demonstrative geometry, whereas the opinion is strongly held by experienced teachers that this study would be rendered more effective by some preliminary and concurrent work in practical geometry. Further, under the present system the study of geometry is unduly isolated from the other branches of mathematics which are generally studied at the same time. The Syndicate are of opinion that it is no longer desirable to insist on the maintenance of Euclid's Elements as a text-book. They consider that the time has arrived for giving liberty to those teachers who prefer other methods of treatment and who do not wish to teach the whole number of Euclidean propositions or to adhere to the Euclidean sequence. The Syndicate have accordingly drawn up a schedule of propositions to indicate the necessary book-work of the parts of demonstrative geometry required for the Previous Examination. With few exceptions these propositions are contained in Euclid's Elements. A separate schedule of constructions in practical geometry has been drawn up and includes those problems which seem best adapted to accompany the course of demonstrative geometry. The Syndicate propose some modifications in the requirements of arithmetic and algebra for the Previous Examination. As regards the date at which the new regulations come into force, the Syndicate recommend that during the year 1904 papers shall be set both under the present and the proposed regulations.

Geometry.—The paper in geometry shall contain questions on practical and on theoretical geometry. Every candidate shall be expected to answer questions in both branches of the subject. The questions on practical geometry shall be set on the constructions contained in the annexed Schedule A, together with easy extensions of them. In cases where the validity of a construction is not obvious, the reasoning by which it is justified may be required. Every candidate shall provide himself with a ruler graduated in inches and tenths of an inch, and in centimetres and millimetres, a set square, a protractor, compasses, and a hard pencil. All figures should be drawn accurately.

Questions may be set in which the use of the set square or of the protractor is forbidden.

The questions on theoretical geometry shall consist of theorems contained in the annexed Schedule B, together with questions upon these theorems, easy deductions from them, and arithmetical illustrations. Any proof of a proposition shall be accepted which appears to the examiners to form part of a systematic treatment of the subject; the order in which the theorems are stated in Schedule B is not imposed as the sequence of their treatment. In the proof of theorems and deductions from them, the use of hypothetical constructions shall be permitted. Proofs which are only applicable to commensurable magnitudes shall be accepted.

SCHEDULE A.—Bisection of angles and of straight lines.

Construction of perpendiculars to straight lines.

Construction of an angle equal to a given angle.

Construction of parallels to a given straight line.

Simple cases of the construction from sufficient data of triangles and quadrilaterals.

Division of straight lines into a given number of equal parts or into parts in any given proportions.

Constructions of a triangle equal in area to a given polygon.

Construction of tangents to a circle and of common tangents to two circles.

Simple cases of the construction of circles from sufficient data.

Construction of a fourth proportional to three given straight lines and a mean proportional to two given straight lines.

Construction of regular figures of 3, 4, 6 or 8 sides in or about a given circle.

Construction of a square equal in area to a given polygon.

SCHEDULE B.—*Angles at a Point.*—If a straight line stands on another straight line, the sum of the two angles so formed is equal to two right angles; and the converse.

If two straight lines intersect, the vertically opposite angles are equal.

Parallel Straight Lines.—When a straight line cuts two other straight lines, if

- (i.) a pair of alternate angles are equal,
- or (ii.) a pair of corresponding angles are equal,
- or (iii.) a pair of interior angles on the same side of the cutting are together equal to two right angles,

then the two straight lines are parallel; and the converse.

Straight lines which are parallel to the same straight line are parallel to one another.

Triangles and Rectilinear Figures.—The sum of the angles of a triangle is equal to two right angles.

If the sides of a convex polygon are produced in order, the sum of the angles so formed is equal to four right angles.

If two triangles have two sides of the one equal to two sides of the other, each to each, and also the angles contained by those sides equal, the triangles are congruent.

If two triangles have two angles of the one equal to two angles of the other, each to each, and also one side of the one equal to the corresponding side of the other, the triangles are congruent.

If two sides of a triangle are equal the angles opposite to these sides are equal; and the converse.

If two triangles have the three sides of the one equal to the three sides of the other, each to each, the triangles are congruent.

If two right-angled triangles have their hypotenuses equal, and one side of the one equal to one side of the other, the triangles are congruent.

If two sides of a triangle are unequal, the greater side has the greater angle opposite to it; and the converse.

Of all the straight lines that can be drawn to a given straight line from a given point outside it, the perpendicular is the shortest.

The opposite sides and angles of a parallelogram are equal, each diagonal bisects the parallelogram, and the diagonals bisect one another.

If there are three or more parallel straight lines, and the intercepts made by them on any straight line that cuts them are equal, then the corresponding intercepts on any other straight line that cuts them are also equal.

Areas.—Parallelograms on the same or equal bases and of the same altitude are equal in area.

Triangles on the same or equal bases and of the same altitude are equal in area.

Equal triangles on the same or equal bases are of the same altitude.

Illustrations and explanations of the geometrical theorems corresponding to the following algebraical identities:—

$$k(a + b + c + \dots) = ka + kb + kc + \dots,$$

$$(a + b)^2 = a^2 + 2ab + b^2,$$

$$(a - b)^2 = a^2 - 2ab + b^2,$$

$$(a^2 - b^2) = (a + b)(a - b).$$

The square on a side of a triangle is greater than, equal to, or less than the sum of the squares on the other two sides, according as the angle contained by those sides is obtuse, right, or acute. The difference in the cases of inequality is twice the rectangle contained by one of the two sides and the projection on it of the other.

Loci.—The locus of a point which is equidistant from two fixed points is the perpendicular bisector of the straight line joining the two fixed points.

The locus of a point which is equidistant from two intersecting straight lines consists of the pair of straight lines which bisect the angles between the two given lines.

The Circle.—The straight line, drawn from the centre of a circle to bisect a chord which is not a diameter, is at right angles to the chord; conversely, the perpendicular to a chord from the centre bisects the chord.

There is one circle, and one only, which passes through three given points not in a straight line.

In equal circles (or, in the same circle) (i.) if two arcs subtend equal angles at the centres, they are equal; (ii.) conversely, if two arcs are equal, they subtend equal angles at the centres.

In equal circles (or, in the same circle) (i.) if two chords are equal, they cut off equal arcs; (ii.) conversely, if two arcs are equal, the chords of the arcs are equal.

Equal chords of a circle are equidistant from the centre; and the converse.

The tangent at any point of a circle and the radius through the point are perpendicular to one another.

If two circles touch, the point of contact lies on the straight line through the centres.

The angle which an arc of a circle subtends at the centre is double that which it tends at any point on the remaining part of the circumference.

Angles at the same segment of a circle are equal; and, if the line joining two points subtends equal angles at two other points on the same side of it, the four points lie on a circle.

The angle in a semicircle is a right angle; the angle in a segment greater than a semicircle is less than a right angle; and the angle in a segment less than a semicircle is greater than a right angle.

The opposite angles of any quadrilateral inscribed in a circle are supplementary; and the converse.

If a straight line touch a circle, and from the point of contact a chord be drawn, the angles which this chord makes with the tangent are equal to the angles in the alternate segments.

If two chords of a circle intersect either inside or outside the circle the rectangle contained by the parts of the one is equal to the rectangle contained by the parts of the other.

Proportion: Similar Triangles.—If a straight line is drawn parallel to one side of a triangle, the other two sides are divided proportionally; and the converse.

If two triangles are equiangular their corresponding sides are proportional; and the converse.

If two triangles have one angle of the one equal to one angle of the other and the sides about these equal angles proportional, the triangles are similar.

The internal bisector of an angle of a triangle divides the opposite side internally in the ratio of the sides containing the angle, and likewise the external bisector externally.

The ratio of the areas of similar triangles is equal to the ratio of the squares on corresponding sides.

Arithmetic.—A knowledge of recurring decimals and of the process of extracting cube root shall not be required. The use of algebraical symbols and processes shall be permitted.

Elementary Algebra, viz., addition, subtraction, multiplication and division; simple equations; fractions; highest common factor, lowest common multiple; quadratic equations; solution of two simultaneous equations, one at least being linear; simple graphs; problems requiring the classes of equations specified; simple questions on fractional indices; the nature and simple properties of logarithms to the base 10, with easy applications of four-figure tables; ratio and proportion; arithmetic progression, finite geometric progressions.

THE "MAGIC CARPET" IN THE CLASS-ROOM.

By G. F. DANIELL, B.Sc.
Science Master at the Mercers' School.

A DEMONSTRATION of the use of the stereoscope as an aid to education, particularly in connection with class teaching, was given by Messrs. Underwood and Underwood at the Mercers' School, Holborn, on May 8th.

I was thoroughly convinced of the success of the triple alliance of boy, master and instrument, in investigating the scenes presented. The boy is put first intentionally, for it was unquestionably the fact that the boys' minds were immediately set to work, and were made to discover and reason. I wish to describe the method used on this occasion, and to suggest other directions in which assistance is to be gained by employing the stereoscope. It is hoped readers of THE SCHOOL WORLD will, if they have not done so already, find out for themselves how great are the potentialities of this instrument, as it would be impossible to describe a tithe of what is being done in America alone within the limits of a single article.

The lecturer, Mr. F. O. Penberthy, began by telling the class to adjust their "scopes" by the aid of a test view. This was accomplished in a few seconds. The effect of the instrument was shown by a few well-chosen stereographs and *inter alia* the correction of the perversion of perspective in ordinary photographs was strikingly demonstrated. (I should always advise the use of some such introductory "graphs" in a first lesson.) The effect of reality is startling. No artist has achieved such correct effects of chiaroscuro, "atmosphere" and lighting. All through the demonstration it was evident that the boys while looking through the "scopes" were intently interested in what seemed to them the *real scene* and not the picture merely.

Under these conditions the boys were then transported to Canada and California to witness stages in the work of "lumbering." Observation was followed by inference and inference tested by re-observation. Thus a short heuristic lesson on four scenes provided not merely a considerable amount of informa-

tion, but may fairly be judged to have stimulated enquiry and reasoning, both deductive and inductive. The educational value of such lessons is obvious.

The concentration of the attention of the pupils on the objects viewed is, to my mind, one of the chief advantages of the method. The interest awakened is permanent, and in America there is a large accumulation of experience showing that people, young and old, have their attention held as it would be by the actual scene. Readers who have merely looked casually through stereoscopes at a few isolated views will find that the close study of selections from the libraries of stereographs now available, which have been made especially for *educational purposes*, produce a very different mental effect.

After the lapse of a few days the boys were asked to write a short essay on "Lumbering." I have before me the results. A correct and detailed description, based on what they had seen and heard, was written by twenty-three out of a class of twenty-four. We may conclude from this that such lessons afford admirable subjects for essays; stimulate private reading; teach boys to express in their own words both what they see and what ideas they have formed; strongly impress themselves on the memory of all children; and supply data and experiences that will become the foundation for correct thought and judgment concerning the places or objects studied.

It is difficult to discover a subject in school curricula which cannot be helped by judicious use of the stereoscope. Modern history, commercial, physical and political geography, geology, plant and animal life, will immediately suggest themselves as fields where the stereograph will be a great acquisition. It is not at first so obvious, but it is equally true, that the help rendered to the study of languages is remarkable. We may put the stereoscope to one of its best uses by calling in its aid to teach boys English—not always a strong point at present in our secondary schools.

It is not my province to deal with the financial side, but I may suggest that a good outfit for a school would be provided by purchasing sufficient "scopes" and duplicates of a few typical stereographs to supply *one* class. When not in use by the class the "scopes" might be divided among the library and class-rooms and supplementary stereographs (only one of each would be required) inserted. If necessary, the number of "scopes" and duplicates may be reduced to half the number of the class, but this is not so good a plan. Gradually a carefully listed library of supplementary views should be available. A considerable literature exists relating to the growing and already very extensive organised series of "graphs." In fact, the stereograph supplies the very data which complete the knowledge of the teacher and equip him with the resourcefulness of a travelled man.

ITEMS OF INTEREST.

GENERAL.

THE London Education Bill passed its second reading by a majority of 137 on April 29th. For an amendment that the Bill be read six months hence 163 voted, and against it 300. That there is general agreement as to the need of modifying the Bill in Committee was made clear by the speeches on both sides of the House. The voting is to be taken as approving the general principle of the Bill, which the Prime Minister defined as being to set up a single central education authority for London and to create a number of local education authorities to which certain powers could be delegated. The central authority is to be the County Council, and the local bodies with

delegated powers the borough councils. The debate foreshadowed the modification since made in Committee in the direction of giving the County Council a definite working majority on the central authority, and also indicated that something will be done to limit the powers of the borough councils.

THE committee stage of the London Education Bill commenced on May 18th, was continued on the two following days, and is being proceeded with as we go to press. Clause 1 has been adopted with a verbal change only, the word "provisions" having been substituted for "modifications." The discussion on Clause 2 has resulted in a great change in the constitution of the central education authority. Instead of consisting of ninety-seven members as provided in the Bill, the education authority for London is itself to decide the number of members to be appointed. The number of representatives from borough councils on the central authority was on May 20th, reduced from thirty-one to twelve, but this compromise satisfied neither party. An amendment to exclude the twelve representatives of borough councils was rejected by a narrow majority only, and as we write the whole cause has been abandoned, so that the Central Education Committee will be appointed by the County Council as in other places.

ALL who are interested in educational work will have heard with profound regret that Mr. Michael E. Sadler has placed in the hands of the President of the Board of Education his resignation of the office of Director of Special Inquiries and Reports to the Board. The reply of Sir William Anson to a question in the House of Commons, and Mr. Sadler's letter to *The Times*, lead to the conclusion that the point at issue is the precise relations which should subsist between the Heads of the Board and Mr. Sadler. The latter rightly maintains that the scientific investigations as to educational procedure throughout the world is the work of paramount importance in the department over which he has presided. Sir William Anson, perhaps very naturally, takes the strictly official position that Mr. Sadler's services and those of his staff must at all times be at the absolute disposal of the Board of Education. To those who are chiefly concerned with educational progress the vital matter seems to be how to retain the services of an able investigator of educational problems. It should be possible so to adjust official relations that Mr. Sadler's services to British education are continued, and the work and discipline of the Board of Education are not impaired. In all branches of inquiry the best results are obtained when the investigator is allowed perfect freedom to carry out his researches. This principle should be clearly recognised in connection with work such as Mr. Sadler has done, for the science of education is still young, and official rules and restrictions are likely to discourage those who are working for its development.

By a majority of forty-two votes, ninety-one voting for the resolution and fifty-one against, it was on May 12th decided to establish an examination in modern European languages as an Honour school of the second public examination in the University of Oxford. The President of Magdalen, who brought forward the proposal in Congregation, premised that he took it as generally admitted that the principal European languages and literatures were suitable subjects of study and mental discipline. To the question why a school should be created, he replied that the interests of education demanded a body of trained teachers. It was a development of the modern side of education which would advance rather than undermine the study of Greek. He supported the proposal as fraught with

immediate advantage to the University and the country, and as securing the placing of Oxford among the living educational forces of the world. Prof. Owen said he was averse to an increase of the financial burdens of the University by some £1,500 or £2,000 a year, as he maintained would inevitably be the case by creating a demand for new professors. The President of Magdalen replied to the financial objection that the expense would not be large, and would probably grow less as the school prospered. He ended by quoting the words of Prof. Karl Breul, of Cambridge, that, "apart from their undisputed practical importance, modern languages can be taught and studied in a truly scientific spirit, and can, in the hands of skilful and enthusiastic teachers, be made the instruments of the highest liberal education."

As has been reported in these columns, the Nature Study Exhibition Association, which arranged the successful exhibition in London last summer, has been dissolved. There seems every likelihood, however, that the work it began will be continued by local associations in different parts of the country. We have received preliminary particulars of an exhibition designed to represent nature-study in the schools of the home counties, which it is hoped to hold in London during the coming summer. An influential committee has been formed and active steps are being taken. Full particulars can be obtained from Mr. W. M. Webb, Hon. Secretary, 20, Hanover Square, London, W.

AMONG recent changes in the ranks of the headmasters of the more important schools, a few are of prominent importance. Mr. J. E. King, of Manchester Grammar School, succeeds Mr. J. S. Phillpotts at Bedford Grammar School, while Mr. J. L. Paton, of University College School, London, becomes head of the Manchester school. Mr. Francis Collins, of the Central Foundation School of London, Cowper Street, E.C., follows Mr. H. B. Baker, F.R.S., at Alleyn's School, Dulwich, Mr. Baker having been elected Lee's Reader in Chemistry at Oxford. Mr. C. E. Ashford, for nine years science master at Harrow, has been elected first headmaster of the Royal Naval College at Osborne.

THE annual exhibition of the work of pupils in the schools of the London School Board was opened at the Medical Examination Hall, Victoria Embankment, London, on May 9th, by Lord Reay. The exhibits included work in drawing, colouring, and modelling; specimens of wood-work, metal-work, and wood-carving; exercises from the schools of cookery, laundry-work, housewifery and needlework; and good examples from the schools for the blind, deaf, and other defective children. Among many other interesting features of the exhibition may be mentioned the classes at work in practical cookery, laundry-work and housewifery held during the day of each of the dates on which the exhibition was open, and the gymnastic displays, the dramatic recitals, and first aid to the injured demonstrations which took place during the evenings.

A SPECIAL section of the exhibition was devoted to the science apparatus, and the exhibits on view included work done by both teachers and pupils. We were glad to observe that this year the work of teachers and pupils was for the first time separated, and the new arrangement added greatly to the convenience of visitors. There were numerous excellent pieces of home-made apparatus suitable for use in the teaching of chemistry, physics, botany and physiology; and this part of the exhibition was good evidence of the great extent to which the cost of the equipment of the science side of schools can be diminished when teachers become interested in manufacturing

apparatus themselves. The relief maps shown by the boys of Summerford Street School were especially good, and Mr. Harrison's case of lantern slides, made by mounting natural objects to show fruit and seed dispersal, served to show that good nature-study work is being done in many London evening continuation schools. Dr. Stewart and Messrs. Hubble and Todd, the organisers of the science instruction, have good reason to be proud of the science teaching in the board schools under their supervision.

THE University of Chicago has established the degree of Bachelor of Education for two years' professional work in the School of Education. Students are to be admitted to the school from the junior colleges of the university and from certain approved high schools.

WE do not recollect having seen it noted yet that the new Secretary of the Board of Education, Mr. R. L. Morant, is one of the founders' kin at Winchester, at which school he was, naturally, educated. It will be an interesting coincidence if the secondary education of this country is given a new lease of life by a descendant of William of Wykeham, who established its first Public School.

MR. W. H. WHITE, of the Church Middle-class School, Leeds, writes to say that a form of pipette made for him by Messrs. Reynolds and Branson, of Leeds, is much more convenient than the old type. An auxiliary bulb is blown about half way between the graduation mark and the mouthpiece of the pipette. By this expedient, inexperienced workers are prevented from getting corrosive liquids into their mouths, and Mr. White finds also that it enables the correct volume of a liquid to be determined more rapidly. Prof. Coleman, to whom we submitted the new form of pipette, suggests that a still further safeguard would be to constrict the end of the tube between the mouth and the auxiliary bulb at the entrance of the tube into the bulb.

THE English student or teacher who intends to spend some time at work in Paris should certainly not fail to provide himself beforehand with a copy of a new work that has just been issued by the Librairie Larousse, entitled, "Guide de l'Étudiant étranger à Paris." In the preface it is remarked very justly that the French Government makes special efforts to attract students to Paris from all parts of the world, having created a new degree—the Doctorat of the University—especially for them. This "Guide" will help both the student who intends to stay several years in the French capital and him whose stay will extend over a few weeks only. A special section is devoted to the holiday courses and examinations of the *Alliance Française*, of which every foreign student ought to know. Its address is 45, rue de Grenelle.

THE Council of Education in Canton Zürich has arranged a holiday course for teachers in primary and secondary schools. The course meets the desires of the Swiss Union of Teachers, la Société pédagogique de la Suisse romande, and the Conference of Cantonal Directors of Education. It will be conducted by Professors at the University of Zürich. The programme embraces a special course in botany, physics and chemistry, special courses in foreign languages for teachers who speak German, and courses in German for foreigners, as well as a general course on experimental psychology, modern literature, and Swiss history. The fees are 20 francs for a special course and 10 francs for the general course or a single branch of a special course. An enrolment fee of 5 francs is charged. The courses will last from the 3rd to the 15th of August. The Committee in charge of arrangements is Dr. R. Keller, Rector of the Gymnasium in Winterthur, Herr Fritschi, Erziehungsrat and President of the Swiss Union of Teachers, and Herr Zollinger, Erziehungssekretär

in Zürich, who will be glad to give further information. The Zürich schools open for the autumn term shortly after the close of the holiday course and are well worth a visit. Admission can be easily obtained by anyone who manifests a serious desire to inspect them. The total travelling expenses would amount to nearly £7. Board and lodging can be obtained in the town at a maximum cost of £2 per week. Enrolment must be made by 15th June.

IN a recent letter to *The Times*, Mr. E. B. Sargent, the Director of Education in the Transvaal and Orange River Colonies, suggests a scheme for public school and college extension throughout the Empire. In his travels through the colonies in all parts of the world, Mr. Sargent has been struck with the desire everywhere evinced by thoughtful and well-educated colonists for the establishment of the genuinely English type of public-school and college. Most institutions of higher education hitherto established in the colonies, whatever precautions were taken at their inauguration, have eventually suffered from insufficient revenues, sectarian jealousies, lack of tradition, and steady control. In contrast with the comparative failure of other agencies, there exists the wonderful success of the Church of Rome in providing educational facilities of every description, accomplished by means of colonising settlements of men and women belonging to one or other of the religious orders of the Church. The problem which presents itself for solution is, says Mr. Sargent, to find an educational instrument combining the supremely effective organisation of the Roman Church with unwavering loyalty to English ideals of Empire.

MR. SARGANT goes on to suggest that the example set by Winchester College in the first half of the fifteenth century should be emulated by modern public-schools, when William of Wykeham, who had been Master at Winchester for about eleven years, assumed the corresponding position in the new college at Eton, and was accompanied thither by five Fellows and thirty-five scholars. One public school for each group of self-governing colonies would, it is said, be sufficient to begin with. Mr. Sargent proposes that, besides the headmaster, assistant-masters should be sent out from the home school. They should be chosen from among those who have had considerable experience of teaching there already, and, after a term of service in the colony, they should return to the old conditions some years before there was a chance of their becoming heads of boarding-houses. A small number of scholars, whose parents wished them to take up life in the new country, should also take part in the migration; they would naturally be chosen from among boys in the upper part of the school whose character and abilities were both marked. Scholarships should be offered them for one or two years, during which they would remain members of the new school, and every effort should be made to find them suitable occupations when they left, or to provide the opportunity for higher study at any college which was formed upon the same lines as the school itself. Mr. Sargent asks: Will a second William of Wykeham arise to be the benefactor of such a policy? If so, he might make his first experiment in the Transvaal or Orange River Colony. That interesting results would follow from such an experiment is quite certain.

A BOARD has just been appointed by the Italian Minister of Public Instruction to see that the new law relative to physical training in schools and universities is efficiently carried out. The President of the Board is Commendatore Angelo Mosso, Professor of Physiology in the University of Turin.

NEW science buildings for the Colston's Girls' School, Bristol, were formally opened on May 15th by the Right Hon. Henry Hobbhouse, M.P.

THE wail of the assistant-master is still to be heard in the land. "One of them" repeats the now well-known lament in the *Pilot* for May 16th. His salary never increases; indeed, he is expected to be grateful if it does not decrease. "Dare to reach the age of sixty or even fifty, . . . and you are dismissed! The supply of young men with unforeseeing fathers is unlimited, and the country has an excellent system of work-houses for those who have helped others to grow rich and have failed to do so themselves!" The end of the assistant-master's career is thus described: "He goeth forth, after years of faithful service, to live out his remaining years as best he can on the scanty sum he may have been able to save. The thanks of a grateful headmaster are ringing in his ears, and in his hand he holds a Gladstone bag—a parting present from his affectionate pupils. It is his life's reward." And we are afraid these things must needs be until a course of training with subsequent registration is the rule for all schoolmasters. It is useless to compare the lot of the assistant-master with that of the doctor or lawyer until schoolmasters, too, have organised themselves and become a recognised profession.

THE two volumes of the report of the United States Commissioner of Education for 1900-1901 contain in their 1,216 + 1,295 pages very much of interest and importance to students of educational science everywhere. The first volume contains, for instance, separate chapters on "The First Comprehensive Attempt at Child-Study," "Notices of Some Early English Writers on Education," "Education in Great Britain and Ireland," as well as sections on many other important pedagogic problems. Volume ii. contains in addition to an abundance of statistical information a valuable symposium on co-education in the United States and other useful essays. The only complaint the fortunate possessor of the volumes is likely to make is about the richness of the feast set before him. No acting teacher could be expected to read through in a year two volumes of the comprehensive nature of those before us, but as works of reference these reports from the Bureau at Washington are invaluable.

THE issue of the *Journal* of the Department of Agriculture and Technical Instruction for Ireland for March of this year, which has reached us, shows that persistent efforts are being made to improve the knowledge of those engaged in agricultural pursuits in Ireland, and that the activity of the authorities responsible for technical instruction in no way diminishes. The *Journal* contains a monograph on "shorthorns," and details of the shorthorn herds now in Ireland. The address of the Vice-President of the Department to the Council of Agriculture is reprinted, and other short articles on technical subjects are included.

THE March number of the *Educational Review* of Madras states that out of a total of 447 secondary schools for girls in India in 1900-1901, Madras had 209, Bombay coming next with 68. Of the 44,377 Indian girls in all studying in these schools, Madras can claim 21,440, while Burma is second with 5,807.

A LITTLE pamphlet which may be obtained from the office of the *Leith Observer* for threepence contains excellent advice from Mr. J. T. Pearce to the apprentices of Leith in particular, and those of other towns in general. We have read the thirty six pages with interest, and can recommend the pamphlet as suitable to give to a boy leaving school to take up engineering work.

OUR useful contemporary, *School Science*, published in Chicago, has commenced the publication each quarter of a mathematical supplement. The new departure began in the first number of the third volume, that for April, 1903. The

connection between the work of mathematical and science masters is so intimate that it should prove a convenience to these teachers to have in the same magazine articles dealing with new developments in the teaching of both science and mathematics. The first number of the supplement contains an article discussing the reforms suggested by Prof. Perry in his address to the Educational Science Section of the British Association in 1901, which, it will be remembered, was printed in *THE SCHOOL WORLD* for October and November of that year.

THE Civil Service Commissioners have intimated that open competitive examinations for at least one appointment in the Supply and Accounting Departments of the Admiralty, and for at least three junior appointments in the Royal Ordnance Factories of the War Office, will be held concurrently on the 30th June, 1903, in London, Edinburgh and Dublin. Candidates may compete for either or both classes of appointment on payment of a fee of £6. The limits of age in each case are 18 and 20. The subjects of examination are the following, viz. :—*Class I.*—Mathematics I. (elementary, including arithmetic, algebra to binomial theorem, theory and use of logarithms, Euclid Books I.—IV., VI., trigonometry to solution of triangles, mensuration); Latin (unseens, prose, verse, or grammar and Roman history); French or German (unseens and prose—*viva voce* including dictation); English composition (*précis*-writing and essay); geography (descriptive and general). *Class II.*—Mathematics II. (advanced, including elementary solid geometry, Euclid Book XI. Props. 1-21, Book XII. Props. 1 and 2, geometrical conics and dynamics and statics); German or French; Greek; English history (from the Roman conquest); chemistry and heat; physics; physiography and geology. All the subjects of Class I. may be taken up. Only two of the subjects of Class II. may be taken up, and if one of these subjects be a modern language it must be different from the modern language selected in Class I. Successful candidates are appointed for a probationary period of two years at a salary of £100 a year. Afterwards the salary is £120—£10—£200—£15—£350. In the Ordnance Factories there is prospect of promotion to higher posts with salaries ranging from £500—£1,000, and in the Admiralty the salaries of the higher posts range from £500—£900. The last day for returning entry forms to the Secretary of the Civil Service Commission, Burlington Gardens, W., is the 11th June.

SCOTTISH.

THE Report of the Royal Commission on Physical Education has just been issued. It completely falsifies the predictions of those who declared that the object of the Commission was to foster a spirit of militarism in the youth of the country and to make the schools a recruiting ground for the army. Indeed, the report recommends that cadet corps and boys' brigades should be assisted when necessary by grants from the Education Department rather than from the War Office, as such bodies are to be regarded as educational agencies and not as military. Generally speaking the report may be said to be much less revolutionary than was anticipated, and the Commissioners have most wisely confined themselves to proposals within the range of practical politics.

THE chief recommendations are as follows: (1) That recreation should be given a more prominent place in the school timetable; (2) that School Boards should have the command of medical advice and assistance; a systematic record of physical and health statistics should be kept, and a small number of medical and sanitary experts should be added to the inspecting staff of the Education Department; (3) that where necessary

school managers should be empowered to provide meals at cost price for the poorest pupils, or should co-operate with voluntary agencies for this purpose; (4) that a skilled committee be appointed to prepare a course for a national system of physical training for Scotland; (5) that the physical instruction should be given by the ordinary school staff.

THE Higher Education Committees of the Educational Institute have approved of the following resolutions in regard to the forthcoming Education Bill for Scotland: (1) That the education authority be directly elected by the ratepayers; (2) that a committee representative of the various educational interests of the country should be appointed to act as an Advisory Council to the Scotch Education Department; (3) that the Education Department should be located in Edinburgh; (4) that the training of teachers should be directed by the Education Department along with a Board in each university centre, consisting of representatives of the university, the local authorities, and the teaching profession; (5) that a super-annuation scheme applicable to all teachers should be established.

PRINCIPAL STORY, speaking at the Graduation ceremony in Glasgow University, again appeared in the *role* of Cassandra in regard to the operations of the Carnegie Trust. He gave figures showing that more than 50 per cent. of the students had taken advantage of the provisions of the Trust for the payment of fees. Judging by these figures, he said, one would conclude that there must have been a great deal of "unsuspected neediness" among students in the past, or that many were taking advantage of the provisions who had no title to do so. For his own part, he feared that through the working of the Trust many students would no longer have occasion to exercise those characteristic Scottish virtues of "courage," "hardihood," and "self-denial," during their university courses. But the reverend Principal need have no fear on that score, as all these qualities may still be required in the fullest measure in the efforts to feed, clothe and house themselves during the long winter months.

ON the occasion of his receiving the freedom of the city of Edinburgh, Lord Balfour referred to the movement in favour of the transference of the Scotch Education Department to Edinburgh. He was strongly of opinion that such a change would be fraught with danger to the national interests. The Education Department had to be in constant touch with the other great departments of State, and its removal to Edinburgh would seriously diminish its influence with them to the consequent loss and prejudice of Scottish educational interests. The Scotch Education Department, it should be remembered, was a great spending department and it was absolutely essential for it to be in close touch with the Treasury, the Auditor-General, and the other officials who controlled the expenditures they incurred. Finally, if the proposed removal was effected, the Secretary for Scotland would either require to reside mainly in Edinburgh, and thus be cut off from effective parliamentary control, or if he was retained in London, whilst his staff were in Edinburgh, he would be placed in an impossible and intolerable position.

IRISH.

A MEETING of the Catholic Headmasters' Association was held on April 14th, in Dublin, the Rev. W. Delany, S.J., in the chair. The meeting was pessimistic as to the present working of the Intermediate system and observed "with apprehension its injurious effect upon our schools." Attention was

called to the "general feeling of uncertainty as to the stability and reliability of the Rules, the character and consequences of the examinations, the suitability of the programme issued from year to year, the position of inspection in the system, and other matters of serious importance." Some of the chief causes of the uncertainty lie in the makeshift character of the present system of inspection, with its temporary staff and its relation to the school grant; in the breakdown of last year's examinations through the inability of some of the examiners to carry out the definite and well-meant instructions they received from the Board, leading to most inequitable results; in the vacillation of the Board with relation to their schemes for apportioning the school grant; in the unfair advantage given to the science course over the others; and in the peculiarities of the rules and programme. The Association further passed resolutions asking the Intermediate Education Board to furnish the head of each school this year with a copy of the Inspector's report on the school, and reaffirming that, unless proper provision is made for the higher education of Catholics in Ireland, it would be unfair to Catholic Intermediate schools to demand from their teachers specific evidence of qualification.

THE Convents' School Committee has directed attention to the fact that, owing to the failure of the Board to carry out its undertaking that all the questions on the pass papers would be within the capacity of an average pupil fairly well taught, it is almost impossible to induce a very large proportion of girl pupils to enter the Intermediate classes. They press for a separate programme for girls' schools, which should, in addition to the ordinary subjects, include instrumental music and needlework, domestic economy with practical cookery, and drawing as a separate subject in all grades.

IN the general anxiety to pass the Land Bill, the country as a whole is perfectly ready to allow Mr. Wyndham to divert the equivalent grant from education to land; he has, however, expressed a hope that he may be enabled therefrom to increase the grant to the Board of Technical Instruction for the teaching of science in Intermediate schools, while Mr. Balfour has promised that it will not be used to establish or endow a Roman Catholic University for Ireland, at least without proper discussion in the House of Commons.

THE Departments of Agriculture and Technical Instruction announce that short summer-courses of Instruction to Secondary and Technical Teachers will be conducted again this year during the month of July. Courses will be held in the following subjects: experimental science, drawing, manual instruction (woodwork), woodcarving and modelling, building construction, metal work, lace and crochet-making and design, and domestic economy. This will be the third year that similar short summer-courses have been held.

THE Association of Irish Schoolmistresses has published its report for last year. It contains a record of considerable work accomplished, especially in connection with the Royal University Commission, leading to the establishment of the Irish Association of Women Graduates which focused the opinion of the women graduates of the Royal University and brought it to bear with considerable effect on the Commission. A number of queries were sent out to all women who had taken degrees in the Royal, the result being as follows: women were in favour of a reconstituted Royal University with constituent colleges, one Protestant, one Catholic; these should have a common curriculum; at least two women's colleges, one Protestant, one Catholic, should be endowed as residential halls; external students should be allowed; and Fellows should only be appointed by the test of examination or the production of

original work. The Association has also strongly urged upon its members to take advantage of the extension of the English Register to Irish teachers and to apply for registration under the English Act.

WELSH.

IN connection with the University College of South Wales and Monmouthshire at Cardiff, there has been a Training School of Cookery and Domestic Arts, under the superintendence of Miss Hester Davies, since 1891. At the recent distribution of certificates it was stated that, in addition to training teachers, the school superintended the teaching of cookery to nearly 5,000 children in the Cardiff elementary schools. Principal Griffiths pointed out that the disparagement which often was attached to cooking and the domestic arts was largely due to the fact that the teaching of these subjects had not had the idea of educational discipline brought into them. They might reasonably be looked upon as branches of experimental science. "It was not at all impossible for cookery to be yet more scientifically treated, especially when in future they would be able to apply electric heat to cookery in every degree of temperature." It is a clear gain to the subject that a school of cookery should be established in the University College, for it means that the domestic arts may be really educational subjects when they are dealt with in a truly educational manner.

THE Headmaster of the Carnarvon County School did a very bold thing when he stated his views on the teaching of Welsh, noted in previous Welsh "Items of Interest" in a number of THE SCHOOL WORLD. He has of course been severely criticised. His reply is as follows: "If Welsh children have learned nothing of their own language except a smattering of colloquial Welsh when they come to the County School, it is not the duty of that school to begin to teach them their own language. A great distinction must be drawn between Carnarvon street-Welsh and the Welsh language." Mr. Trevor Owen, writing of his experience as examiner during several years for Dr. Morris's charity, gives ample proof of this. "The answers," he says, "were of the most wretched type conceivable, the spelling absolutely inaccurate, the composition wrong, and the whole thing practically unintelligible. I do not recollect a single paper of merit during my whole experience as examiner." Again, of the children who go to the county schools many stay an inadequate time. And, of course, only a small proportion of the children who go to the elementary schools proceed later to the county schools. It is clear, therefore, Mr. de Gruchy Gaudin argues, that "if Welsh is to remain the language of the Principality it must be taught in a much more systematic and thorough manner. A child must be taught Welsh in the elementary schools, and learn it as his own language, just as an English boy learns English. He must be taught to read and to write Welsh, and English should only be begun when he has some grasp of the Welsh. His English will in no wise suffer. . . . Should a child receive such a training, it is then the duty of the county school to continue the study of the language, its literature and history, and I should with pleasure arrange for the best teaching to be given."

MR. WILLIAM JONES, M.P., speaking at a meeting in Anglesey on behalf of the new buildings for the University College of North Wales, Bangor, recalled some interesting facts with regard to past efforts in money-raising in Wales. He reminded his hearers that the temporary construction fund of the Aberystwyth College in 1875 was collected chiefly in the Nonconformist chapels. In one month the sum of £3,138 17s. 6d. was raised, and the contributors numbered 100,000 people. He suggested that such self-help in higher education should induce

millionaires to contribute their share in thousands and tens of thousands, and Government to give a substantial grant for building funds in Wales. It was also stated that in 1884 £5,000 was collected in Anglesey in a fortnight's time for the building fund of the present Bangor College.

IT must always be remembered that the Sunday School is an institution of very special importance in Wales. Mrs. Gee, of Denbigh, who has recently died, is said to have been a teacher in Sunday-school work for a period of over seventy-four years.

CURRENT HISTORY.

MR. CHAMBERLAIN, in speaking of the respective advantages and disadvantages of Crown colonies and self-governed colonies, with special reference of course to the present situation in South Africa, laid stress upon what is too often regarded as a truism without important consequences, that self-government is essentially the rule of a majority. When we speak of the British people as a "self-governed" people, we generally forget that a large minority are *not* represented by the policy of the reigning government, even immediately after a general election. What special application this may have in the various colonies of South Africa is a matter of high politics with which we have no concern in these columns. But Mr. Chamberlain's remark set us thinking of seventeenth-century politicians in England. Oliver Cromwell's rule was undoubtedly, and probably consciously, that of the strong man maintaining the opinions of a minority who claimed to know better than the majority of their fellow countrymen what was good for them. And his great and almost immediate predecessor in the government of England and Ireland, Thomas Wentworth, Earl of Strafford, would have heartily endorsed the moral of the speech of our present Colonial Secretary. Strafford and Cromwell are in various ways now coming to their own.

KING EDWARD began his recent round of visits with going to Portugal, and naturally pleasant things were said. Portugal is not much more than half the area of England and Wales and its population does not equal that of London, but it has colonies in South Africa on both the east and west coasts more than twenty times the size of the European motherland, besides islands and other scattered possessions in the Atlantic and the East. And the Portuguese are proud of these relics of their once mighty empire and interested in them. If we consider that a line drawn across Africa anywhere in the neighbourhood of the fifteenth degree of south latitude traverses exclusively Portuguese and British territory, we can see how important it is that the two countries should have friendly relationships. Like ourselves, their "back is turned to the Continent." We are both, each in our degree, ocean powers. This friendship, or at least alliance, is of very old standing. To say nothing of mediæval relationships, every schoolboy knows the marriage of Charles II. with Catherine of Braganza, and her dowry of Tangier and Bombay, and a Macaulay schoolboy will also know of the Methuen Treaty of 1703, and the drinking of port to the exclusion of claret that followed till Pitt made a commercial treaty with France in 1786. King Edward referred to the exceptional rights and privileges that were granted to the British factory of Oporto, but he naturally did not speak of the period when Beresford and English generally were unpopular in Portugal owing to those same privileges, or to the consequent exploitation of Portugal by English merchants about 1820.

IN April the German Emperor paid a visit to Denmark, and we are told that at Roskilde Cathedral he bowed before the monument of King Christian IV., and said to his suite, "He was, indeed, a great hero." What, among the wars and other deeds of Christian IV. of Denmark (1588-1648), was in the

mind of William II. of Germany when he paid this homage to the seventeenth-century king? The Thirty Years' War from which Germany suffered so much began with a religious constitutional question in Bohemia. It rapidly grew into a German war between the Emperor and the Catholic princes on the one side against the Protestant princes on the other. The other powers of Europe intervened, Spain on the side of the Emperor, and Denmark, Sweden, and finally France, on the Protestant side, and the war at last ended in 1648 after eight years of diplomacy at Münster and Osnaburg. It was probably to Christian IV.'s intervention as a Lutheran prince in this war, in which the Hohenzollerns, then Margraves of Brandenburg, took a successful part, that the Emperor referred in speaking of him as a hero. Led into war by promises of money from England which were not fulfilled, he was defeated at Lutter (1626), and was glad to save himself from actual loss by making peace in 1629. But he afterwards gave assistance to the more famous, and for a time more successful, "Protestant" hero, Gustav Adolf of Sweden.

SOME interesting particulars of the defence of Mafeking were recently mentioned by Major-General Baden-Powell. It seems that much was done by sheer bluff. Mines were laid, but instead of dynamite they were filled with sand. Sham signals and pretence at wire fences were also used, and orders were shouted through megaphones to imaginary relief forces. Military and naval history abounds with instances of small forces concealing their weakness by confidence, and adopting means to hide their real numbers. The "Birnam wood" that marched to Dunsinane against Macbeth is a well-known example in literature. But perhaps the most famous illustration of this method of fighting an enemy is that adopted by Admiral Duncan during the great naval mutiny of 1797. He was watching the Dutch fleet at Texel, then in alliance with France, when he was abandoned by all of his fleet except two or three ships. But by continuing to make signals to an imaginary fleet in the offing he frightened the Dutch from venturing out of harbour till his men had returned to their duty, and the subsequent victory off Camperdown made England safe again for the time, and raised its hero to the peerage.

TEST EXAMINATION PAPERS IN GEOGRAPHY.

London Matriculation.

(Candidates are to answer EIGHT questions, but no more.)

- (1) Explain briefly the geographical significance of the following:—The Pampean Sea of South America, The Rift Valleys of East Africa, The Atlantic Coastal Plain of North America, the Aral-Caspian Depression of Eurasia.
- (2) In what parts of England and Wales are climatological and physiographical conditions most favourable for the cultivation of (a) wheat, (b) hops?
- (3) Enumerate the causes that have led to the localisation of the industries of Sheffield, Middlesborough, Nottingham, Stroud, Northampton, Belfast.
- (4) What is the nature of the climatic control of vegetation in (a) the llanos of the Orinoco, (b) the tundra of Eurasia, (c) the Gobi desert, (d) the basin of the Congo?
- (5) Point out in what way, if any, the political importance of the following towns is based on physical advantages of situation:—Herat, Madrid, Montreal, Philadelphia, Calcutta.
- (6) How do you account for the fact that the monsoon lands of Asia are amongst the most densely populated parts of the earth?

Explain the origin of the monsoon winds.

(7) Discuss the statement: "When it is 12 o'clock, mid-day, at Greenwich it is 12 o'clock at Plymouth, but 7 a.m. at New York."

(8) Write a short description of the Caledonian Canal, the Peak District, Strathclyde, Vale of White Horse, Bog of Allen.

(9) Give an account of the Mediterranean Sea with special reference to the successive phases of its commercial development.

(10) Enumerate and, where you can, account for the conditions that prevent or retard the commercial development of Argentina, Rhodesia, Australia, Mesopotamia.

(11) Name the trans-continental railroads of the New World, and describe the regions served by one of them.

(12) On the accompanying map of Africa, insert and name the Atlas Mountains, Drakenberg Mountains, Mount Ruwenzori; trace the courses of the Congo, Niger and Nile, and delimit their basins; insert the Tropic of Capricorn, locate the chief deserts, and mark the position of Delagoa Bay, Kano, Berbera, Port Elizabeth, Algiers, Suakin.

College of Preceptors.

SECOND CLASS.

A. General. (Not more than THREE questions.)

- (1) "In all the continents the line of greatest elevation is placed out of the centre, on one of the sides, at unequal distances from the shores of the seas." Illustrate this statement, preferably by means of a sketch-map.
- (2) Name some points (a) of resemblance, (b) of difference between the configurations of the Atlantic and Pacific.
- (3) Explain these terms:—*Atoll, lagoon, isotherm, savanna, artificial boundary, fiord, moraine.*
- (4) Give the names of the British possessions in Africa, with their capitals, and write a short account of the climate and productions of one of them.

B. United Kingdom. (Question 5 obligatory: answer not more than THREE others.)

- (5) On the outline map of the United Kingdom mark the basins of the Thames, Clyde, Shannon. Indicate the districts of densest population, with their leading industries. Locate the four largest towns in each country. Name the largest islands and openings into the land.
- (6) Why are the following places important:—Bristol, Aberdeen, Carlisle, Leith, Belfast, Dublin, Swansea?
- (7) Write an account of the distribution of rainfall in the United Kingdom.
- (8) Name districts (one in each case) from which large quantities of (a) tea, (b) rice, (c) gold, (d) coffee, (e) tobacco, (f) currants, are sent to the United Kingdom.
- (9) What parts of the United Kingdom are the chief centres for making (a) cotton, (b) steamships; growing (c) flax, (d) hops; mining (e) iron, (f) lead; and for (h) sugar-refining.
- (10) Draw a map of the Irish Sea, showing the chief steamship routes.

C. Physiography. (Question 5 obligatory: answer not more than THREE others.)

- (5) On an outline map of the world locate (a) the chief deserts, (b) the course of one of the Tropics, (c) the largest forests, (d) the course of the Trade Winds.
- (6) Explain some of the effects of rivers on the surface of the land.
- (7) What is the relation of mountains to rainfall?
- (8) What are the causes and effects of the monsoons?

- (9) What are the chief conditions that determine the climate of a place?
 (10) What do you know about the distribution of volcanoes?

THIRD CLASS.

(Question 1 obligatory: answer not more than FIVE others.)

- (1) On an outline-map of Great Britain, between the Humber and the Firth of Forth, trace the courses of the chief rivers, locate the seaports, and show the positions of:—Leeds, Lanark, Hexham, Falkirk.
 (2) Explain these terms: *right bank, source, basin, estuary, bed*, used in connection with rivers.
 (3) For what are the following places noted:—Plymouth, Paris, Belfast, Glasgow, Liverpool, St. Petersburg.
 (4) Give the positions of the chief highland districts in Europe.
 (5) Into what seas do the following rivers flow:—Rhone, Volga, Shannon, Tiber, Elbe, Loire?
 (6) Why is cotton made in Lancashire, wool in Yorkshire, cutlery in Sheffield? In what parts of England is most wheat grown? Why?
 (7) Make a sketch-map showing the positions of the mountain ranges in the United Kingdom.
 (8) Why is it colder in winter than in summer?

Oxford Locals.

SENIOR.

- (1) On an outline map of India indicate the basins of the Ganges and the Indus, and trace the courses of the chief rivers in the two basins; mark the boundaries of the Deccan Plateau, and place dots with initial letters showing the positions of the following towns:—Madras, Haidarabad, Calicut, Agra, Patna, Darjiling, Goa, Trincomali, Singapore.
 (2) Explain the causes of the monsoon winds of the Indian ocean, and give an account of their effect on the vegetation of India.
 (3) Illustrate, from instances in both Italy and India, the climatological and physiographical conditions that determine the possibility of rice cultivation.
 (4) Give reasons for the following:—(a) The wheat exports of Karachi; (b) the teak exports of Madras; (c) the *locale* of the textile centres of Italy; (d) the unhealthiness of the Campagna.
 (5) Where are the following places? Account for their importance:—Bombay, Bulawayo, Brindisi, Buenos Ayres, Batum, Bushire, Bergen, Beira.
 (6) Write a general description of the distribution of highlands and lowlands in North America.
 (7) Whence do we derive our main supplies of:—rubber, silk, silver, furs, wheat? Explain the suitability of the respective sources of supply with regard to climate and soil.
 (8) Enumerate the chief deserts of the earth and point out in each case the controlling climatic force.
 (9) Explain fully what is meant by *local time*.

JUNIOR.

- (1) On an outline map of Ireland insert the rivers Shannon, Boyne, Blackwater; Loughs Erne, Corrib, Neagh; show the distribution of mountains, name the openings of the south-west coast and indicate the positions of Dublin, Birr, Sligo, Londonderry, Cork.
 (2) In Lancashire there are more than 1,000 people per square mile; in Lanarkshire there are more than 1,200; in Louth about 200. How do you account for these differences?

- (3) Name some places in the United Kingdom where the following industries are carried on:—cotton, brewing, slate quarrying. Account for the location in each case.

- (4) Draw a sketch-map to illustrate the railway communication between:—(a) Cardiff and Leeds; (b) London and Aberdeen; (c) Dublin and Queenstown.

Indicate also the chief steamship routes between England and France; Great Britain and the Baltic; Great Britain and Ireland.

- (5) Explain and illustrate these terms:—*tundra, hinterland, campos, glacier, volcano, delta*.
 (6) Write a short essay explaining your preference of one of the Colonies as a field for emigrants.
 (7) From what countries do we obtain our chief supplies of gold, tea, bananas, tobacco, tin, teak, guano, sugar, silk, cotton?
 (8) Give reasons for:—(a) The great rainfall in the Amazon basin; (b) the desert condition of Central Australia; (c) the "extreme" climate of Central Russia; (d) the annual overflow of the Nile.
 (9) What countries, &c., are crossed by (a) the Equator, (b) the meridian of Greenwich?
 (10) Draw a sketch-map of the Danube basin or the Rhine basin; indicate the course of the water-parting in either case, and show the chief towns.

PRELIMINARY.

- (1) On the outline map of Europe draw the following rivers and mountains:—Danube, Rhone, Rhine, Volga, Caucasus, Carpathians, Alps, Appenines, Scandinavian Mountains. Name the inland seas, and mark the position of Berlin, Constantinople, Dresden, Genoa, Hamburg, Lisbon, Moscow, Stockholm, Warsaw.
 (2) Where in England and Wales are the following made:—cannon, pens, boots and shoes, carpets, knives, paper?
 (3) Explain these terms and give examples:—*strait, archipelago, isthmus, promontory, volcano*.
 (4) Describe a bicycle ride from York to London, mentioning the occupations of the people in the various counties, and the character of the surface you would pass over.
 (5) What is the principal trade of each of the following ports:—Cardiff, Hull, Liverpool, Bristol, Southampton?
 (6) Draw a sketch-map showing the towns on the railway routes between London and Plymouth, and London and Manchester.

RECENT SCHOOL BOOKS AND APPARATUS.

Modern Languages.

A Selection of German Idioms and Proverbs. Compiled by Alfred Oswald. 127 pp. (Blackie.) 1s. 6d.—A convenient and neatly printed book of (a) idiomatic uses of (1) prepositions and adverbs, (2) other parts of speech, (3) particles, and (b) of proverbs, (1) German-English, and—which is hardly wanted—(2) English-German. For the purposes of extending the vocabulary and for revision it will prove most acceptable; of course it makes no claim to be exhaustive. We have noticed a few slips: "Speak out!" is not necessarily "*Lesen sie laut!*" It should be "*Gleich und gleich gesellt sich gern*" (p. 95). "*Lust und Liebe sind Fittige für grosse Thaten*" (p. 57) is not a proverb, but a misquotation from Goethe's "Iphigenie."

A Practical German Composition. By Alfred Oswald. 135 pp. (Blackie.) 2s.—Mr. Oswald first gives some thirty pages of "practical hints for translation," which will be found useful; and then a number of well-chosen passages for translation, in six parts, graduated according to difficulty. Occasionally the English reads a little awkwardly, e.g., "I saw her on the street." "I went with him to London till Thursday." "He lives in No. 17, King Street." "He fell soon asleep." "A few slices of ham and biscuit." There is a vocabulary to each exercise, in which a good deal of valuable information is given. The book is well printed, and the proof has been read with care. On p. 25, l. 18, read *dauert* for *beidauert*.

A. Darmesteter, A Historical French Grammar. English Edition, by A. Hartog. Book II. *Morphology.* xviii. + 238 pp. (Macmillan.) 3s. 6d.—This is a reprint, with certain corrections and additions, of part of the grammar published in 1899. Probably the chief reason why the "morphology" is issued in this form is the fact that the subject has been introduced into the programme of the Leaving Certificate Examination in Scotland; but many teachers in England also will be glad to have this section of the excellent handbook at a reasonable price.

Idiomatic Phrases (French-English). By Edward Latham. With a Preface by Francis Storr. 80 pp. (Sonnenschein.) The arrangement of this book is like that of Mr. Payen-Payne's excellent volume. It contains, however, idiomatic rather than proverbial phrases, as Mr. Storr points out; a distinction, some might say, with very little difference. It certainly contains a large number of useful expressions. The renderings are mostly satisfactory, sometimes very neat; sometimes a round-about phrase is used in place of a common expression. Thus instead of "to try to do an impossible thing," surely it would have been better to render *rompre l'anguille au genou* by "to make a rope of sand." For *il en arrivera ce qu'il pourra* an obvious rendering is "time will tell." The proof has not been read with sufficient care.

A. Daudet, La Belle-Nivernaise. Edited by Frank W. Freeborn. 68 pp. (Ginn.) 1s.—This carefully printed text of Daudet's popular tale is preceded by a short, but adequate biographical account of the author, and followed by a few pages of notes which give all necessary information, but do not make the text a peg for elementary grammar rules.

An Outline of French Literature.—By D. T. Holmes, B.A. ix + 164 pp. (Holden.) 2s.—This outline is "founded on the *Littérature française* of Professor Meunier," a book which we have not seen. We cannot tell, therefore, how much credit is due to Mr. Holmes for this convenient hand-book; but we conclude that he has taken much of his matter straight from Professor Meunier's pages from the fact that his English often suggests French modes of expression; e.g., "the durable tradition of his able administration," "they lacked amplitude of inspiration," "the disputatious and susceptible Sorbonne," "he sallied forth in nomadic fashion," "his verse is well minted," "an epoch of trouble and brutality." The criticisms are eminently sensible, and as a rule the relative importance of authors is well indicated. Montaigne, however, is badly treated, and only a few lines are devoted to Lesage; whereas Mme. de Maintenon gets a whole page. It is a pity that dates are not given more freely. We have noticed a few slips, e.g., *Durandal* for *Durendal* (p. 13); *où* for *on* (p. 36); *Jodelle* is generally included in the *Pléiade* (p. 46); *Attila* for *Attila* (p. 73). Can it be said that the *Lettres Persanes* are "so many pamphlets directed against Christianity?" Is it fair to say no more of the *Nouvelle Héloïse* than that it is "a story which could have originated only in an unhealthy and paradoxical brain?" What evidence is there for saying that printing was invented in 1436?

Classics.

Clytemnestra: A Tragedy. By Arnold F. Graves. With a preface by R. Y. Tyrrell, Litt.D., D.C.L. xix. + 121 pp. (Longmans.) 5s. net.—Mr. Graves's conception of *Clytemnestra* breaks away from tradition altogether. She is a more human, and we must add, a far weaker creature than the terrible and merciless creation of Aeschylus. The whole standpoint of the play is modern, and all its characters fall below the heroic level. This does not imply that it is an untrue conception; but we think, on the whole, that Aeschylus comes nearer to the barbaric age than Mr. Graves. In spite of this fault, which mars the play in our opinion, the play is written with simplicity and some skill in construction. It is interesting to read, and we are quite ready to believe that it will act.

Cornelius Nepos. Twenty Lives. Edited by J. E. Barss. xiv. + 316 pp. (The Macmillan Company.) 5s.—The plan of this book is the same as that of Macmillan's *Ovid*. Two-thirds of the book is edited in the ordinary way; the last seven "Lives" being annotated with footnotes which give translations of the words which a boy at that stage would not be likely to know, or other help. These seven are intended for reading at sight. The Introduction contains references to standard "books for parallel reading"; and a very brief sketch of the history brings in the personages whose Lives follow. In the text, long quantities are marked; a doubtful advantage after the earliest stage. We think that this should be done only in the Grammar and the first reading-book. A number of illustrations are inset in the text; again a doubtful advantage, since it is difficult to keep the words in one's eye in reading. The notes are overloaded with references to grammars: if one thing is certain, it is that no boy will look them up. Some of them are too elementary; thus, "*saltasse* for *saltavisse*," p. 137, and the frequent explanations of "ablative of cause," "dative of end or purpose," and so forth. As a whole, we do not think these notes judicious. There are useful exercises for retranslation at the end.

Edited Books.

The Student's Prayer Book. By W. H. Flecker. 167 pp. (Methuen.) 2s. 6d.—This volume deals with the text of the Order for Morning and Evening Prayer and the Litany in a very careful way. The introduction is essentially good, and the notes are splendid. Of course such a work does not go far, but for school purposes it will be found very useful.

Chaucer's Prologue and Nun's Priest's Tale. By A. J. Wyatt. 175 pp. (W. B. Clive.) 2s. 6d.—This is another of the Examination Manuals associated with the University Correspondence College. As such it presents all the familiar features of these books. It is concise to a marvel, and to a fault; the introduction, for instance, aims at imparting information in thirty-two pages which an ordinary student would not absorb from five times that number; nor would he probably know much more about Chaucer if he could repeat Mr. Wyatt's pages by heart than if he had never opened them. This volume will, however, fulfil an educational need, and so merits praise for the manner of its execution: much intelligence has been expended on the art of so putting things that a student shall derive the utmost possible benefit from the method employed.

Scott's Legend of Montrose. By A. F. Flux. 247 + xvi. pp. (Black.) 2s.—This is another volume in this well-known "school" edition. It is done in exactly the same style as the preceding novels of the series, and there is nothing, in the in-

roduction or the notes to call for special comment, or indeed for special praise. To say that it is useful is to describe it most fully.

The Laureate Poetry Books. X., XI., XII., XIII., XIV., XV. (Arnold.) 2d. each.—These six booklets contain representative selections from Wordsworth, Longfellow, Scott, Milton, Keats, and Shelley, and the two Brownings. An account of each respective poet is appended to each. At the size and price could not, perhaps, be bettered. Serviceable, to say the least of it.

Select Poems of Tennyson. By H. B. George and W. H. Hadow. xxv. + 154 pp. (Macmillan.) 2s. 6d.—These selections avoid all the more abstruse portions of Tennyson's work, and have been compiled with great discrimination. The introduction is if anything a little out of line with the selection; while excellent of its kind it cannot be considered as quite simple. It is a condensed but highly wrought estimate of Tennyson which makes very good reading even for students who have long passed the period of youth. The notes are as scholarly and fine as this series always presents.

English Grammar and Composition.

Senior Course of English Composition. By J. C. Nesfield. iv. + 358 pp. (Macmillan.) 3s. 6d.—The course consists of two parts. The first hundred pages deal with figures of speech, perspicuity, simplicity, brevity, impressiveness, euphony, picturesqueness, the qualities of composition. Each of these sections is provided with a large number of exercises, which may be worked orally. They have the merit—as indeed have all the exercises—of being actual extracts from journalism or literature. Part II. consists of a few pages dealing with the structure of sentences and paragraphs, followed by essays for reproduction, subjects of essays with notes, and more than thirty pages of "Subjects for Essays, without notes." The extracts are culled from various sources—we notice that one of the essays for reproduction is an article on Stamp Collecting (SCHOOL WORLD, August, 1901), and some are presumably original; all are admirably suitable for reproduction. The notes are, we think, too full, even for a senior course, but there can be no question as to the practical utility of the book in the hands of students preparing for the Senior Locals and examinations of a similar standard.

Principles of English Grammar. By Rev. A. Macrae. vii. + 168 pp. (Relfe.) 1s. 4d.—According to the publishers' announcement, this book has been written "to remedy the deficiencies so often met with in the text-books on grammar now in the market." After careful study of it we have been unable to discover any feature that is likely to excite trepidation in the minds of the publishers of already well-known works. The author has written an interesting preface; for the rest, the book is neither better nor worse than the majority of books on English grammar.

A First English Grammar and Analysis. By W. Davidson and J. C. Alcock. viii. + 69 pp. (Allman.) 6d.—An elementary text-book of an old-fashioned type. It is printed in bold type, some of the characters being one-sixth of an inch high. It is fairly trustworthy, but we are not enamoured of the plan of the book, by which eight pages only are devoted to analysis, and those are quite at the end.

An English Grammar. By Rev. S. C. Tickell. 60 pp. (Newmann.) 2s.—We have already commented on Mr. Tickell's method of teaching analysis and parsing (THE SCHOOL WORLD, July, 1899).

Science and Technology.

Open-Air Studies in Bird Life: Sketches of British Birds in their Haunts. By Charles Dixon. xii. + 280 pp. (Griffin.) 7s. 6d.—Mr. Dixon is a well-known writer upon birds, and this book will add to his reputation. Following the plan adopted in the other volume of this popular series of "Open-Air Studies," the author takes in turn various haunts, and describes the ways of their feathered denizens. This method obviously lends itself to a discursive style, but it is one of the merits of the book that the importance of structural affinity, rather than of similarity of habit, is unobtrusively kept before the mind of the reader. A pleasantly personal note, and the frank heterodoxy of the author upon certain debatable points, add much to the interest of the narrative. The book is beautifully illustrated, chiefly by plates drawn by Mr. Charles Whympers. The coloured frontispiece is especially charming.

Nature Studies (Plant Life). By G. F. Scott Elliot. 352 pp. (Blackie.) 3s. 6d.—This book must be welcomed as a decided acquisition to the literature of plant natural history as distinct from academic botany. It contains a store of interesting and, in many cases, out-of-the-way information, treated in a manner which the ordinary student will find no less novel than refreshing and suggestive. It also contains a number of excellent illustrations. It is to be regretted that the author did not more consistently carry out his intention, stated in the preface, of as far as possible doing without technical terms. Had he done so the book would have appealed to a much wider circle of readers. To those, however, who have even a slight knowledge of botany it may be unreservedly recommended.

The Sciences. A Reading Book for Children. By Edward S. Holden. x. + 224 pp. (Ginn.) 2s. 6d.—Mr. Holden has created a big brother Jack, who is a student at college and possessed of the pedagogic passion. He is at home for the holidays and has with him his young brother and sister, Tom and Agnes, and his young cousins, Fred and Mary. The four young people play in the morning and spend the afternoon acquiring useful information on scientific subjects from the clever Jack, who knows the leading principles of all the sciences. This book contains all the instructive conversations which occupied these holiday afternoons, illustrated with 198 well executed illustrations.

Mathematics.

A Treatise on Differential Equations. By A. R. Forsyth. Third Edition. xvi. + 512 pp. (Macmillan.) 14s.—In this edition some substantial additions have been made; thus there is an outline of Frobenius's method for solving ordinary linear equations by series, and an introduction to Jacobi's theory of multipliers. Professor Forsyth's excellent treatise has now been translated into Italian as well as German.

Beginners' Algebra. By M. S. David. viii. + 232 pp. (Black.) 2s. 6d.—An excellent book, dealing with the right things in the right way. It has the merits of Prof. Chrystal's "Introduction to Algebra" (to which Mr. David refers with grateful appreciation), while its limited scope and clear style make it really suitable for beginners. This is certainly one of the best of the elementary text-books which have appeared lately, and contains all that should be learnt before going beyond quadratic equations in one variable.

Solid Geometry. By Dr. Franz Horevar. Translated and adapted by C. Godfrey and E. A. Price. viii. + 80 pp. (Black.) 1s. 6d.—Even a short course of solid geometry and mensuration is of great educational value, and ought to form

part of a school course more often than it does. This little book provides teachers with excellent material; beside the proofs of the most indispensable propositions, there are directions for making cardboard models, and a very good and practical collection of examples.

Preliminary Tests in Geometry. Parts I. and II. By W. Slade. 28 pp. (Relfe.) 6d.—Twenty-four papers, each containing two practical exercises, a proposition of Euclid, and two or three deductions. This arrangement is convenient, and the exercises appear to be easy enough. Directions like "Write out Proposition 47" are open to objection; in other respects this is a useful compilation.

Miscellaneous.

The Municipalisation of Secondary Education. A plea for the proper Recognition of efficient Private Schools as part of the Educational System of the Country. By J. W. Richards. vi. + 58 pp. (Simpkin.) 6d. net.—The question as to what position should be assigned to efficient private schools in the national system of secondary education deserves careful consideration. Inefficient private schools cannot reasonably expect to survive the educational stock-taking which the immediate future has in store; but it is earnestly to be hoped that local education authorities in carrying out the second clause of the Act of 1902, will, when considering the educational needs of their areas, sympathetically inquire into the work, equipment and staff of the private schools, with a view to arrange for the continuance of good work where it is found to be going on. Mr. Richards urges the claims of efficient private schools, and though he often repeats himself and is sometimes unfair to the masters in public secondary schools, he has many good arguments which should be studied by all those whose duty it will be to administer last year's Act.

The Making of our Middle Schools. By Dr. Elmer Ellsworth Brown. xii. + 547 pp. (Longmans.) 10s. 6d. net.—Educational literature in the United States is abundant, but so far it does not seem to have included a survey of the history of American secondary schools. Such a survey Dr. E. E. Brown, Professor of Education in the University of California, has made in this important volume. Not only has he welded together materials gathered from all sources—and the wealth of the materials is indicated in a copious bibliography—into a more or less continuous story, but he has also traced the connection between the various types of American schools and their foreign, mainly English and Scotch, prototypes. Although much of the detail in the accounts of the establishment of local schools is naturally deficient in interest to the English reader, he can follow with both interest and profit the main lines of development. Historically speaking, there have been three species of "middle schools," *i.e.*, schools between the common or primary school and the universities. The first were the old colonial grammar-schools, copied in aim and curriculum as well as in name from the English grammar-schools of the Renaissance. Their principal function was to train the directing classes, and especially the ministers of religion for "college," *i.e.*, the universities. When the stratified colonial society was broken up in the eighteenth century, the "academy" type of institution found favour. It had neither the classical tradition nor the connection with college that the grammar school possessed. Finally, in the nineteenth century, when elementary education rose into prominence, and when the States began to frame State systems of education, the public high school, which has closer relations with the primary school than either of its predecessors, became the prevalent type. Professor Brown does not merely trace the history of the past. In four most suggestive chapters

at the end of the book he points out the tendencies which are now at work amid "the unrest in secondary education," and tries to estimate in a hopeful spirit the place and function of middle schools in a democracy such as is that of the United States. If it were only for the sake of the first and last chapters, there is no doubt the book should find a place in every library of education.

Arnold's Country-side Readers. Book I. 144 pp. 10d. Book II. 176 pp. 1s. Book III. 204 pp. 1s. 2d. Book IV. 236 pp. 1s. 4d. *Arnold's Seaside Reader.* 264 pp. (Arnold.) 1s. 6d.—This is a well-printed, nicely illustrated, and strongly bound series of reading books. The titles may, however, mislead some teachers. The first object of the books appears to be to provide interesting material for young pupils from which they may learn to read. The volumes are not devoted solely to subjects explaining the objects of the country-side and the seaside. Interspersed with the natural history lessons are fairy tales, short poems, and in the last book pieces of history and biography. The first four books should prove popular in rural schools, and the last obtain many readers in schools by the sea.

Cape of Good Hope Teachers' Annual, 1903. By Geo. Gilchrist, assisted by the General Secretary of the South African Teachers' Association. xii. + 227 pp. (Lancaster: Geo. Gilchrist.)—All teachers who meditate taking up teaching either in elementary or secondary schools in South Africa should study this useful annual. It contains all the available official information respecting South African schools, syllabuses of the different school examinations, and chapters on school law and infectious diseases, as well as much other important professional information.

The Calendar for the Year 1903 of the Royal University of Ireland. 519 pp. *Supplement to the University Calendar of the Royal University of Ireland, 1903.* 748 pp. (Dublin: Ponsonby & Gibbs.)—Students will find in this issue of the Calendar of the Royal University for Ireland all the changes in the courses and in the regulations for the year 1904 duly set forth, as well as any other information they may require about the work of the university. The supplement contains all the questions set in the numerous examinations held in connection with the Royal University during the year 1902.

Memories Grave and Gay. Forty Years of School Inspection. By John Kerr. xiii. + 371 pp. (Blackwood.) 2s. 6d.—Dr. Kerr's reminiscences have now reached a third edition, which is evidence enough that many persons have found them interesting. We recommend inspectors who have not yet done so to read the book; it will give them many hints as to how to dispel the idea that the school inspector is of necessity an ogre. Teachers will find much useful guidance pleasantly presented and judiciously blended with high-class entertainment.

Reading Taught through Rhyme and Rhythm. By J. R. Blakiston, formerly Chief Inspector of Schools. xvi. + 80 pp. (Bell.) 8d.—Here is another ingenious attempt to lessen the difficulties of the learner. It has sometimes come across us that it would be a very good thing to find out how long children do take in learning to read, and whether any of the devices now plentifully put forth are used with success. Mr. Blakiston tells us that his scheme of making great use of rhyme has been largely tried and has been very successful. It is an extension of the phonetic method, and naturally it disregards the spelling difficulty. If it be possible to save "nine to twelve months in a child's school life," then teachers would be well advised to add this musical use of rhyme to their ordinary methods. This little book will be found full of suggestion.

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.

Levels and Contour Lines.

I NOTICE in your issues of THE SCHOOL WORLD for March and April articles by Mr. Morley Davies on "Levels and Contour Lines." Could the writer of these articles tell me where such diagrams could be obtained?

The High School,
St. Annes-on-the-Sea, Lancs.

S. A. JOHNS.

THE enquiry of your correspondent calls my attention to the fact that I did not specifically mention the publishers of the maps I recommended for use. I really thought them matters of common knowledge among teachers. The sheets of the Ordnance maps of all scales can most easily be obtained in the country by ordering through a head post-office: a charge is made for postage in addition to the price of the maps. I have tried this method and have been very satisfied with the ease and promptness with which I obtained the sheets. In London, any map can be obtained immediately from Mr. Stanford, Long Acre, London, W.C., who also publishes a very useful *Résumé* of the Ordnance Survey publications. It is well to note that the maps on larger scales than six inches to the mile have no contour lines.

Bartholomew's cycling maps (2 miles to an inch) may be had from the Edinburgh Geographical Institute. As far as the limited stock allows, the copies without black printing should be asked for, with an explanation that they are wanted for teaching purposes. The "Diagram" hand-maps, which are all very small scale, may be ordered through Messrs. Philip and Son, 32, Fleet Street, London.

I take this opportunity of repairing another omission from my article. It is necessary to treat large paper-maps with great care in class-work. As far as possible, they should be always kept flat, not rolled or folded. Rolled sheets, when unrolled, are very liable to tear. Folded sheets wear badly at the creases: they can, of course, be cut into rectangles, and pasted on holland or linnette with a slight margin between the pieces to allow of folding, but this method, though excellent for outdoor use, is bad for practical indoor work, as it prevents the drawing of straight lines of section across the map. After trying several other methods, I have found the following answer very well for large maps on thin paper, such as Bartholomew's cycling maps. Obtain a sheet of millboard rather larger than the map itself, and fasten the map to it by means of the gummed tape which is sold in reels for mending music. Great care must be taken to lay this tape straight, or the map will cockle up. It is best first to fix down one of the longer edges of the map, then the other long edge, and then the shorter edges. On no account work round the edges, finishing at the starting-point, for cockling is inevitable that way.

A. MORLEY DAVIES.

The Geometrical Treatment of Angles and Parallels.

THE suggested proof of Euclid I., 32, given in Mr. Woodall's paper under the above title in the May number of THE SCHOOL WORLD, is open to the gravest possible objection, and that is, that it contains the assumption of a principle not contained in the definition of angle on which the proof professes to rely, and that assumption is involved in such a way that it would be absolutely impossible for a beginner to detect it.

Now whatever definition of an angle be taken, if the plane and straight line be supposed infinite, it can readily be shown without assuming Euclid's parallel axiom, or Euclid I., 32, that the limiting position AI (Fig. 1) of a line through a point A to some point on a line BC is, when I is at infinity, the line through A making zero angle with BC, that is, no turning is required to move a line from BI to AI.

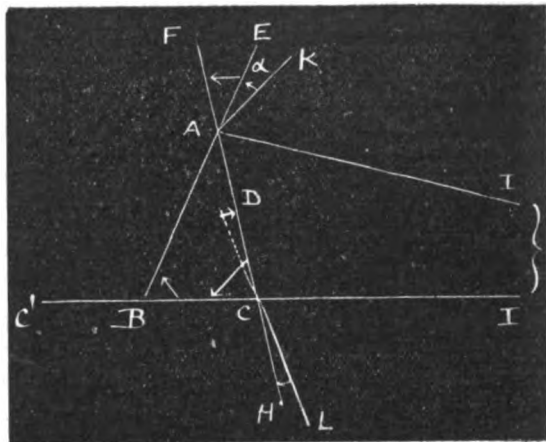


FIG. 1.

If now the angle B of the triangle BAC be transferred to the position IAK, BC along AI, BA along AK, BC has turned through zero angle from BI. ∴ BA rigidly attached to BC has turned through zero angle from BI.

But, unless we assume Euclid's parallel axiom (or its equivalent), we do not know whether AK coincides with AE (AB produced) or not. We must therefore assume that EAK is an angle, +α which may not be zero.

Therefore, in order to bring BA along its old direction AE, we shall have to turn it through an additional angle +α from AI, i.e., from BI making zero angle with AI.

That is, as the line BA slides along itself to AE it turns through an angle +α from BC.¹

Now let us apply to the triangle BAC the process of Mr. Woodall's paper. I have only modified it so as to bring B back to its original position, and to pivot only about that point in the line moved. This serves to simplify the issue.

- (i.) Pivot at B, turn BC into position BA, angle turned through from BC = + B.
- (ii.) Slide BC along BA to AE, angle turned through from BC = KAE = + α. Total angle turned through from BC = + B + α.
- (iii.) Pivot at A, turn BC through angle A into position AF. Total angle turned through from BC = + A + B + α.
- (iv.) Slide BC along AC to CD, as in (ii.) angle turned through from BC = - LCH = - γ,² where LCI = CAI. Total angle turned through from BC = + A + B + α - γ.
- (v.) Pivot at C, turn BC through C to lie along BC, and slide along CB to BC'. This last slide adds no angle. ∴ Total angle turned through from BC = + A + B + α - γ + C.

Thus, A + B + C + α - γ = two right angles.

And without assuming the parallel axiom, or an equivalent, we cannot show that α - γ is zero, and therefore we do not know that A + B + C is two right angles.

¹ EAI is > EBI under the conditions chosen.
² HCI is > HAI under the conditions chosen.

The corresponding proof that the exterior angles of a polygon are four right angles is, of course, equally vicious.

Macclesfield Grammar School.

E. BUDDEN.

WITH regard to Mr. Budden's criticisms, which I have read with some interest, I should like to make three remarks:—

(1) Mr. Budden's objections seem to depend on the introduction of unusual sliding motions, which, being unnecessary, were not mentioned in my article. He also seems to have overlooked the fact that, for the benefit of our "beginner," I use a straight-edge, and do not suppose the sides of the triangle to be moved at all. The lines which form the sides of my triangle do not necessarily terminate at the corners, and if the portions of them which form the sides are, say, 8 inches, 9 inches, and 10 inches long, then I use a straight-edge a yard long and no sliding is required. It is an advantage to let some portion of the straight-edge lie across the base while turning through the angle pivoted at the opposite corner. At the same time sliding would introduce no difficulty, for the straight edge, however short it may be, will slide along the side on which it lies (obviously without turning) until the corner towards which it began to slide lies somewhere between its two ends, and then it can be turned through the angle pivoted at that corner. I prefer not to have an end of the straight-edge at the corner in question. These details of actual demonstration were not necessary in the statement of the general principle, but I think they will help Mr. Budden to see that the straight-edge may, without sliding, turn in succession through the three angles of the triangle, and that in so doing it turns neither more nor less than two right angles.

(2) The "corresponding proof that the exterior angles of a polygon are four right angles" was given by Playfair and Hamilton (his quaternion proof), who, moreover, used it to prove that the angles of a triangle are equal to two right angles, and I fail to see that Mr. Budden has proved it to be vicious. Of modern books giving it I may mention Casey's "Elements of Euclid," and Minchin's "Geometry for Beginners." The latter book makes very full use of the "turning" definition of angle.

(3) In conclusion, I venture to think that not only would it be "absolutely impossible for a beginner to detect" in my proof the assumption of the principle omitted from my definition of angle, but that it would be equally impossible for that same beginner to understand Mr. Budden's explanation of the deficiency. At all events, I will suggest that he should try the experiment of explaining to some beginner, or class of beginners, my proof as given by me, then explaining his objection to it, and letting the beginner say which he finds to be the more convincing.

St. Asaph.

H. B. WOODALL.

Junior Class-Book of European History.

I SHOULD be much obliged if you could give me the titles of some simply-written books on Universal history and on European history for children of twelve to fourteen years.

E. M. WHITE.

"BOOK IV." of the "Britannia History Readers," published recently by Edward Arnold (price 1s. 6d.) will supply your correspondent's needs. That is a very good book.

For the teacher E. W. Kemp's "History for Graded and District Schools" (Ginn, 4s. 6d.) may be useful as the record of attempts made (allegedly successful) in the U.S.A. But it is quite adapted to schools for that country only. The Britannia Reader is only a European history. Kemp's book treats of Hebrews, Egyptians, &c.

A. J. E.

[AN article by Mr. C. S. Fearenside in THE SCHOOL WORLD for October, 1901, contains a list of pupils' books of European history.—EDITORS.]

The Education of Pupil Teachers.

THE appointment by the Board of Education of a small Committee from the Inspectorate to enquire into and make suggestions regarding the training of young teachers is an earnest of the Board's intention to remedy some of the defects of the pupil-teacher system as at present worked.

The recommendations of the Committee of 1898 (Report, vol. i.) have to some extent become operative, but not to any great extent, and by no means generally through the country. This Report is still a valuable mine of suggestions, although its recommendations, largely based on the assumption that an improvement in the material would be brought about, lose weight from the very reason that things are, as regards the sources of supply, very much as they were four years ago.

The pupil-teacher system being the only available source of supply at all ample and regular, of primary teachers its improvement, rather than its abolition in favour of some other plan, must be looked for. I propose to examine a few of its defects, and to suggest some form of solution.

The establishment of central classes is now practically universal, and considerable improvement in respect of staffing, appliances, and curriculum is noticeable. The best of them, having regard to the unpromising class of candidates admitted, and the limited time at their disposal, are doing thoroughly good work. It is perhaps unsound to pay much attention to examination results; but if these are worth anything, the record is satisfactory. Central classes pass annually about 350 boys and girls at London matriculation and higher examinations, immediately, and mediately through the training colleges a number about as large. At Wales, Victoria and Birmingham the numbers are correspondingly ample. The pupil teachers entered at Cambridge and Oxford are sound and trustworthy students, and as a rule take an honours degree.

Now for the chief defects. There is often no entrance examination conducted by the local authority, and the Government test for candidates is often a mere farce. An entrance examination is absolutely necessary, unless the entrant has spent at least a year at a secondary school and can produce evidence of fair ability and industry, such as a Junior Local Certificate. With a rational entrance qualification, pupil teachers should attend at least half time. The standard they are expected to reach is as high for the average student as in the full-time secondary schools; and it is obviously unjust to expect good work from young people fagged out with a day's work before a class. Again, it is wrong to compel girls of pupil-teacher age to be in the streets of large towns late in the evening, for the heart of a large town is anything but a savoury place after night-fall. This question demands an immediate solution, and possibly furnishes a reason for careful parents declining to allow their daughters to undertake the work of primary teaching.

The amount of recreation possible under present conditions must be but small. In addition to Saturday afternoon, a weekly half-holiday should be general; and every pupil-teachers' centre should have its sports clubs, and in addition, chess and debating societies for both sexes.

To the practice of apprenticing pupil teachers to particular schools the limited outlook of the elementary teacher is largely due. I would have the pupil teacher articulated to the Education Authority, and during the middle years of his apprenticeship he should visit all classes of schools in the area, and so broaden his knowledge of teaching by observation of the less stereotyped methods of secondary teachers.

When we come to the problem in rural districts we find that a complete overhauling of the system is necessary. Though there are still many teachers in rural schools whose scholarship is adequate, the conditions of their work are such that their energies are fully exercised in the conduct of their schools; and

the majority of these teachers would gladly be relieved from instructing pupil teachers. The following plan has already been submitted to some of those best fitted to judge, and has been pronounced perfectly workable. In each of the lesser towns, a small centre, staffed by two or three well-qualified instructors, should be established. Each "year" of pupil teachers would attend two whole consecutive days in each week and part of the whole of Saturday. A half-holiday in the week would bring their school work down to that of half-time teachers. Maintenance scholarships would be provided by the county councils to cover the cost of bed and board while away, and by means of approved-lodging houses the difficulty of young people spending a night in each week away from home would be met. Voluntary supervision and occasional hospitality would be freely given by clergymen, teachers and others with a view to safeguarding the morals and extending the outlook of the village girl or boy. In very few cases would the pupil teacher have to travel more than six miles, and if no bicycle were at hand the farmer's or carrier's cart would be available. The rural pupil-teacher is a source of supply well worth considering, especially as the number of boys in towns willing to take up primary-school work is fast diminishing.

If I were to summarise the wishes of those teachers engaged in the instruction of pupil teachers, the list would run somewhat as follows:—

- (1) A proper entrance examination for all candidates for pupil-teachership, followed by small scholarships to enable those selected to spend a year in a good secondary school.
- (2) Increased Government grants to pupil-teachers' centres.
- (3) The abolition of all evening classes for pupil teachers.
- (4) Oral collective instruction for all pupil teachers, particularly those in the rural districts.
- (5) A matriculation examination common to all universities.
- (6) More thorough technical training in the schools, and more direct responsibility attached to head teachers for this part of the pupil-teacher's preparation for his profession.
- (7) Greater accuracy and resourcefulness in the work of candidates from primary schools, and more vigour in the work of many of those from secondary schools.
- (8) Sufficient training-college accommodation, unhampered by religious tests, for all who are fit to profit by a normal course.

ARTHUR J. ARNOLD.

Pupil-Teachers' Centre, Sheffield.

Graphs for Lower Forms.

THE general recognition of the value of graphs as a powerful factor in arousing interest in the early stages of a boy's mathematical work ought to be sufficient to compel its inclusion in a school curriculum. By the decision, however, of the Universities of Cambridge and London to include questions in graphs in the algebra papers of the Preliminary, Junior and Senior Locals and the London Matriculation, no choice is left to the teacher whose work lies in preparing pupils for these examinations but to adopt the subject at once. The following notes which I have made after a year's work with three forms may be of assistance to those who have not yet mapped out a course for their own classes.

First, as regards the mathematical attainments of the forms in question. Form A consisted of boys who had only begun algebra some little time previously, and therefore were not able to do much more than the simple rules and the solution of simple equations. In form B the boys were able to solve simultaneous equations and resolve expressions into factors. The boys in form C had covered the ground up to progressions and indices.

Time-Table.—It was found impossible to obtain a separate period in an already crowded time table, and I was, therefore, compelled to take one-third of the time devoted to a lesson in algebra or Euclid. The results more than justified themselves.

Note Books consisting of alternate leaves of squared and ordinary ruled paper will be found most satisfactory.

Scheme of Work.—In form A we began by discussing positive and negative quantities illustrated by numerous examples of the type, "Prove on squared paper that $3 - 5 + 1 + 2 = 1$." Then followed the co-ordinates of a point with plenty of oral work at the black-board. The areas of various geometrical figures formed by the straight lines joining points whose co-ordinates were given were next determined. The next step was the drawing of simple graphs, and here the purely mathematical part of the subject ended so far as form A was concerned. As soon as they had had sufficient practice in drawing graphs, they began to represent graphically various data in which they were personally interested; e.g., the scores made at cricket—imaginary in many cases, I am afraid—the rise and fall of the barometer and thermometer, the number of marbles, marks or chestnuts gained *per diem*, and so on. Gradually they were able to tackle questions in which they had not only to plot curves but to deduce the answers to questions arising from the curve they had plotted. Questions of the following type were worked with great interest: "Given the lighting-up time for cyclists for various dates, find whether a cyclist could be summoned for not having his lamp lit at such a time on such a date." The use of graphs to find the number of inches in a given number of centimetres and *vice-versa*, and other practical questions of the type afforded a considerable amount of interesting and useful practise.

In form B the same ground was covered more quickly, and the solution of simultaneous equations by graphs and the verification of the results by algebra was the next step. More difficult questions in plotting curves were given, and the limit of the work was reached by their ability to find the equation of a given straight line.

The boys in form C required a considerably less amount of time to reach the position attained by form B. They were then able to proceed with the solution of quadratic equations by means of graphs, and this part of the subject occupied some time, but the work proved interesting and suggestive. For example, in solving two equations such as $x^2 - 6x + 9 = 0$ and $x^2 - 6x + 8 = 0$, a boy is apt to give the answer to the first equation as $x = 3$ and to the second as $x = 4$ or 2 without stopping to ask himself the question as to why one equation has apparently only one root when as a quadratic equation it ought to have two. A comparison of the graphs of the equations, however, at once enables him to see the reason, and the liability to future mistakes of this type is thus reduced to a minimum. The solution of simultaneous quadratic equations by means of graphs, and the introduction of the geometric figures of the circle, ellipse, parabola and hyperbola and their respective equations, afford ample practice and practically mark the limit of the purely mathematical work in the form. More advanced questions arising from the plotting of curves should alternate with the purely mathematical work, and in this respect Whitaker's "Almanac" will be found a veritable El Dorado of suggestive statistics.

R. B. MORGAN.

Newark Grammar School.

Viva-Voce Examinations in French.

I MUST thank Mr. Conacher for his kind expression of approval of my short article on this subject. I do not know whether I understand aright his remarks on nasals, but I think Prof. Passy will convince him that *mg* and *ng* are as different

from *m* and *n*, as *a* is from *z*. The alphabet of the Association Phonétique Internationale shows this very clearly. I agree with Mr. Conacher that the tendency in French at the present moment is towards lessening the number of *liaisons* in conversation and reading of prose.

DE V. PAYEN-PAYNE.

Information wanted in Natal.

WE are often asked here to provide information about schools in England. I venture to ask the hospitality of your columns for the purpose of inviting heads of English schools, both day and boarding schools, to supply us with their prospectuses, and any other information which they may think it worth while to file.

Education Office,
Pietermaritzburg, Natal.

P. A. BARNETT.

A Holiday in Switzerland.

THE members of the party which I propose to take to Switzerland this summer cannot be described as "schoolgirls," under which title you referred to them in the notice which you were kind enough to insert in your April number. On the contrary, most of them will be engaged in some professional work.

We shall leave London on August 4th, and I have arranged with M. Dessoulavy that those who travel out with me and wish to do so can take a course in French at Neuchatel (fee £1) for about three weeks from August 6th. They can then spend several days in the Oberland, and return *via* Lucerne and Paris. As this is not a commercial venture, I shall feel obliged if enquirers will send a stamped addressed envelope.

L. EDNA WALTER.

38, Woodberry Grove,
Finsbury Park, London, N.

Physical Geography at the Cambridge Locals.

THOUGH rather late, I feel bound to draw attention to the criticism on the *Junior* candidates of the examiner in physical geography in the Cambridge Locals. He says: "The practical part of the subject as defined by the schedule issued by the Syndicate had evidently been studied in a practical manner in very few cases. For instance, in the majority of the papers in which a question referring to a rainbow was attempted the colours of the rainbow were given in the order exactly opposite to the correct one, and had obviously been learned by rote." This criticism seems unfortunate. (i.) The time set apart for teaching geography in schools is necessarily short, and, however much excursions may be indulged in and lectures given on the spot, it is not likely that a rainbow will present itself for examination at the proper time, and however much observation apart from the teacher be insisted on, it is scarcely the fault of the "instruction" if the children do not notice the particular order of the rainbow's colours. (ii.) Even if the fact is observed, it is detached from everything else in the subject of physical geography and therefore useless educationally. (iii.) The "observation of rainbows" is stated in the printed schedule, referred to by the examiner, to be "for seniors only;" and with the examiner I hold that, if the question is to be set at all, it must be set as a question on observation and not as cram-work, and consequently it ought not to have been set in an examination from which the observation is specially excluded.

Perhaps as an isolated question it may not do much harm, but there is a distinct tendency to set questions on physical geography which are not geography at all, much less physical geography, and the tendency should be checked.

High School,
New Southgate.

J. FAIRGRIEVE.

PRIZE COMPETITION.

Result of No. 18.—Most Popular First-Year Books in French.

THE voting in this competition selected the following six books as the most popular:—

- (1) "First French Book." By Henri Bué. (Hachette.) 10d.
- (2) "Macmillan's Progressive French Course." First Year. By G. E. Fasnacht. 1s.
- (3) "Dent's First French Book." By S. Alge and W. Rippmann. 1s. 6d.
- (4) "First French Course." By C. A. Chardenal. (Hachette.) 1s. 6d.
- (5) "Siepmann's Primary French Course." First Year. By Otto Siepmann. (Macmillan.) 2s. 6d.
- (6) "First French Book." By F. E. A. Gasc. (Bell.) 1s. 6d.

The first prize is awarded to—

The Rev. Geo. Harris,

Christ's Hospital, West Horsham,

who named the six books correctly.

The second prize is taken by

C. Newdigate,

Stonyhurst, Blackburn,

who named five of the winning books.

Edith C. Stent's list was the next in order of merit.

No. 19.—Most Popular School Class-Books of General Geography.

WHICH six books of general geography are most widely used in schools at the present time? Answers to this question are required in the competition for this month. Each competitor must send a list of the titles, &c., of six school-books of general geography that he considers are the most popular ones now in use in schools.

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

We offer two prizes of books, one of the published value of a guinea, the other of half-a-guinea, to be selected from the catalogue of Messrs. Macmillan and Co., Limited. The prizes will be given for the two lists which most resemble that drawn up as a result of the voting of the competitors.

In naming a book, its title, author, publisher and price should be given. Each list of books sent in must be accompanied by a coupon printed on page v., though a reader may send in more than one list provided each has a coupon attached. Replies must reach the Editors of THE SCHOOL WORLD, St. Martin's Street, London, W.C., on or before Thursday, June 11th, 1903. The decision of the Editors in this, as in all competitions, is final.

The result will be published in the July number, when the successful list will be published.

The School World.

A Monthly Magazine of Educational Work and Progress.

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. 55.

JULY, 1903.

SIXPENCE.

THE RELATIVE ADVANTAGES OF ABSTRACT AND CONCRETE METHODS IN EDUCATION.¹

By Sir OLIVER LODGE, F.R.S.
Principal of the University of Birmingham.

PART I.—GENERAL CONTENTION.

PERHAPS the words "abstract" and "concrete" do not accurately represent my meaning; perhaps I should have used the words "synthetic" and "analytic." But what I mean is simple enough: the only uncertainty is connected with the practical problem as to which method of teaching is best. Is it best to begin with abstract principles, and gradually build up a concrete structure? Or is it best to begin with the concrete facts of experience, and analyse or dissect them down to their foundations? Or is it best to begin at both ends at once, endeavouring to interleave the principles and the facts? Or, lastly, is it better to apply the two methods in sequence? And if so, which is it best to begin with?

I will ask no more questions, but will state what I believe to be the best mode of dealing with youth. (For adults it may be that other methods are desirable—though I doubt it.)

I believe it best first to introduce the learner to some concrete facts, to interest him in the completed structure, to accustom him to the clothed and living organism for some time, before proceeding to instruct him in its abstract principles. And when we approach those abstract principles I do not think that it can be, with young learners, by dissection. It is too hard a way. It is the way that scholars arrived at them no doubt; but it took men of genius to dissect out and to display the principles.

That work has now been done, and there is no need to conduct the learner through that difficult task; indeed it is impossible. When he is led to approach the principles, they must be given to him in their simplest and most abstract form. They must not be confused and masked with any concrete or technical details. They must be pre-

sented in as bare and simple a fashion as the teacher has been able to arrange them in his own mind.

But it should be recognised that the joy of having them so arranged is liable to lead a teacher to think that the learner can appreciate them as he does, and that a learner can begin with them. It is the attempt to begin with them that is the mistake. The concrete experience *must* be there first, so that the principles shall not be perfectly isolated and unsupported wraiths in an unknown world; but rather shall themselves be seen to be, or be gradually felt to constitute, a substantial underlying framework able to sustain a great structure of concrete fact.

The learner who is thus being led by two distinct paths, first by the path of experience, and next by the independent path of reasoning, until the two meet, will not have learnt, in the first instance and by the first path alone, to *understand* the organism to which he is being introduced; but he will have acquired some fulness of experience, some interest and feeling of reality, of practical value, to which one can afterwards appeal; an experience which, whether one appeals to it or not, will colour and enliven all his subsequent more abstract studies.

And when the two paths have met, and a fraction of genuine science is thus begun, then I would once more direct his attention to further details of the finished structure, to a clearer and stronger and more comprehensive grasp of the abstract principles, until gradually the structure can be realised as a whole and comprehended all together.

There are some subjects in which the necessary initial experience is begun by life itself—subjects in which simple experiments cannot be avoided. There are some children's minds which realise this more readily than others, and those are they that are able to learn rapidly and may even *appear* to be able to begin with abstract principles. Not that they are really able to begin with abstractions, but because the concrete instances whence the abstractions are drawn are unconsciously and without effort familiar.

Children who as infants have taken pleasure in watching the working of a crane or of a clock or of a steam engine; children who have had mechanical toys, and have drawn with compasses, and cut paper patterns, and dealt with material bodies and

¹ The substance of a discourse made to the Birmingham Teachers' Association on March 5th, 1901.

geometrical shapes familiarly; these will find no difficulty in beginning their conscious education with the abstract principles; rather they will delight in them and take a pleasure therein as a simplification of what else were complex, as a child likes to thread beads on to a string, or stitch tangled skeins into a pattern, or form scrap calico into clothes for dolls.

I repeat, then, that though we may begin with the goal, and show what we are aiming at, or rather not show it laboriously and insistently, but let it show itself; then it is necessary to begin independently at the bare and accurately-stated first-principles, and lead up little by little to the goal from which we started, but which the child now arrives at by a long and laborious route, and is able to regard now with quite other and comprehending eyes.

Nor is one such alternation sufficient. It is necessary to dive down to first principles and come up again to the living and complete reality again and again, until gradually the descent and the ascent cease to be alternate processes distributed in time, but become one comprehensive and simultaneous *grasp*.

ILLUSTRATIONS FROM THE TEACHING OF LANGUAGES, OF HISTORY, AND OF GEOGRAPHY.

To illustrate I may take examples from any subject:—

For instance, would I recommend beginning with the grammar of a language, introducing the learner first to the skeleton of the dissected and museumed accidence? I would not.

He should first see and hear the language in actual work, see it below pictures, over shops, in newspapers, in general talk, or in as many of these places as might be possible.

But then I would not expect him to be able to do the work of scholars and dissect out the abstract principles of grammar from the concrete mass.

No; I would then begin again at the beginning, and lead him up, through accidence and syntax and all the other carefully elaborated schemes, to a comprehension—not of how the language arose by evolution; that belongs to a further stage of scholarship—but at least of what sort of elements and processes it is now in fact composed.

So, also, take history. I have an idea that a child cannot take a proper and healthy interest in history till it becomes able to take some sort of interest in contemporary politics, till it realises in some dim fashion the motives which actuate public men, and the passionate patriotism to which humanity may be subject. If this idea be well founded, then history is in reality an adult subject, and only in a very limited and family fashion can a child be taught it. Its "history" can be largely biographical, or it may follow the fortunes of a reigning house, because these things are not wholly beyond its concrete experience, but it cannot grasp the rise and decay of nations as a whole, nor can it enter into the mind of statesmen, nor

realise the fierce struggle for apparently insignificant objects which constitutes human life. So its history must be full of anecdote and of picturesque adventure, not too far removed from fairy tales and schoolboy scimmages: must be, in fact, the beggarly elements and trappings of history, and not its soul.

Yet this adventurous treatment is by no means to be despised. The parts of history which live in our imagination are those parts which have been seized and embodied by poet or novelist or dramatist, by men and women of genius who have known how to clothe dead bones with living human substance, and have been able to recreate the dead past and make it stir our feelings and quicken our pulse. History of this kind is fit for human beings at any age; and picturesque treatment should precede as well as accompany more orderly and systematic presentation.

Geography again, if well taught, is, I suppose, an admirable subject; but the best way to appreciate it is to plan a route of travel, and then, if possible, go the journey uncondacted. Let a boy see in the actual what has been studied in the map, realise the distances, the mountains, and the rivers, fill in the details which a book leaves blank, get some living notion of what the surface of the earth is like, and how poorly it has to be represented, until gradually he learns to exercise his imagination, and becomes able to picture something of a country and surroundings he has never seen.

(To be continued.)

RECENT REFORMS OF SECONDARY EDUCATION IN FRANCE.

By DR. H. SCHOEN.

Professor at the University of Aix-Marseilles.

SINCE the beginning of the nineteenth century secondary education has perhaps made less progress in France than in any other European nation. Whilst England, Germany, and even smaller countries such as Switzerland, Holland, and Belgium, have done much to reform their secondary as well as their primary education, the French *Lycées* and *Collèges*¹ present but slight changes from the time of Napoleon I. to the Third Republic.

In the curriculum of French secondary schools, the first place was assigned to Greek and Latin studies, just as they have been handed down from century to century since the middle ages. Such modern studies as living languages and natural sciences were held in small esteem. Physical training, which is in so high repute in England, was practically neglected in France. As to moral

¹The French "Lycées" and "Collèges" are both establishments of secondary teaching, but the former are State schools and the latter are town schools.

education, it was hardly ever contemplated. As modern society progressed under the threefold influence of scientific thought, industrial discoveries and social intercourse among nations, the gulf became wider and wider between French official teaching and the needs of modern life. A young man, who came out of the French grammar-schools at the age of seventeen, was like a soldier provided with the arms of the middle ages, who would have had to fight an enemy armed with the most modern weapons. He had spent his youth over Latin or Greek translations, but he was generally quite ignorant of the most simple applications of steam or electricity. He knew how a Roman in the time of Augustus wrote a letter or greeted a fellow countryman, but was unable to ask his way or to order his breakfast in English or German; he was acquainted with the topography of ancient Rome, but was sometimes ignorant of the geography of modern Europe and often had no notion of the American States. He could recite all the list of French kings from Mérovée to Louis Philip, but had no exact notion of the war of 1870 or the organisation of a modern government.

In a word, the young Frenchman entered upon life almost unarmed for its struggles. He resembled the adolescent in the year 1865, who is described by the illustrious Academician Ernest Lavissee, who designates him as follows:—

A young man who knows nothing about his own body, nor animal and vegetable life; a young man who knows hardly anything of his own country and nothing at all of foreign lands, condemned by his imperfect knowledge of the past to misunderstand the present and future; a young man of insufficient parts, of wavering faith, whatever his faith may be, liable to remain in ignorance of essential things, for his education has not left in mind any of the great curiosities which are a stimulant to work; a young man nearly devoid of knowledge and who thinks himself perfect—a very nice but deficient youth.¹

For some time this practical incapacity of the pupils on leaving the French lycées and colleges had attracted the attention of the government, as well as that of the public in general. For twenty-two years (1881) a first attempt was made to establish, parallel with the Greek-Latin education, a more practical one, which was called *enseignement spécial*, particularly devoted to the study of the exact sciences. In 1891 this teaching was already replaced by what is styled *enseignement moderne*, the latter epithet being thought more significant. In this new curriculum a more important place was assigned to living languages, as indispensable for any man of education. This change, however, proved a failure. For the children of the upper class naturally adhered to the classical side, which is required for all liberal careers; besides, this study is a deep-rooted tradition in a Romanic country like France. The boys who followed the modern side could only be recruited among pupils from the elementary schools in town and country, or among those who

were unable to pursue their classical studies. Hence arose a tendency to despise the "modern teaching."

The natural result of this tendency was that the Faculties of Law and Medicine excluded this new category of pupils, as well as the Faculties of Letters and Theology, for which a knowledge of Greek and Latin was more justified, so that in the French Universities only the Faculties of Sciences remained open to those who had gone through the modern curriculum. As very few families were willing to render four Faculties out of five inaccessible to their boys, by far the greater number of the sons of the upper class continued to pore over Greek and Latin dictionaries; whilst in all neighbouring countries the number of pupils who studied sciences and foreign languages was ever on the increase, the proportion of French classical scholars was far higher than in England and Germany. This was hardly compatible with the aspirations of a modern democratic nation. For this reason the State education seemed to respond less and less to the wants and legitimate requirements of modern society.

In order to reconcile higher education to the ever-increasing requirements of every day, the Minister of Public Instruction, seconded by the two Chambers, has just brought about a radical reform in secondary teaching. But this reform, though rapidly carried out, has been, however, long under consideration and prepared with care. Far from being hastily conceived, no scholastic reform was ever more seriously and methodically elaborated in France. For two years a committee appointed by Parliament interviewed the leading educational authorities, and their labours have been incorporated in seven large volumes, which have been gratuitously distributed among the Universities and lycées of France.

The Reform may be summarised as follows:—Three fundamental ideas inspired the organisers. The first was to give a larger scope to modern studies, without unduly loading the programme, without over-taxing boys' delicate brains, and thus render official education more compatible with the needs of modern life. Secondly, an attempt was made to unify secondary teaching by imparting to all scholars a common fund of general knowledge, on which special branches of learning might be engrafted, according to the future careers of the pupils. Lastly, it was desired to facilitate the entry of primary-school boys into the lycées and colleges, and also intended that a pupil not working for a liberal career might leave these establishments without having passed through all the forms, but with sufficient knowledge to carry him through practical life. These diverse objects, which were kept in view, will serve to illustrate the principal lines of this reform. But how were they to be practically realised?

To begin with, the separation between classical and modern education was abolished in order to unify the teaching in secondary schools. Formerly, the classical lasted a year longer than the modern curriculum; henceforth, secondary education will

¹ See *Revue internationale de l'Enseignement*, No. 12, December 15th, 1902.

occupy the same length of time for all pupils alike. The modern schoolboy was excluded from most liberal careers; in the future there will be *equality of sanction*, that is to say, all careers will be open to every pupil of secondary schools, whatever special studies they have chosen. This is how the unity of secondary teaching is to be realised.

But this unity could not be uniformity. During the last half century the syllabuses had been overloaded, and gave rise to many complaints. At the beginning of the nineteenth century the curriculum had comprised Greek, Latin, French, philosophy and elementary mathematics. By degrees were added history, geography, modern languages, chemistry, physics and natural history; but these additions had only overloaded the programmes or overwhelmed the intelligences, without producing any good result on the majority of pupils. It was then decided that certain branches, such as Greek, modern languages, mathematics, should not be required from all pupils in equal proportion, and that each scholar might study as many sciences, modern or ancient languages, according to his tastes, capacity, and also according to the career he might choose. Thus the State wished to avoid overwork and, at the same time, to give a better place to modern studies than previously, but only for a certain number of the scholars.

To permit the pupils of primary schools to enter a lycée or college without difficulty, it was decided that the teaching of the secondary school, properly called, should commence only with the sixth form inclusively.¹ Therefore, the pupils of the seventh and eighth classes, called the *Elementary Division*, from the ninth and tenth, called the *Preparatory Division*, should only study what is taught in a good elementary school, and particularly not begin any special study that should afterwards be continued in the sixth class. Consequently, Latin is excluded from these classes, and modern languages are, but temporarily, maintained in them. That is to say, in these two divisions the teaching will comprise only French, writing, drawing, singing, arithmetic, elementary morals, geography and history.

Experience has proved that it is useless to begin Latin, as was formerly done in France, before nine or ten years of age, that is to say in the seventh or even in the eighth form; it is assuredly better to begin by teaching the child to speak its native language, to reflect and to reason. As for living languages, many professors disapprove their imminent suppression in the lowest classes; but these languages will be, by way of compensation, more thoroughly taught in the higher forms. The great advantage of this part of the recent reform will be to permit many parents who live in the country to keep their children longer at home; and when we consider the drawbacks of the great boarding-schools (*internats*), which are so numerous in France, it will be satisfactory to

know that the number of boarders from six to ten years old will be diminished.

With the sixth form begins thus so-called *secondary education*. It is divided into two great cycles, the first of which lasts four years, from the sixth to the third, and the other three years, from the second to the head class.

The **FIRST CYCLE** is organised in such a way as to form a whole, so that the pupil who has gone through it, and who wishes to enter practical life from fourteen or fifteen years of age, could leave the lycée or college without being too uninformed, provided with a store of knowledge, small no doubt, but sufficient. It was thus wished to attract to the lycées and colleges many children whose parents would be discouraged by too prolonged studies.

This first cycle is separated into *two divisions*. In one is studied French, modern languages (five hours a week), history and geography (three hours), arithmetic and science (three hours), drawing, much Latin (six or seven hours), and a little Greek, but the last as an optional subject.

In the other division, which does not include the study of Latin and Greek, more French is studied, more science (mathematics, physics, chemistry, natural history), modern languages, history, geography, and, from the fourth form, a little book-keeping. At the end of this first cycle, a *certificate for secondary studies of first degree* can be given to the pupils according to the marks obtained during these four years of study, and according to the judgment of the professors whose lessons they followed.

In the **SECOND CYCLE** the variety is still greater. Four principal groups are offered to the pupils, viz., (1) the *Latin-Greek Section*, intended for scholars who previously have done not only Latin but also Greek. To the latter subject is given five hours a week, whilst modern languages and mathematics are reduced to a minimum. So far as one can judge, this section is at present the least in favour among the pupils, and it seems that only the future teachers of Greek and Latin will learn the language of Homer and Sophocles. It was indeed hoped to save this language in reserving it for select pupils,¹ but the number seems to be few.

(2) The *Latin Section with a more developed study of the living languages*.—The time devoted to Greek in the previous section will especially be given to the study of two modern languages, and English or German are required, whilst in the Greek-Latin section the pupils have the choice between English, German, Italian and Spanish. This section seems to be suitable to the aristocracy, future lawyers, political men and journalists.

(3) The *Latin Section with a more complete study of sciences*.—Here mathematics, physics, and chemistry will take the place of Greek. It will be suitable to

¹ Cf. what Prof. G. G. Ramsay, M.A., LL.D., Litt.D., at the first annual meeting of the Scottish Classical Association (November 20th, 1902) has said: "We recognise the fact that those studies (classical studies), with their severe demands, are not, and by their very nature cannot be made available for all; we recognise that, with the advance of knowledge in all departments, there are other subjects which must form part of any general scheme of higher education, however high; and that there are other directions in which, if only right methods be employed, and right aims held in view, a liberal education of a really high kind can be secured."

¹ In the French lycées and colleges the highest classes are the first and second, while the lowest forms are the ninth and tenth.

² In France the State schools (lycées and colleges) include numerous boarders (*internes*).

careers requiring a thorough study of the exact sciences combined with general culture. It is probable that future doctors, future students of the Faculties of sciences, will prefer it.

(4) Finally, the *Section of Modern Languages combined with the study of sciences*.—This section, the only one in which there is no Latin, is intended for pupils who have not studied Latin in the first cycle, or who had no taste to continue it. It seems that it will be preferred by future officers, engineers, manufacturers, merchants, post and station-masters.¹

The two first sections prepare for a class of *Philosophy*, in which the philological studies are crowned, according to ancient French tradition, by the teaching of psychology, logic, morals, metaphysics and history of philosophy. The two last sections end in a *Mathematical class*, in which the exact and natural sciences are ranked first, and leave but little space for the study of philosophy.

To each section will correspond, after the two highest forms, a special examination, corresponding to the teaching of each branch, and of which the two parts will continue to be called in France, from ancient tradition, *Baccalaureates*. But each of these four Baccalaureates will confer the same prerogatives and render all the Faculties accessible.

Such is the reform which has been introduced into France since last October, at least in the greatest number of classes. It seems that it will give good results, for it is a powerful effort to bring secondary education nearer to the most legitimate needs of our time. It gives more importance to real life and secures for modern languages, exact sciences, history and geography, the place they merit in our contemporary societies.

The ancient establishments of secondary teaching, the legacy of the past, with its Greek-Latin tradition, no longer corresponded to new scientific methods. The French lycées and colleges—renewed and transformed—are to be henceforth in close communion with the noblest aspirations and intellectual wants of our time. Such is the condition of their vitality, success and influence.

[The French Government issued the new programmes for all secondary schools—classical and modern—in France, in July, 1902, and the new curricula, which give detailed courses of study, are most important, as likely to be of great assistance to teachers and local authorities concerned with English secondary education. The Office of Special Inquiries and Reports of our Board of Education is at present engaged in preparing a volume on the subject; meanwhile Prof. Schoen's article will prove of general interest. The author wishes it to be stated that the right of reproduction or translation of this article is expressly reserved. Requests for permission to reprint the article or for further information should be addressed to the author, Prof. H. Schoen, 25, rue du Quatre Septembre, Aix-en-Provence, France.—EDITORS.]

¹ See *Journal Officiel de la République française*, vol. xxxiv., No. 148, June 2nd, 1902; cf. *Revue internationale de l'Enseignement*, June, 1902; Marcel Bernis in the *Revue de l'Enseignement secondaire*, xxiii., No. 13, July 1st, 1902; *La Réforme et l'Inquiétude dans l'Université*, and, lastly, our article in the *Deutsche Rundschau*, October, 1902.

BOY ADMINISTRATORS.

By F. W. HEADLEY, M.A.
Haileybury College.

BARON COUBERTIN'S recently published estimate of English public schools,¹ while highly commendatory, cannot but lead us to reflect upon the principles on which our public-school system is based and, further, on the question whether the system is not being gradually modified. There can be no doubt, as Baron Coubertin has said, that the life of them is the management of school institutions by the boys themselves. Are we true to this principle? or is the tendency growing to manage for the boys instead of letting them manage? Is the master more and more invading domains that used to be reserved for the boy?

The temptation to desert what is really the ground principle of the public school is never absent. A boy manager, whether games or house-discipline be entrusted to him, is frequently inefficient. His term of office is short. He has to learn his work, and often, before he has learnt it thoroughly, his school-time is over. If he is of the ablest sort, he will learn by watching his predecessors before he himself takes the reins, but it is not given to all to learn in this easy way. He may be casual and easy-going—very often is—and to interfere immediately and perpetually may mean the withdrawal of the freedom which it is essential to give him. Again, it may happen, though not very often, that failures of this kind may come to the notice of the parents of other boys who suffer through the inefficiency of prefects or captains of games. And then there may follow a demand from outside for greater smartness, greater efficiency, even at the sacrifice of our fundamental principles of school government. The British public, in fact, demands that there should be no failures. But occasional failures, sometimes comic, sometimes tragic, are of the very essence of the system. The management of some departments is very largely entrusted to boys. It is their education or a large part of it. Rob them of responsibility, supervise till failure is difficult, and what becomes of their education? It is postponed, all this valuable part of it—the business training, the management of other human beings—till they have left school.

Many influences tend to narrow the boy administrator's sphere of activity. Such an institution as a volunteer corps or a natural history society cannot be entirely managed by boys. They can only fill subordinate positions where not much freedom is possible. And thus even such an excellent institution as a volunteer corps leads to some curtailment of self-government. Even in school games there is not the same freedom as heretofore. The intense excitement aroused by interschool contests and the publicity given to them have

¹ *Fortnightly Review*, December, 1902.

led to one regrettable consequence. If excellence in games is to be attained, the management of them cannot be entirely entrusted to the boys themselves. There must be masters appointed to coach and superintend. Their personal influence is, no doubt, excellent, and they have often the good sense to allow as much freedom as possible to the boy-captains. But when experience and inexperience meet, the latter, unless it is unusually self-confident, is likely to seek advice and follow it. And so a good thing is gained by the sacrifice of another good thing.

In matters of discipline there is a movement in the same direction. In this spic-and-span age public opinion is exacting, and the tendency is to entrust less to prefects for fear there should be failure. Then follows the invariable result. The boy-official is less strenuous, because his responsibility is less. It happened—say, thirty years ago—in not a few schools that a house would be left for a number of years in the charge of a master whose slackness was of a kind and of a degree that would not be tolerated at the present day. It was in this soil that the strongest prefects grew, just as among the ancient Israelites the strongest judges arose when things were at their worst. We cannot revive this obsolete state of things, but we can see its merits, or, to put it better, its redeeming features.

The school of thirty years ago had one undoubted advantage. The greater leisure of those times allowed boys to think, and develop ideas of their own. The pressure of examinations discourages thought and leaves little energy in those, over whose heads the examinations hang like drawn swords, for anything exceptional. Baron Coubertin does not recognise the evil of this. He recommends longer hours with a view to the attainment of a higher intellectual level. But make the hours of all boys as long as those of army candidates, and school institutions would dwindle and pine. If the schoolboy is to be made more intellectual, it must be by exciting greater interest in intellectual subjects and by bringing more pressure to bear upon idlers. The idea that the brain can be stimulated by mere confinement in company with books and an overworked master is a very strange one. Excessively long hours have only a deadening effect.

The moral of all this is plain. We must not over-teach and, still less, must we over-govern. Human nature at school is much the same as human nature elsewhere. Release from responsibility produces everywhere the same result—moral slackness and enfeeblement. The little village communities still existing in India, and of which we still find vestiges in Britain, are suffering, or have suffered, from similar influences. So long as the central government was either weak or bad, the necessity of defending themselves against marauders, rival villages, or unscrupulous tax-collectors, bound the individuals together and formed the cement of the community. But, when the State became strong, the police ubiquitous and moderately efficient, then the little community

had no need to defend itself. The responsibility was shifted on to the shoulders of the police, and there followed a weakening of the ties that bound together the associated families. There was less self-government and more government from without.

These facts are a warning against over-governing. Formerly a public school resembled a family in which the father instilled sound principles into his sons, and then left them very much to themselves. Now we have reached a stage in which it may be compared to one in which the father and the elder sons who have passed the age of boyhood organise the amusements of the younger sons and, to a great extent, live with them. Both systems have their advantages. But there is great danger in extending the present system further. Probably in many schools it has already gone further than is desirable. But happily, as a rule, much of the administration and management is still left to the boys themselves, and it is highly important that they should remain so, and that; wherever it is possible, there should be a further extension in this direction. No doubt where there is freedom there will occasionally be evils, and serious ones. If there has been any remissness on the part of boy-authorities they must have their responsibility forcibly brought home to them. But we must not consider that, because of the existence of evil, the system is condemned, as long as the evil in question is confined to a small minority and is repro- bated by the majority. Nor should it lead to any narrowing of the spheres within which boys exercise authority. After all, masters can, by incessant activity, do nothing but cleanse the outside of the platter. Their true policy is to strive to influence the minds of those whom they put in authority. If they can be induced to think rightly on important questions, all will go well. And with regard to school institutions, any encroachment by masters should be viewed as a movement in the wrong direction. As examinations enter more and more into the lives of boys, and as their leisure hours are more and more cut into, it will be easy enough to find excuses for departing further from the sound principles which have guided public schools in the past. Yet nothing but harm can result from yielding to the temptation. The tendency in the present day is manifest, and the conditions under which we live may ultimately act irresistibly, so that our own efforts may be powerless to direct the course of school development. But it is not for the individual to decide that he is impotent to resist the force of circumstances. Arnold's principles are still those on which public schools must be worked, though the trend of things is slowly making it more difficult to be faithful to them.

SELF-GOVERNMENT is the object a great school proposes to itself in its life and laws, and the praeceptors are the machinery for carrying out this self-government amongst the boys themselves. Without them the masters are despots, and despotic laws must, as far as they can, do the work of sound internal popular government, self-worked and within reach of all.—Thring.

MATHEMATICAL INSTRUMENTS FOR SCHOOL USE.

By W. D. EGGAR, M.A.
Eton College.

GEOMETRICAL drawing has recently become a recognised part of mathematics. It used to be a very humble retainer whose services were frequently dispensed with. Then some years ago it was promoted from 500 to 1,000 marks in Army examinations, and at once rose to a position of importance in military circles. In civilian society it was still treated as a person of no importance; but recent action of the Universities has raised it from obscurity, and many of us desire its better acquaintance. The Cambridge Local and other examinations require practical geometry to accompany theoretical; and the combination forces us all to recognise that Euclid's order and method do not fit in well with our practical work. It is not proposed to alter our practical methods to fit in with Euclid; though many irreverent attempts have been made to cut Euclid up and piece it on to the practical work. It may, therefore, be assumed that drawing-office methods are to be followed, and that the best modern instruments are desirable.

In selecting instruments for beginners, certain special features are to be looked for. Accuracy is of course the main consideration in all instruments; but for elementary work we need in addition simplicity, durability and cheapness. The following remarks are made in the hope of helping teachers to compass these ends.

PENCILS.—The Cambridge Local authorities demand a hard pencil, though the degree of hardness is not specified. The writer finds that Faber's HH with a "chisel" point is well suited to elementary work. It makes a fine clear line, and the chisel edge lasts longer than an ordinary point, though in delicate work a fine point is preferable as making it easier to see the beginning and end of the line. In skilful hands an F or an HB gives good results; but for the average clumsy boy HH is to be recommended.

SCALES.—A boxwood scale, showing inches and tenths on one edge and centimetres and millimetres on the other, is, of course, a necessity. For ruling lines and measuring distances it is an advantage to have the edges bevelled. If, on the other hand, we wish to use the scale in combination with a set-square, for ruling parallels at given distances, the bevelled edge is a disadvantage, as the set-square is liable to slip over or under it. Still both kinds can be used accurately for both purposes, and the matter may be left to individual taste.

Mr. Baker, 244, High Holborn, supplies a scale of good quality, showing 12 inches and 30 centimetres, at 1s. 6d. Messrs. Aston and Mander, 61, Old Compton Street, supply similar scales showing 6 inches at 8d. each. Messrs. Eyre and Spottiswoode supply at 45s. per gross 6 inch scales, with diagonal scale at the back. A cheaper form of

very fair accuracy can be obtained from the Educational Supply Association, 42, Holborn Viaduct, 2s. per dozen.

PROTRACTOR.—The semicircular form is the easier for beginners to understand. If made of stout celluloid, with the graduations on the underside, it is fairly rigid and accurate (Aston and Mander). Lilley and Son, 10, London Street, Fenchurch Street, make a celluloid protractor showing half-degrees. The cheap horn-protractors are liable to warp, and none of the semi-circular type appear to me to give as accurate results as the rectangular form. This is, perhaps, more difficult to explain to a beginner; but if its method of construction from the semi-circular form is explained, or, better still, if the student is encouraged to make both kinds for himself on paper, the difficulty disappears. It may, perhaps, be mentioned here that the correct way of using a protractor in *setting off* angles is *not* to put the base of the protractor along the line with which we wish to make our angle, as this necessitates a double operation; first, the marking of a point opposite the required graduation, and then the joining of this mark to the angular point. The correct way to set off an angle of, say, 70° is to arrange the protractor so that both the middle point of the base and the 70° graduation lie on the first line. Then we have only to rule a line along the base of the protractor.

A useful form of rectangular boxwood protractor has degrees and a scale of chords on one side, and on the other a diagonal scale showing hundredths of an inch. These can be obtained anywhere.

Another form, combining scale and protractor, has degrees and scale of chords on one side, inches and centimetres on the other (Aston and Mander).

SET-SQUARES.—These should be made of ebonite or celluloid, rather than of wood, which is liable to warp. Celluloid is a pleasant material to handle, and I have found it satisfactory (Aston and Mander, Baker). Some very cheap and apparently durable pearwood set-squares (Eyre and Spottiswoode) have edges graduated in inches. Nickel is another possible material (E. S. A.). If one alone is used, it should be the 60° set square, and the longest edge of it should be marked with a fleur-de-lys. It can then be used in conjunction with the scale for ruling parallels at any required distance apart, the fleur-de-lys sliding down the slanting scale double of the required distance. This is of course on the same principle as the marquoise scales, in which the slope of the triangle is one in three.

If possible, two set-squares should be in use, both the 60° and the 45° . They slide better against each other than against a bevelled straight edge, and they are useful for making angles of 45° , 60° and 30° , as well as the ordinary parallels and perpendiculars.

The so-called parallel rulers often supplied with boxes of instruments are of no practical use.

DIVIDERS.—Dividers to be of any use must have sharp points and be capable of accurate adjustment. Ordinary cheap stiff-jointed dividers

fail to satisfy the second condition, and very soon cease to satisfy the first; for the student, having no particular use for the instrument, judges that the points must be intended for sticking in to something, and inserts them in the desk. If, however, one of the legs is provided with a screw adjustment, we can measure and set off distances accurately to hundredths of an inch by first pulling the legs out as nearly as possible to the required points, and then turning the screw until the coincidence is perfect. In the dividers supplied by Messrs. Aston and Mander, the screw is provided with a stop, which prevents it from coming out altogether and so being lost. Such instruments are expensive, and are not really needed except for dividing arcs by trial, so they may reasonably be dispensed with.

COMPASSES.—For elementary work, a pair of compasses that will take an ordinary cedar pencil is desirable. Screw holders are suitable, provided the screw cannot be detached. Little fittings of this sort are liable to be lost, and are difficult to replace. A spring-socket avoids this difficulty (Aston and Mander, Baker). A neat form of screw-socket which will take a pencil of any moderate size is supplied by the Educational Supply Association (7s. 6d. per dozen). The screw does not come off.

A teacher may find it advisable to keep the instruments used by the class in a drawer, in which case separate boxes for each student are unnecessary. If, however, it is thought desirable for the students to bring their instruments, boxes are indispensable. Most of the instrument makers make special terms for supplying large numbers, and provide boxes of different quality and price. (Aston and Mander, Eyre and Spottiswoode, E. S. A., and Relfe Bros., may be mentioned as supplying these elementary boxes.)

A HOLIDAY TRIP ON THE LOIRE.

By DE V. PAVEN-PAYNE.

Principal of Kensington Coaching College.

WHEREAS most English people who have travelled in France are familiar with Normandy and Brittany and the districts lying between England and Paris, only a small proportion are acquainted with the Loire country, which is no less interesting architecturally and is much more so historically, as it is so closely connected with our own Angevin kings and with the entire history of France up to the time of the Bourbons. Even those teachers who have attended holiday courses at Tours have been known to return to England without having visited even the more famous *châteaux* along the banks of this river.

We propose to sketch out a trip of three weeks or more which may be undertaken either at Easter or in the summer. The first thing to do is to get

to Paris. We have always considered the afternoon train, leaving Charing Cross at 2.20, and arriving at Paris at 9.30, the most convenient one of the day. It is a wonder that it is not more largely used, as there is now a restaurant car from Boulogne to Paris both for first and second-class passengers; so that one does not have to gulp down a hasty meal for which an extravagant price is demanded at the South-Eastern buffet. After a night's rest in Paris one can leave the next morning for Chartres, whose cathedral equals in interest those of Amiens, Reims, or Beauvais. The chief points to be remarked in the cathedral of Chartres are the two steeples—one of which Huysmans compares to a huge pencil writing the prayers of mankind on the sky—the stained glass and the Byzantine figures in the porches. An excellent *déjeuner* can be obtained at the Hotel de France; but really more than one day should be given to this town, during which time one might read Mr. Cecil Headlam's monograph in the "Mediæval Towns Series" (Dent, 4s. 6d.) Mr. Massé's handbook on "Chartres" in Bell's "Cathedral Series," and J. K. Huysmans' "La Cathédrale" (Stock, 3f. 50). The next stopping place should be Le Mans, where the east end of the cathedral is one of the finest in France, and very little known. Laval is not worth stopping at, and the monastery at Solesmes is now, unfortunately, closed by reason of the recent law on religious congregations. Formerly the Benedictine monks were delighted to show visitors round their domain and allow them to share their frugal meal. The sculptures in the church are particularly noteworthy. Therefore, unless permission can be got to visit Solesmes, from Le Mans one may proceed straight to Angers, the capital of Anjou. Here a stay of two days should be made. Although the cathedral is interesting rather than beautiful, the castle and the old houses will afford plenty of sight-seeing, and an excursion should be made to Les Ponts de Cé. The tourist ought to carry with him, everywhere, Baedeker's "Northern France" (Dulau, 7s.) and Joanne's "La Loire" (Hachette, 7f. 50). The essential book for the Château country is "Old Touraine," by T. A. Cook (Rivingtons, 12s., 2 vols.). It is one of the most delightful books a traveller can put in his bag; for the atmosphere of the French Renaissance surrounds one while reading it, and one is enabled to appreciate the things seen.

After Angers a *détour* may be made to Nantes; but, although it is a busy industrial town, it can hardly be called interesting, as both its castle and its cathedral (with the exception of the tomb of the last Duke of Brittany) are distinctly mediocre. If the journey to Nantes is undertaken, it is almost worth while to go on to St. Nazaire and visit Guérande, a walled town within whose gates one may imagine the life of 500 years ago, as Alphonse Daudet so charmingly describes it. The river should then be followed either from Nantes or Angers to Saumur, where an excursion can be made to the largest dolmen in France. An excellent *déjeuner* can be obtained at the Hôtel de Londres, and the wine of the district should not be

left untasted. From Saumur the steam tramway will take the tourist to Fontevrault. The old abbey, —wherein are buried our Henry II. and his wife Eleanor, and all of our Richard I. except his heart, which lies at Rouen,—has now been converted into a reformatory for youthful criminals. The eastern end of the old abbey church is now the present chapel, and it is very incongruous to notice the wooden forms for the prisoners and the high seats from which the warders watch them even during divine service. It is advisable to obtain permission beforehand to visit the abbey, or one may be disappointed at the end of the expedition. This remark will apply to most of the castles, for it is often difficult to arrange the trip so as to arrive at them on the particular day set apart for receiving visitors: but if written application be made to the proprietors a short time previously, a courteous permission will invariably be obtained to visit the château at one's convenience. One then has the additional advantage of not going round with a crowd, or of having to hurry through interesting material.

Those who can walk have a great treat in store for them in travelling from Fontevrault to Chinon, a distance of under twenty miles. From Montsoreau (readers of Dumas will remember the name), where the Loire is joined, the side of the river should be taken to Candes, where is a most interesting church in which lies buried the soldier-saint, Martin of Tours. Here, and all through the Loire country, "good wine needs no bush" is not quite a true proverb, for, although the *vin du pays* is excellent, every inn-door has its bush or wreath of ivy.

Chinon, which was the favourite residence of our Henry II., will demand at least a day. The castle, which is really three castles, is a most interesting ruin, and was the spot where Jeanne Darc had her first interview with the Dauphin, whom she recognised, although he was disguised as a courtier. There is a most spirited statue of Jeanne in the town, and another of Rabelais, who was born here. From Chinon travel to the Castle of Azay-le-Rideau, which is quite unspoilt, and contains (or did, until quite recently) some splendid portraits by Clouet. The tourist had now better make his way to Tours, the former capital of Touraine, "the garden of France." He will need two or three days for the town itself, and as many more for excursions. He will find the town pleasant, and will not wonder at several English people having made it their headquarters. If he is a lover of Balzac, he will enjoy identifying many of the spots immortalised in the works of that prolific author, especially the sacristan's house just to the north of the Cathedral. The two remaining towers of the Abbey of St. Martin will give him an idea of the size of that gigantic structure. He will be disappointed, however, in Plessis, the scene of Louis XI.'s villainies. From Tours many excursions may be made, and two must be; those to Loches and Chenonceaux. A third might be made to Poitiers; and others to Langeais, Luynes, and Cinq-Mars in the more immediate neighbourhood. Loches, which was another favourite prison

of Louis XI., will give the tourist a splendid idea of the mediæval castle, which has hardly been altered for modern requirements. There is a gruesome tale of a new governor of the Château, who, on his appointment, determined to investigate every part of his new command. Having descended to the lowest dungeon, far down in the bowels of the earth, he happened to note that part of the floor was boarded over; on asking why, he found that the gaolers could give no reason. So he had the boards pulled up and found that there was a still lower dungeon beneath. On entering this the corpse of a man, which crumbled to dust at a touch, was found sitting in a corner. He had been forgotten there, and left to die years previously. At Loches, the traveller will understand the meaning of the word *oubliette* the holes from which lead to the adjacent river Indre. The curious castle chapel and the beautiful tomb of Agnes Sorel will also interest him. After what has been said, it will be seen that a day for Loches is not too much. In fact, a good plan is to sandwich a day of sight-seeing in Tours with a day of excursion in the neighbourhood. An idle afternoon may be passed in visiting the Abbey of Marmoutier on the north bank of the river, and continuing the walk to Vouvray, where the sparkling wine of the district should be sampled. Poitiers is some distance off, but if a day can be spared for it, the traveller will not regret his visit. The cathedral and the old church of Nôtre Dame are sure to be appreciated. But all associations of the battle will be difficult to localise. If at any time difficulty is found in obtaining a suitable place for lunch, it should not be forgotten that at every station is served a *repas* at 1 fr. 50 c. all through the middle of the day. It is not very extensive, but will enable the traveller to stave off the more alarming pangs of hunger.

The last excursion from Tours is, without contradiction, the best—that to Chenonceaux. The home of Diane de Poitiers has often been described by pen and pencil. But every traveller will find it one of the few things that exceed the expectations he has formed of it. A beautiful walk of under ten miles through the forest will bring him back to the Loire at Amboise, where he will be charmed by the splendid situation of the castle and its little gem of a chapel, containing the tomb of Leonardo and a splendid carving over the door of St. Hubert's conversion. Recollections of Mary, Queen of Scots, or, as she then was, Mary, Queen of France, and the slaughter of the Huguenots, will render the castle more interesting still. After a day at Amboise the tourist should proceed to Blois. On the way, however, he should not omit to stop at the Château de Chaumont, which has a splendid view over the Loire, and still retains much of the appearance of the mediæval stronghold. Blois itself will require quite two days; the Castle, with its numberless historical associations, especially those of Henri de Guise and Henri III., and its marvel of architecture, the open staircase (on which Mr. T. A. Cook has written a most interesting book, "Spirals

in Nature and Art"), will take almost all his time. A splendid excursion from Blois, best undertaken on a bicycle, which may be easily hired in the town, is to the three châteaux of Chambord, Cheverny, and Beauregard. The way is chiefly through splendid forests, and can easily be accomplished in a day. From Blois we may proceed to Orléans direct, or make a *détour* through Vendôme and Châteaudun. The former has a splendid Renaissance church with some of the best tracery in France; and at the latter one can see unaltered the room in the château where the Revolutionary Tribunal sat to judge the *noblesse* of the neighbourhood. At Orléans remembrances of the "Maid" will confront the tourist at every step; and he must not forget a visit to the Museum of Antiquities, one of the few old houses left in the town. A trip to the source of the Loiret is very pleasant. Here we leave the tourist, as we have come to the end of the real Loire country. If his holiday has come to an end, two hours will bring him back to Paris from Orléans, and thence to England. If his ardour for sight-seeing is still untamed, we can recommend him to proceed through Bourges and Nevers, and then turn northwards through Auxerre—especially undertaking a *détour* to Vézelay, the hill monastery, whence started the Third Crusade—Sens and Fontainebleau, to Paris. A trip of three weeks should not cost more than from £16 to £20, everything included. For short railway journeys it is quite possible to go third class in France, and in the hot weather it may be recommended on account of its coolness. Those unaccompanied by ladies will often find it convenient to choose a small hotel near the station to sleep at, and have their main meals at the chief hotel or restaurant in the town. The small hotel is almost invariably clean, and money is saved on rooms and railway omnibuses. It should be needless to add that a minimum of luggage means a maximum of ease.

THE PHONOGRAPH AS AN AID TO THE TEACHER OF MODERN LANGUAGES.

By Prof. WALTER RIPPMMANN.

MANY of us can remember the excitement caused by the appearance of the phonograph—or rather of that modification of it which enabled us not only to record sound but also to reproduce it. Since then this most ingenious instrument has been gradually improved, until the results to be obtained from a first-rate phonograph are truly remarkable.

It was an obvious suggestion, made long ago, that it should be utilised for modern-language teaching. The inevitable wag suggested that in future a penny in the slot would ensure a lesson in French and German, by a recognised authority, in the purest of accents. The absurd claims of the phonograph to be regarded as a substitute for

the living teacher prevented me for some time from doing justice to what may indeed be regarded as an aid to the student, even though its use in the class-room is hardly to be recommended.

An interesting and valuable article by my friend Mr. Dumville in a recent issue of the *Modern Language Quarterly*, and an inspection, or I should say, a hearing, of some of the records sold by the "Modern Language Press," 13, Paternoster Row, have induced me to make some experiments, and to consider the question to what extent the phonograph may be of service.

The distinctness of a phonograph record depends mainly on the speed at which the recorder (a sapphire point) travels over the wax, and, of course, on the clearness of the speaker's delivery. It is, therefore, obvious that a speed of 160 revolutions a minute will produce better results than a speed of 120, and that a large cylinder will be better for this purpose than a small one; also, that it is easier to record slow speech satisfactorily than quick speech. Even under the most favourable conditions (*i.e.*, 160 revolutions and a large cylinder) a good deal of the sonority of the voice is lost; and it is almost impossible to get good records of the voice when it is "dropped." It follows that the sustained speech of declamation is best suited for reproduction—the speech of the elocutionist, rather than that which the phonetician studies. Even the trained public speaker will make several experiments before he determines the pitch at which the phonographic reproduction of his voice is good. Interesting evidence of this will be found in the records of Mr. Gladstone's voice, which are sold by the Edison Bell Company.

If we assume that a teacher is the fortunate possessor of really good records made by Frenchmen and Germans—records which truly represent the intonation of educated speakers—what use can he make of them? He can have the same passage "said" again and again, and the intonation will remain unchanged. In this the machine is superior to the human being: there is no variation, and it does not lose its temper, however often he asks it to say it again.

When he hears it, he can strive to imitate; and in doing so he will be in just the same position as the English pupils of the foreigner who depends entirely on their imitation of his sounds. The machine cannot tell him whether his imitation is a good one; it does not tell him how individual sounds are produced, how the organs of speech behave; it only gives the acoustic effect. It may be suggested that he could obtain much help even for individual sounds by letting the machine run slower; but as soon as the number of revolutions per minute is appreciably reduced, there is also a great reduction of pitch, and speech hardly becomes recognisable in consequence. It is only possible to see how far his own pronunciation deviates from the model record, if he will take a record of his own speech, and compare it with the other; even then he may lack sufficient ear-training to appreciate the difference.

It will be recognised that the phonograph has

great limitations. It will prove of real service only to one who has trained his ear and has acquired a good knowledge of phonetics. To such an one it will indeed prove helpful, for it provides a means of recording and studying intonation, which the ordinary phonetic symbols represent only in a clumsy and very rough-and-ready way. It will also enable him to realise what differences may exist when two equally cultured readers declaim the same passage.

A word in conclusion as to the value of the records issued by the "Modern Language Press." They reproduce the lessons contained in M. Barbier's "Pictorial French Course" and Mr. Baumann's "Pictorial German Course." Reviews of these books have already appeared in THE SCHOOL WORLD; we are here concerned only with the quality of the records, which are made on small cylinders. It may be said that, on the whole, they are satisfactory. No doubt the results would be better if large cylinders had been used; certainly the records (at least of the more advanced lessons) have been spoken much too fast, simply in order to get as much of the text as possible into the two minutes or so which an ordinary cylinder will record. The consequence is that some of the sounds (especially *s* and the German *ich* sound) are indistinct. It is not stated who were the speakers; the French pronunciation is very good, the German rather pedantic (this is noticeable in the pronunciation of the unstressed *e* and of the *h* in such words as *sehen*). As a check, I have made records of the same lessons in French and German on my own phonograph, both on small cylinders and large, and the results were distinctly better, mainly because I spoke more slowly.

It would be interesting to have the views of others on this subject. I am sure that many teachers of modern languages beside myself would be glad to receive further suggestions with regard to the employment of the phonograph.

NATIONAL UNION OF TEACHERS.

THE National Union of Teachers is a union of teachers' associations extending throughout England and Wales. It embraces 432 local associations, with a membership for last year of 47,326. Many of the associations are also grouped for wider organisations, thus forming County Associations or District Unions. Founded in 1870, under the title of The National Union of Elementary Teachers, its operations have widened, ceasing to be concerned with elementary education alone, and becoming involved with the public aspects of the whole question of education. To bring the title into accord with the Union's work the word "elementary" was removed in 1889, and the local associations now admit members from every type of public school. The Union is neither an educational association nor a trade union, but it combines

the best features of each with special functions peculiarly its own. The local association is the unit of the Union. Each association has its own meetings, officers, and committees, and sends representatives to the Annual Conference, which is the supreme authority, deciding upon the rules, and directing the policy of the organisation. During the past thirty-three years annual conferences have been held in nearly all the large centres of population throughout England and Wales. Invitations are constantly received from the municipal authorities of the various towns. The place of next conference is decided upon by ballot at each annual conference, and the two thousand representatives who attend are publicly received and cordially welcomed by the local authorities. The thirty-fourth annual conference held at



MR. H. COWARD,
President of the National Union of Teachers.

Buxton last Easter was presided over by Mr. H. Coward, of Bristol, whose portrait we publish. During the preceding year he held the office of vice-president, to which he had been elected by the votes of the individual members of the Union.

The Executive is elected by the votes of the individual members in the electoral districts. The country is divided into twelve such districts, each of which sends three or four members, according to the number of members in the district. The present Executive, including the officers, consists of forty-seven members who assemble in London twice a month from all parts of the country. They give effect to the decisions of Conference, and carry on the work of the Union throughout the year. Seven standing committees deal with education, legal assistance to members, parliamentary action and superannuation, teachers'

tenure of office, internal organisation, finance, and general purposes, and the work of the Examinations Board. A separate council of forty-five members meets monthly to administer the Benevolent and Orphan Fund of the Union, and a board of twenty-seven members meets fortnightly to transact the business of the Teachers' Provident Society, which has been established for members of the Union.

One of the principal aims of the Union has constantly been to improve the condition of education. By uniting the teachers' associations a means has been provided for obtaining an expression of their collective opinion upon matters affecting education and the profession. In this manner the Union has afforded the advice and experience of the associated teachers to the Board of Education, the Local Authorities for Education, and other organisations which have relation to educational affairs.

The influence of the Union is widely exercised. Three of its members advocate the cause of education in the House of Commons, one is a member of the Consultative Committee of the Board of Education, another a member of the Teachers' Registration Council; it is represented on the Technical Education Board of the London County Council; the Central Board of Intermediate Education in Wales and the Court of the University of Wales include members of the Union among their members; two of its members have just been appointed on the Board of Education Departmental Committee to consider the question of physical training of children in public elementary schools; the Secretary was a member of the recent Royal Commission on Secondary Education; members of the Union have been members of many school boards throughout the country, and have been connected with nearly every organisation which had for its aim the advancement of education or the promotion of the welfare of the children. On the education committees under the Education Act of last year no less than 200 members of the Union have been appointed.

The educational reforms great and small which are due to the persistent advocacy of the Union are far too numerous for separate notice, and can only be partially enumerated. They include amendments to the Education and Factory Acts, the appointment of Royal Commissions and Select Committees to consider questions of education, the extension and liberalisation of curricula, the abolition of rigid and unnatural classification of scholars by mere age, and the establishment of flexible, natural, and educational classification by attainments and capacities; improvements in the regulations concerning instruction in various subjects; the reduction of over-pressure on younger scholars; the establishment of healthier and more reasonable conditions of study in school; improvements in the enforcement of school attendance; extensions in the school life of children; reductions of the "half-time" system; the abolition of universal annual examinations of schools; the

abolition of the examination of each scholar; a more educational graduation in various branches of the curriculum; the raising of the standards of proficiency required for exemption of children from attendance at school; the abolition of the principle and the worst forms of payment according to mechanical results; establishment of the "block grant" and the Higher Elementary School Minute; amendments in the organisation and selection of the inspectorate; improvements in methods of inspection and examination; amelioration in the curriculum and training of pupil teachers; improvements in the curriculum and training of King's scholars; extensions of facilities for the training of teachers; the raising of the standard of proficiency required from candidates for the Teacher's Certificate; the new modelling of "Codes of Regulations for Day and Evening Schools"; alterations in rules mistakenly laid down by school boards and other bodies of school managers; the election or appointment of experts in teaching on local governing bodies for education.

Moreover, the conferences and branch meetings of the Union promote reforms in pedagogic plans and ideals by affording opportunities for the professional discussion of school method, and for inspection of the best and newest books and apparatus for schools. These gatherings also enable officials of the Board of Education, members of school boards, and other school managers and private educationists to confer with teachers on subjects of common interest and importance.

The National Union of Teachers has also aimed at the advancement and protection of the teacher. Among the many professional benefits secured for teachers collectively by its influence may be mentioned the revival of pensions for the older teachers and the extensions of the amount and scope of the fund for that purpose, whereby these teachers have profited to the extent of over £521,000; the relief afforded by the abolition of excessive and unnecessary statistical returns; the reduction of requirements in needlework in rural and half-time schools; the abolition of the Inspector's power of endorsing the teacher's certificate; the right of withholding or re-presenting scholars at examinations; liberty of classification; the safety of the teachers' certificate as comprehensive of all obligatory subjects; the second-class drawing certificate, and the special drawing certificate without examination; security for reasonable corporal punishment by head teachers, and the recovery of the same prerogative for certificated assistants under many school boards; the reduction in the ratio of pupil teachers to adults: the right of appeal against disastrous reports by Inspectors, and against the suspension or cancellation of diplomas; the regulation and partial reform of the inspectorate; the appointment of certificated teachers as Inspectors' Assistants and Sub-Inspectors; the appointment of Sub-Inspectors and other certificated teachers as Inspectors; the increase in salaries caused by public representations of the case; the establishment of a general scheme of superannuation for certificated teachers in public elementary schools

and institutions connected with such schools, together with a system of insurances in connection with that scheme.

Moreover, by frequent meetings of its local associations, committees, and conferences, the Union has afforded to its members opportunities for professional counsel, social enjoyments, the formation of friendships, and the acquisition of experience in the conduct of public business and affairs.

The Union has also endeavoured to secure the compilation of a comprehensive register of teachers, and to promote and extend the influence and dignity of the profession of teaching. It regards the present Order in Council regulating the registration of teachers as most unsatisfactory, as the exclusion of primary teachers possessing those academic and other educational distinctions necessary to qualify for admission to Column B, until they have worked for twelve months in a school other than elementary, is unfair to the teachers concerned, and likely to mislead the public.

Advice and legal assistance is given to members in any case arising in connection with their professional duties. Cases of difficulty with managers or inspectors are also inquired into, and if necessary the members are defended locally, or at the Board of Education. In the event of a teacher being unjustly dismissed, the Union exposes the matter, and often succeeds in maintaining him at his post. Cases upon which legal action arise include alleged assaults by teachers (corporal punishment), assaults by parents and others upon teachers, cases of illegal dismissal, generally involving protracted and expensive proceedings in the High Court of Justice, and libels on the reputation of teachers, which have resulted in many verdicts being obtained for teachers, with damages of £150, £100, £50, and many smaller amounts. For the conduct of this department of the Union's work three Standing Counsel, a General Solicitor, and 300 local Solicitors are employed. The cost of legal advice and the conduct of legal proceedings on behalf of its members amounts to about £4,000 a year, and the total expenditure in connection with securing better tenure of office for teachers has amounted to over £13,000.

An Examinations Board has been established, which for a small fee conducts term examinations for pupil teachers, examinations in commercial subjects, examinations for County Council and other public bodies, and examinations for Diplomas. Although this department of the Union's work has only been established within the last six years, the number examined last year exceeded 10,000.

A Provident Society established by the Union is registered as a Friendly Society, and enables members to secure annuities and endowments, to assure for sick and death payments, and to accumulate small savings. Membership of this branch is optional, but the low rates, and the fact that the profits belong to members themselves, have been sufficient inducement to attract over 9,000 mem-

bers. The annual income of this branch of the work exceeds £40,000.

Provision has been made for aiding needy and incapacitated teachers, and the widows and orphans of teachers, through the Benevolent and Orphan Fund. The amount received last year for this Fund exceeded £22,000, and the total amount raised for benevolent purposes is over £170,000.

A Circulating Library has also been established, which enables members to obtain works of imagination, education, science, &c., on payment of a small subscription.

The subscription to the Union is 7s. per annum, with an admission fee of 5s., from which newly certificated teachers are exempt. Members pay a small additional subscription for their local associations. They also subscribe to the Provident Society according to their individual requirements, and most of them annually subscribe, and procure contributions to the Benevolent and Orphan Fund.

The total amount thus subscribed by members for last year and collected for benevolent purposes exceeded £72,000. The total funds of the various branches, on December 31st last, amounted to over £175,900. The income received as dividends and interest on the invested funds last year reached £6,281.

The work at the central office is conducted by a Secretary, five heads of departments, and a staff of senior and junior clerks, whose combined salaries last year amounted to £4,786. In addition some 2,000 members conduct the local work of the Union with zeal and ability, as honorary officers of the local associations.

The life of the certificated teacher in England and Wales is far brighter, happier, and more comfortable than it would have been but for the Union. Few organisations have done so much for their members at so little cost to them individually.

The Executive, in concluding their annual report to the last Conference, stated that "the influence and repute of the Union stand higher than ever; the signal success of its legislative efforts is now manifest in many quarters where, until recently, the Union was perhaps underrated or ignored. . . . But members of it know very well that it is also an institution of the utmost value not to themselves alone, but to the children, the schools, and the education of the commonwealth. To belong to such an institution is not only a protection and an aid, but an honour and a duty."

The Educational Systems of Great Britain and Ireland. By Graham Balfour. xii. + 307 pp. (Clarendon Press.) 7s. 6d. net.—This is a second edition of Mr. Balfour's useful history of educational effort in the United Kingdom which was reviewed in our issue for October, 1899. So many events have taken place in the sphere of education in England and Ireland since the first appearance of the book that a great deal of new matter has been added to the new edition. The Education Act of last year is discussed and the work of the Board of Technical Instruction in Ireland is described, and all other changes are duly chronicled. The book is sure to continue to hold its high place in the opinion of educationists.

READABLE BOOKS IN HISTORY.

By J. S. LINDSEY.

PROF. ARMSTRONG, in his much-quoted address to the Educational Science Section of the British Association last September, spoke of "the comparative paucity of readable books for young people," and threw out some warnings against expecting children to "master classics" or enjoy "text-books." In particular, he wanted "books written in a bright, attractive, and simple style, full of accurate information, which . . . would carry us back in time and sketch the history of the peoples of the earth." The whole passage happened to fall in very much with a line of thought that I have been following a good deal for some years past; and on reading it I promptly sat down and jotted down a little list of books which struck me as likely to strike young people as "readable." But the excellent list, based on the same text, supplied by "Custos," in the December, 1902, issue of *THE SCHOOL WORLD*, caused me to lay mine aside for some months; and now that I take it out again I do so with one or two deliberate restrictions and qualifications. These have been suggested or forced upon me during an attempt to select a "Working Library" in British history for my Historical Series.

In the first place, I propose to confine myself to history, whereas "Custos" very properly included the closely correlated subject of geography, and more particularly to confine myself almost entirely to British history, whereas Prof. Armstrong asked for books which should "sketch the history of the peoples of the earth." [I may say that I am a warm advocate of general history, but venture to suggest that the broad treatment of British history, with considerable attention to its international aspects, furnishes a good working compromise between the narrow provincialism of purely English history and the shallow cosmopolitanism of universal history.] Finally, I prefer to avoid altogether books primarily written for the educational "market," and I start with a bias in favour of "classics."

I had better add three general cautions as regards the appended list and the hardihood with which I put it forth. In the first place, I have never been able to understand why a "history book" should be more "readable" than an arithmetic or a Euclid, though, at the same time, I have no admiration for the style of sum or question at which Sir Oliver Lodge has been poking fun in these columns. In the second place, I fancy the reaction against "ought-to-be-read" books in favour of "readable books" may go too far. And in the third place, "readable" is a relative term, depending for its meaning on the age of the "young people" whom we are considering: this point has been admirably worked out in an article on the "Reading Tastes of High School Pupils," contributed by Mr. Allan Abbott

to the (Chicago) *School Review*, for October, 1902. Mr. Abbott's article is based on an exhaustive analysis of statistics, and I take it that, before any really adequate list of "readable" books for young people can be compiled, someone must make a laborious census of opinion among both teachers and pupils. I wish *THE SCHOOL WORLD* would undertake such an inquiry.

The appended list, therefore, is merely tentative, not dogmatic: it does not contain books which "young people" like, or, in my opinion, ought to like, but books which I like now, which I think I should have liked in my teens (when, in point of fact, my principal books were the "Arabian Nights," "Robinson Crusoe," books about African travel, and Lord Lytton). The first group consists of "backbone" books, written specially for children by eminent writers. The second group contains books which deal with special periods and subjects, and are usually, both in style and subject-matter, suitable for rather older children than the first group. The third group gives tastes of some historians who were men of genius, who had some sense of literary style, and whose works were neither pot-boilers nor written to order. The fourth group contains a few inspiring collections of essays, which will have somewhat the same effect on the historical facts gathered in the young person's mind that a turn of the hand has on the bits of coloured glass in a kaleidoscope. The fifth or biographical group is discussed below.

I.—THREE "BACK-BONE" BOOKS written specially for Children.

- | | |
|---|-------|
| | s. d. |
| (1) Dickens' "Child's History of England." Various editions and prices. | |
| (2) Scott's "Tales of a Grandfather." Various editions and prices. | |
| (3) P. W. Joyce, "Child's History of Ireland." (Longmans) | 3 6 |

II.—SPECIAL PERIODS AND SUBJECTS.

(i.) *Elementary.*

- | | |
|--|----------|
| (4) J. R. Green, "Short History of the English People." (Macmillan) | 8 6 |
| Better in Illustrated Edition | net 40 0 |
| (5) A. W. Jose, "Growth of the Empire." (Murray) ... | 6 0 |
| (6) G. R. Parkin, "Round the Empire." (Cassell) ... | 1 6 |
| (7) E. A. Freeman, "Old English History for Children." (Macmillan) | 6 0 |
| (8) H. B. George, "Battles of English History." (Methuen) | 6 0 |
| (9) Sir W. Besant, "History of London." (Longmans) | 2 6 |

(ii.) *Advanced.*

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|---|---------|
| (10) Macaulay, "History of England." Chapters I.-III. (Longmans) | 2 6 |
| (11) J. R. Seeley, "Expansion of England." (Macmillan) | net 4 0 |
| (12) Lucy Dale, "Principles of English Constitutional History." (Longmans) | 6 0 |
| (13) W. Bagehot, "English Constitution." (Paul) ... | 3 6 |
| (14) H. J. Mackinder, "Britain and the British Seas." (Heinemann) | 7 0 |

III.—CLASSIC HISTORIANS.

(i.) *Contemporary Writers.*

	s. d.
(15) "Froissart's Chronicles." Translated by Lord Berners. (Macmillan)	3 6
(16) E. J. Payne (Ed.), "Voyages of Elizabethan Seamen to America." [Hakluyt.] Vol. II. (Frowde)...	5 0
(17) J. Boyle (Ed.), "Selections from Clarendon." (Frowde)	7 6

(ii.) *Standard Authorities.*

18) J. R. Green (Ed.) "Readings in English History." 3 Parts. (Macmillan)	4 6
19) P. S. Allen (Ed.), "Selections from Froude." (Longmans)	3 6
(20) R. Southey, "English Seamen." (Methuen) ...	6 0

IV.—SOME SUGGESTIVE ESSAYS.

(21) Sir E. Creasy, "Decisive Battles of the World." (Macmillan)	2 6
(22) Macaulay, "Critical and Historical Essays." (Longmans)	2 6
(23) Carlyle, "Heroes and Hero-Worship." (Chapman, &c.) from	1 0
(24) Emerson, "Representative Men." (Routledge, &c.) from	1 0
(25) Emerson, "English Traits." (Routledge, &c.) from	1 0

V.—BIOGRAPHIES.—Every one agrees that the first or second stage of history study must be biographical, but there is no sort of agreement as to the kind of lives worth studying, or as to the manner of biographising. There is a systematic attempt to meet this difficulty (for both elementary and secondary education) in Messrs. Black's "Historical Series for Schools;" and I should strongly recommend all teachers to read the pamphlet descriptive of the series. Miss Charlotte Yonge, Mr. A. C. Benson, and Miss Alice Gardner, have also issued collections of biographies especially designed to stir rather than stuff. The following list of subjects suitable for biography in British history is based on the result of a Prize Competition in THE SCHOOL WORLD, for June, 1899; but in order to make up the round number of a score I have added three names as representative of certain phases of life altogether ignored in the competition: Anselm, the mediæval saint-statesman; Henry V., the mediæval crusader; and Montrose, the semi-modern hero of personal loyalty: Alfred, Anselm, Simon de Montfort, Wallace, Bruce, Black Prince, Henry V., Sidney, Drake, Raleigh, Montrose, Cromwell, Wolfe, Howard, Wilberforce, Nelson, Wellington, Livingstone, Gordon, Gladstone.

WHEN historians have to relate great social or speculative changes, the overthrow of a monarchy or the establishment of a creed, they do but half their duty if they merely relate the events. In an account, for instance, of the rise of Mahometanism, it is not enough to describe the character of the Prophet, the ends which he set before him, the means which he made use of, and the effect which he produced; the historian must show what there was in the condition of the Eastern races which enabled Mahomet to act upon them so powerfully; their existing beliefs, their existing moral and political condition.—J. A. Froude.

THE ABUSE OF THE TERM
"HEURISTIC."¹

By Prof. H. E. ARMSTRONG, LL.D., Ph.D., F.R.S.

WHEN of old the Greek philosopher rushed naked from his bath into the highway and cried, *Eureka!* he was but giving vent to the holy ecstasy of discovery by which he was for the time being overmastered. He engaged in no mere verification of statements made by others, but, finding himself in the exquisitely rare position to most mortals of having an idea of his own, applied it in practice and found it of worth. That was his method, his principle, his discovery. To the present day, boys and girls are led to prate meaninglessly of the *Principle of Archimedes*: no expression is more dear to the syllabus maker; but the true lesson to be learnt from the example set by the great engineer is never dwelt upon—those who read Greek with their feet on the fender seem to have no conception of it, for they neither teach it nor practise it.

I have been called to account for introducing the word "heuristic," although I have done nothing more than resuscitate it—I confess with a certain wicked intent. We were in want of a word which would serve as the antithesis to "didactic," as a war-cry in leading a revolt. *Eureka!* And admirably it has served its purpose. Of course, those who love to be didactic, who must follow fashion and worship authority, resent its introduction—but what matters that? Impossible as the task may seem, the *heures* desire to gain freedom of action, of thought and of opinion for the rising generation: the very objections that are taken show that consciences are being stung, that the potency of the drug is being felt. But the true object and nature of our crusade is only faintly apprehended as yet. It is the usual fate of words to be misunderstood. One misconception is very strange—that the "heuristic method" is the historic method, a method which involves the study of a subject in the order of its development historically. This is in no way necessary, though it is sometimes advantageous. In point of fact, all that we advocate is that learners should be put in the position of discoverers, that they should be allowed, even taught, to help themselves; that they should be encouraged to engage in some definite quest: we desire simply to put an end to spoon feeding, to the constant use of highly peptonised mental food.

I notice that, in the preface to his delightful "Practical Exercises in Geometry," Mr. W. D. Eggar speaks of the experimental method as "sometimes called heuristic." If a restricted meaning be given to the term "experimental," the comparison is just—not otherwise. Nearly all the so-called experiments carried out in schools are mere demonstrations or verifications of statements made in advance; they do not involve discoveries and therefore strictly speaking are not experiments. Moreover, it is possible to apply heuristic methods

¹ "A First Course of Chemistry (Heuristic)." By J. H. Leonard. 134 pp. (Murray.) 2s. 6d.

in many cases in which experiments, as ordinarily understood, are impossible.

An attack, characterised equally by its vigour and by its want of discrimination, which I fear was little short of being an absolute misrepresentation, was made on heuristic teaching by Mr. Taylor at the recent Manchester Conference.¹ Mr. Taylor was pleased to discriminate between the heuristic *method* of teaching and a creation of his own imagination which he called the heuristic system—"which is the use of that method to the exclusion of every other." As no one has ever proposed any such "system," it is unnecessary to argue the point. If he has ever seriously attempted to sympathise with the work of those who are endeavouring to recover the birthright of individuality for British youth, Mr. Taylor has obviously been unable to place himself in their position—but in this respect he is not singular. Were it not that we are all aware how absolute is the hold upon us of preconceived opinions, how little we are open to conviction on most matters, it might be thought that rational methods would be self-recommendatory. The fact is, however, we look at everything through strongly tinted glasses—our judgments are nearly always *presumptuous*, to use Faraday's expression.

Faraday, to whom Mr. Taylor refers as asking Tyndall—who was about to repeat an experiment before him—what he was to look for, did not wish to be told what was to be the result: he knew that he was there to witness that; but what the aim, the motive of the experiment was. It is of the essence of heuristic work that a problem be stated at the outset; and yet not in such a manner as to assume in advance knowledge of what will happen afterwards; a subordinate problem, a clearly defined motive, must underlie each successive experiment of a series.

There is no difficulty in leading young children to work from such a point of view; but in those who have been at school for a few years the worship of authority becomes so firm a habit that they are unable to imagine why they should work from any other motive than that of being told to do this or that—and they will not think for themselves.

The methods adopted in teaching Classics and Euclid, learning lessons by rote, in fact, have entirely demoralised the schools and have made rational teaching of scientific method well nigh impossible; shadow has taken the place of substance and it will be long ere we recover our liberty and are able to put substance in the foreground. It is, indeed, surprising how slow the progress is towards emancipation. To those of us who advocate an independent attitude and who ask for nothing more than a commonplace, unbiased, police-detective method of treatment, the difficulties which almost all teachers seem to find in making any simple, direct appeal to facts are difficult to understand. And yet they are there;

those who come forward as our supporters prove this in almost every attempt they make to carry out our recommendations. It is hard to find fault—but if we are ever to arrive at an understanding, the extent to which there is a departure must be pointed out.

Mr. Leonard's "First Course" bears, within brackets, under "Chemistry" writ large, the mystic and much-abused word *heuristic*. The father is obliged to confess that he cannot recognise his child; he is compelled, indeed, to disown such progeny, to confess that they are not lovely in his however charming they may be in the eyes of other people. Chapter i. is on Chalk. At the outset the student is asked, "Is chalk a solid, a liquid or a gas?" Why insult the common sense of the young beginner by such a question? "Should you say that chalk is a hard or a soft substance?" is another question the intent of which is obvious. The answer, however, must depend on the origin of the chalk. A student in the south-eastern counties might say "soft," but a student in Dorset or Yorkshire might say "hard"—and both would be right, the fact being that chalk is not a substance in the chemical sense but a particular kind of limestone mainly composed of what I (in Mr. Taylor's opinion) wickedly call "chalk-stuff." From a heuristic point of view, all *talk* about the properties of chalk is out of place at the beginning. The only true policy is to give a lump of chalk to the student, to let him see chalk and handle it; then let him write about it in a plain, crisp, straightforward way. In fact, give *him* an opportunity of displaying some intelligence.

Mr. Leonard proceeds: "The facts you have just discovered tell you some of the physical properties of chalk. Let us now try to find out what chalk is made of, *i.e.*, discover some chemical facts about it. To do this you will require to use the blast furnace."

All this is premature. At such a stage the student may be supposed to have no idea that chalk is made of anything in particular—the term "chemical facts" has no meaning to him. Some motive, some obvious reason, should be adduced for doing this or that with chalk. For example, he should be led to consider what is commonly known of chalk, what it is used for, what is done with it—and then he should consider whether any suggestion for its examination may not be derived from this common knowledge. Limestone, all the world over, is burnt to lime, which is used in making mortar. What is mortar; how is it made? The way to answer this question is not to talk but to get a bushel of lime and make mortar in the playground. The characteristic behaviour of lime on slaking is then brought out and it is thereby made clear that lime is very different from chalk, whence it follows that the chalk is profoundly altered by burning. A direction is thus given to the enquiry. The student sets about heating the chalk with a definite object in view—not merely because he is told to do so—and learns at the outset that an experiment should be based on some previously observed fact; that its conception

¹ *School Government Chronicle*, January 10th, 1903.

—the discovery of the form it is to take—involves an argument.

Certainly some directions are given by Mr. Leonard which border on the heuristic. For example, that above quoted, to use the "blast furnace"—and there is another, which occurs frequently, to write down weights *on a piece of paper*. The student will need to put forth his wits to discover what this mysterious "blast furnace" is; he will not find it in the average laboratory. And of all abominable habits in a student, none is more abominable than that of writing notes on bits of paper. The erewhile owner of such notes can seldom, if ever, cry "Eureka!" when these are wanted.

What I have said of the manner in which chalk is dealt with by Mr. Leonard applies equally to the subjects of the other sections of his book. Thus, chapter iii., on Water, begins: "We will now proceed to find out the answer to the question, of what is water composed?" Later on we read: "We will now decompose distilled water. To do this we do not employ heat, but electricity." This is didacticism pure and simple. Why should the question be asked of what is water composed? No ordinary sane person thinks of it as a composite substance. And why use electricity? No word is said to justify the introduction of this new character into the drama.

Noble efforts are being made at the present day to be rational. Why not carry these a little further to a logical conclusion? Among Mr. Eggar's questions, I notice one in which the number of bricks of a given volume required to build a wall of stated dimensions is to be calculated out, neglecting the space occupied by the mortar. But why neglect the poor mortar? The wall can't be built without it. Are we always to leave out the mortar from the buildings of education? Instead of giving dimensions, why not heave bricks at the class? Let the class measure and weigh them and go outside and see how brick walls are built; even build a bit of brick wall. Having done all this, let them report on the number of bricks used in building certain walls, on the weight of the wall carried by a given girder.

This would be to make the subject live in the boys' minds; such teaching would be truly heuristic. But, oh! it would so offend disciplinary instincts; it would be so unacademic—so horribly practical, so unlike Oxford-and-Cambridge-Local requirements; and yet so like what the world *really* wants.

MAKE your pupil attentive to natural phenomena, and you will soon make him curious; but, in order to nourish his curiosity, never be in haste to satisfy it. Ask questions that are within his comprehension, and leave him to resolve them. Let him know nothing because you have told it to him, but because he has comprehended it himself; he is not to learn science, but to discover it. If you ever substitute in his mind authority for reason, he will no longer reason; he will be but the sport of others' opinions.—ROUSSEAU.

THE ILIAD.¹

THE critics, in examining the first volume of this new edition, have estimated its merits, and we may add its few defects, in such a way that we need not treat the second with the same fulness. The critical notes are selected with sound judgment, although in some respects not so full as those of the new Oxford text; in the present volume, Dr. Leaf has had the advantage of using Mr. Allen's researches and discoveries amongst Homeric manuscripts. With so great a mass of documents, and a mass always increasing, thanks to the discoveries of papyri, no editor can pretend to have made a final text; but Dr. Leaf's is a sound and defensible one. We cannot help feeling, however, that it is a pity he did not himself collate those MSS. where Hoffman and Laroche differ so widely as to shake our confidence (see p. 385 especially). The notes are particularly good when they elucidate an obscure word or phrase, such as ἀγαπήνωρ, xiv. 756; πρυμνός, xiv. 31; σιφλώσειε, xiv. 142; to take a few at random. A more detailed knowledge of comparative philology than Dr. Leaf shows is often necessary in the study of Homer; his note on πρυμνός, for example, is not complete without reference to its etymology; as derived from *προ* or its root, the meaning "furthest" is natural, and the vowel is one of those "Aeolisms" which open up so interesting a question in Homeric antiquities. This question especially calls for an excursus, since Prof. Ridgeway's suggestive hints were made public in the "Early Age of Greece."

We are surprised to find so intelligent an editor as Dr. Leaf trying to arrange the ornaments of the Shield of Achilles on an hour-glass form (p. 603), or countenancing for a moment a shield of Achilles which takes the shape of a British tombstone (p. 605). His objection that in the circular shield half the figures would be upside down is shown to be futile by thousands of Greek vases, not to mention the haphazard methods of early inscriptions. The case for Mycenaean armour, always weak, seems here at its last gasp; and the section on dress will probably have to be reconsidered. But if Dr. Leaf is not free from faults as an archaeologist, and lacks something as an etymologist, as a literary critic he is at his best. His analyses of the several books are masterly, and should, we think, convince even the most devoted unitarian that the *Iliad* is composite. Dr. Leaf is careful to point out that merit is no test of date, and that some of the later parts of the *Iliad* are amongst the noblest fruits of the human intellect. We are truly grateful to Dr. Leaf for his searching but sympathetic treatment of the literary questions involved, which alone would place this edition in the front rank.

¹ "The Iliad." Edited with Apparatus Criticus, Prolegomena, Notes and Appendices, by Walter Leaf, Litt.D., sometime Fellow of Trinity College, Cambridge. Vol. II., Books XIII.-XXIV. Second Edition. xxiv. + 663 pp. (Macmillan.) 18s.

THE ENGLISH GARNER.¹

MR. A. W. POLLARD—not to be confused with his namesake, Mr. A. T. Pollard, as the editor warns us in a pathetic preface—has written a delightful introduction to his volume, clever and humorous, and really useful as a help to appreciate the contents of his volume. He has added a number of new pieces not published in the original "Garner," for which we are truly grateful. It is not every scholar who knows the interest of early prefaces, prohemies, and epilogues; yet an interesting volume might be made of these alone. Mr. Pollard gives the reader a taste of them in the person of William Caxton, whose genial confidences seem to set the man clearly before our eyes. Every now and then, too, Caxton adds a pithy anecdote, such as that of the Sheffield mercer who asked for "eggs" (poor hungry man) but got nothing until he said "eyren." "So," says Caxton, "what should a man in these days now write, 'eggs' or 'eyren'?" The preface to the "Dictes and Sayings of the Philosophers" bubbles with quiet humour. The reader will see how Caxton banters "the noble and puissant lord, Lord Antony, Earl of Rivers, Lord of Scales, and of the Isle of Wight, defender and director of the siege apostolic for our holy father the Pope in this royaume of England, and governor of my Lord Prince of Wales," who in translating the book had apparently omitted all the sayings of Socrates against women. The reasons suggested for the omission are as charming as those which Caxton alleges for putting them all in again on his own account. "I wot well," he says, "of whatsoever condition women be in Greece, the women of this country be right good, wise, pleasant, humble, discreet, sober, chaste, obedient to their husbands, secret, steadfast, ever busy, and never idle, are temperate in speaking, and virtuous in all their works, or at least should be so." However, "peradventure the wind had blown over the leaf at the time of translation of his book," and since his lordship bade me oversee and correct it, I propose to put them in, "humbly requiring all them that shall read this little rehearsal that, if they find any fault, to arette it to Socrates, and not to me, which writeth as hereafter followeth." Amongst the other additions are a Miracle Play (as we expect from Mr. A. W. Pollard—or is it Mr. A. T. Pollard?), the now familiar "Everyman," and some pretty Christmas carols.

Mr. Lang's volume is more miscellaneous. Here we read of that oddity, Kempe, and his "Nine Days' Wonder," the morris dance from London to Norwich. Kempe has a Shakespearian interest, and his pamphlet is dedicated to that sportive tomboy,

Mistress Anne Fitton, one of the claimants for the name of the Dark Lady. "English Dogs and Wines," "Herring Fisheries and the Navy," "The Great Frost of 1608," with high jinks on the Thames, "The Secrets of Angling," "His Majesty King James's Declaration to his subjects touching lawful Sports to be used on Sundays and Holy Days after Service," "The Carrier's Cosmography," "The Worth of a Penny"—these are some of the quaint treatises which meet the curious eye. King James was a man of sense indeed: we wish King Edward would follow his example, and encourage wholesome games on a day now in this pharisaical age dedicated to lounging and drinking. But chief of all the pieces in this volume is the terrible description of life in the Galleys, a veritable horror. Mr. Lang contributes a note on each piece and its author, which would please us better if he could forget to be flippant. This is the one mistake in the book. Mr. Lang has no authority to speak on English literature, and we wish the book had been edited by Mr. A. T. Pollard (to avoid jealousy). But nothing can spoil the text. We have read both volumes with renewed delight, and wish they may have the success they so well deserve. We must not omit to add a word of gratitude to the Early English Text Society, which has published so many treasures, the Caxton "Dictes" amongst them. Of this we may have more to say on some other occasion.

But of all the volumes of the "Garner," the last two on our list will most appeal to the young: the voyages and adventures of the Elizabethan sea-dogs, told in their own words, or by eye-witnesses, deeds of derring-do, heartrending experiences, observations of mankind when all was fresh and new, sidelights on history—what a feast for boys! How Mr. Henty's immortal works, even Captain Maryatt's, pale before those startling pictures! A number of the pieces come from the precious mine of Hakluyt, whose "Voyages," we are glad to see, are to be published shortly in full. Amongst these are: Sir John Hawkins's three voyages to the West Indies, so important for the beginnings of the slave trade; the first Englishman who reached India by an overland route; voyages to the Levant, Tripoli, Mexico, round the world; and sea-fights—the *Dolphin* of London, against five Turkish men-of-war; Sir Francis Drake at Nombre de Dios; the little *Revenge* against the Spaniards, with the last words of Sir Richard Grenville, so familiar to us from Tennyson. Then there is Richard Hasleton's account of the "wonderful things happened to him," his capture and interrogation, escape, recapture, torture by the Inquisition, and final escape (Englishmen were made of stern stuff in those days); and the remarkable account of "Nineteen Years' Captivity in the Highlands of Ceylon, sustained by Capt. Robert Knox, March, 1660—October, 1679," with the earliest account of the manners and customs of that country. Any one of these pieces would be worth the price of the book. Indeed, it is difficult to speak with moderation of the pleasure and profit which are provided

¹ "Fifteenth Century Prose and Verse," with an introduction by Alfred W. Pollard. xxix. + 324 pp. "Social England," Illustrated: a Collection of Seventeenth Century Tracts. With an introduction by Andrew Lang. xxxii. + 453 pp. "Voyages and Travels," mainly during the Sixteenth and Seventeenth Centuries. With introduction by C. Raymond Beazley, Fellow of Merton College, Oxford. 2 vols. xxviii. + 332 pp. xxiv. + 444 pp. (Constable.) 4s. net each volume.

by these books. We hope Messrs. Constable will be able to make them available for schools in some way, whether by a reduction of terms or as may appear most convenient. The general reader may thank his stars they are so cheap.

THE CLASSICAL REVIEW.¹

THE *Classical Review* is now more than sixteen years old, and has won for itself an honourable place amongst scholarly journals; but the editors feel constrained to appeal for fresh support. It seems difficult to understand how such a periodical should lack support in a country where the staple of higher secondary education is still classical; but such is the fact. Probably this is due to the low intellectual standard of the public-school master, who generally has a good degree, but seldom shows any interest in questions of literature, scholarship, or research. A number of those who are interested in these things are in such a position that they really cannot afford to buy books except such as are absolutely necessary-tools of the trade. In a wider view, such periodicals as the *Classical Review* are indispensable. One may spend a great deal of money on periodicals, but it is money well spent. It is not by any means the same thing to see them in a library. When the last number comes damp from the press, and you cut it open, and lo and behold, a new Satire of Juvenal (or a bit of one), the collation of a new MS. of Cicero, or of Tacitus (such as the "hidden treasure" at Toledo, of which a collation is for the first time given in the *Classical Review* for February, 1902). What pleasure can equal this for the scholar, except discovering such things for himself?

The *Classical Review* contains many such things, and besides reviews, careful and nearly always authoritative, of all recent works of importance for scholarship. Sometimes these reviews are racy reading, as Prof. Ridgeway's reply to Mr. Myers, or Prof. Roberts's to Dr. Rutherford, a well-deserved lesson. Notes on archaeological finds ought to interest those who do not take the archaeological journals. Not least is the hospitable welcome offered to emendations and criticisms, whereby they may be discussed from all points of view before their author commits himself to them finally. Some of our readers will recollect the thousands of suggestions which were offered on Herondas, Bacchylides, and the "Constitution of Athens," many of which commended themselves to foreign editors, and but for the *Classical Review* they would not have been published at all.

We should like to support most cordially the editor's appeal for further support. There is no reason why the bulk of the *Review* should not be considerably enlarged if the number of subscribers should increase; matter there is in plenty. Let

all who care for classical scholarship rally round Dr. Postgate, and let not our enemies, who would make education a means to get money,

rem, quocumque modo rem,

be able to taunt us with lukewarmness in a vital question, when courage and unanimity may win the day.

PRACTICAL EXERCISES IN GEOGRAPHY.

By E. W. HURST, B.A., F.R.G.S.

Bishops Stortford College.

I.

AMONGST the numerous reforms that have been mooted in the educational world during the last two or three years none is worthy of more serious consideration than that which would render geography as valuable a training for the mind as any other branch of science. It is not necessary to point out the time-honoured methods which have hitherto made the geography "period" a kind of reading-lesson, plus more or less memory work. As Sir Henry Craik remarks¹, "The object should be not so much to impart information to the pupil as to exercise him in obtaining it for himself from sources within his reach, and setting out in an orderly manner all necessary facts relative to a given topic. . . ." "The exercises in the preceding paragraph presuppose that every school will be equipped with a proper set of reference books, e.g., . . . a reference atlas, . . . one or more of the comprehensive year-books now issued by various publishers." In other words, given a good atlas, and such books as "Whitaker's Almanack," "The Statesman's Year-Book," Hazell's "Annual," it should be possible to devise a series of graduated exercises in each branch of geography of such a nature that not only is the pupil's self-activity continuously exercised, but the geographical principles to be learnt are discovered by the pupil from the results of his exercises. The exercises which follow are an attempt to show that elementary geography can be treated on the lines indicated by Sir Henry Craik. More advanced geography—that which leads the pupil to an appreciation of the climatic and physiographic control of man and his activities, and calls for the exercise of more highly-developed mental faculties than are possessed by the average boy under twelve—is not touched upon. Nor do the exercises constitute a systematic course; they are intended merely to be indicative of the lines that may with advantage be followed, subject to modifications suggested by the teacher's own experience. The general aim throughout is to provide the pupil with material for discovering facts and principles by his own effort.

For instance, instead of *telling* him that the right

¹ The *Classical Review*, vol. xvii. (1902). 480 pp. xviii., Nos. 1—4. 236 pp. 12s. a year, or 1s. 6d. a single part. (Nutt.)

¹ Circular to School Boards and School Managers, Scotch Education Department, Feb., 1903.

bank of a river is that bank, &c., &c., let the teacher draw a rough map on the blackboard, like that in Fig. 1., and then put the two following exercises before him:—

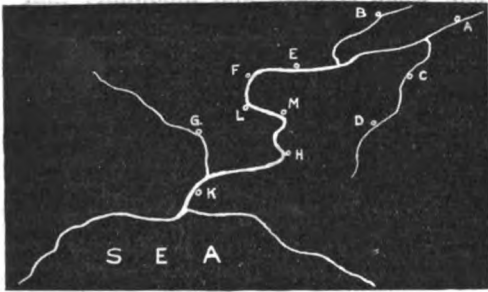


FIG. 1.

Ex. 1.—A river has two banks; one is called its *right*, the other its *left* bank. In Fig. 1, A, B, C, E, F, L, are situated on the right banks of the adjoining rivers, and D, G, H, K, M, are on the left banks.

Do rivers flow into the sea, or away from it? Do they flow up-hill or down-hill? Decide the direction in which the rivers in Fig. 1 flow and define the term *right bank*.

Ex. 2.—Remembering that water always flows down-hill, arrange the towns on the *main* stream in Fig. 1 in the order of their heights above sea-level, beginning with the highest town.

Many exercises can be planned involving the use of the globes—of which there should be a sufficient supply in every school.

Ex. 3.—Tie a piece of cotton to the North Pole of your globe. Pass it half round the globe and tie the other end to the South Pole. Cut the cotton at its middle point. Move one of the free ends of the cotton round the globe. Notice its course. What is the name of the line along which it moves? If the globe were cut through along this line, through what point of the straight line joining the two poles would the section pass? Draw the shape of such a section.

Ex. 4.—Stretch a thin strip of paper round the globe along the Equator. Allow the ends of the strip to overlap. At any point where there is a double thickness of paper push a pin through. Take out the pin and measure the distance between the two pinholes in the paper.

Then enter in your note-book:—

My globe measures . . . inches along the Equator.

The earth " 25,000 miles " "

Therefore the scale of my globe is 1 inch = . . . miles.

Having in this way discovered the scale of your globe, measure with a strip of paper the distances between the following pairs of places, and convert the measured distances into miles. Tabulate your results as follows:—

The Distance from	To	Measured on my globe, is, in miles,
London	Peking	
San Francisco	Sydney	
North Pole	South Pole	
Cape Horn	Cape of Good Hope	
Iceland	Trinidad	
Saint Helena	Cape Town	

Ex. 5.—Locate on your globe the places named in column i.

of the following table. In each case imagine a vertical line going downward from the place through the globe. Notice if the place where such a line would leave the globe is land or water, and fill in column ii. accordingly.

Places on the land in the N. Hemisphere.	A line passing through centre of earth emerges in the S. Hemisphere where there is . . .
Moscow.
Cairo.	
Montreal.	
Delhi.	
Dawson City.	
London.	

The spots where these lines emerge in the S. hemisphere are known as the *antipodes* of the places in the N. hemisphere. What conclusion would you come to from the results of the above table? Fill in the following:—The antipodes of most of the . . . of the earth are . . .

Ex. 6.—The following table shows one of the many routes by which it is possible to travel round the earth. First follow the route on your globe and then mark it on an outline map of the world.

Liverpool—Quebec—Vancouver—Yokohama—Shanghai—Hong-Kong—Colombo—Red Sea—Mediterranean Sea—home.

What is the approximate length in miles (a) of the land, (b) of the sea, part of the journey?

Ex. 7.—Find on your globe the positions of London and Japan. Imagine you can travel round the world with equal ease in any direction; find out the shortest distance between the two places.

Write your answer in this way: The shortest distance between London and Japan is across . . . and through . . .

Ex. 8.—Measure on the globe the distances between the opposite shores of the Atlantic and the Pacific Oceans along lat. 30° S, the Equator, and lat. 30° N. Tabulate your answer thus:—

Parallel.	Width of Atlantic in miles.	Width of Pacific in miles.
30° S.		
0°		
30° N.		

A large relief globe may be utilised to permit the discovery by the pupils that a series of plateaux encircles the earth with important consequences in respect of drainage, &c. They may then turn to their globes or atlases and work out such exercises as the following:

Ex. 9.—Fill in the following table:—

Continent.	Ocean to which the long, gentler slopes descend.	Ocean to which the short, steeper slopes descend.
S. America.		
N. America.		
Asia.		
Europe.		
Africa.		

What is the direction of the two slopes in the Old World and in the New? Try to draw up a general rule with respect to the distribution of the two slopes.

Ex. 10.—What is the most suitable place you can suggest through which a canal might be cut so as to save time and coal in passing from the Atlantic to the Pacific Ocean?

Estimate the distance that would thereby be saved in sailing from New York to San Francisco.

Where might a canal be cut with advantage between the Pacific and Indian Oceans?

TABLE I.

Continent.	Area (square miles).	Length of coast-line (miles).	Population in millions.
Europe	3,750,000	19,800	360
Asia	17,000,000	35,500	850
Africa	11,250,000	16,000	207
N. America	8,250,000	28,000	100
S. America	7,000,000	15,700	40
Australia	3,000,000	8,800	3

Ex. 11.—From Table I. (a) Arrange the continents in order of size. Remembering that the area of a square in square measure is obtained by squaring the length of the side in long measure, construct five squares, the areas of which are in proportion to the size of the continents.

(b) Find, as shown on the following table, the proportion of the length of the coast-line to the area of each continent.

Continent.	Area (square miles).	Coast-line (miles).	$\frac{\text{Coast-line}}{\text{area}}$

(c) Find, in each case, the average number of people per square mile. Arrange, as in the table, *Ex. 11, b*. The last column will be population divided by number of square miles.

(d) Draw six squares, each of one-inch side, and place the correct number of dots in each to illustrate the density of population.

(e) Do you notice any connection between the results of (b) and (c)?

TABLE II.

Ocean.	Total area of river basins each exceeding 100,000 square miles.	Number of such river basins in					
		Europe.	Asia.	Africa.	N. America.	S. America.	Australia.
Arctic	3,765,000 sq. miles	1	3	0	1	0	0
Atlantic	11,280,000 ,, ,,	3	0	4	4	4	0
Indian	2,182,000 ,, ,,	0	4	2	0	0	1
Pacific	2,908,000 ,, ,,	0	4	0	3	0	0

Ex. 12.—(a) Draw up a table, naming the rivers included in Table II. Opposite each write the name of the ocean into which it flows.

(b) Arrange the oceans in the order of their drainage areas.

(c) Try to explain this order with reference to the results of Exercise 10 as to the long and short slopes of the globe.

(d) On a map of the Eastern and Western Hemispheres colour the drainage areas as follows:—Arctic, brown; Atlantic, red; Indian, green; Pacific, yellow; Inland, black.

Ex. 13.—Make a list of large islands lying near each of the continents. Measure the length and breadth of each island.

Tabulate your measurements as follows:—

Island.	Length.	Breadth.	Length Breadth.

Study your list in order to discover whether there is any general rule bearing on the relative length and breadth of continental islands.

SPECIAL EDUCATIONAL INQUIRIES.

THE publication of the "Papers relating to the Resignation of the Director of Special Inquiries and Reports"¹ has raised the question as to what exactly should be the duties of an Office of Special Inquiries and Reports; what should be its relation to the Board of Education; and what responsibility should rest with the Director of the work of such an office. In view of the resignation of Mr. Sadler, and the subsequent appointment of Dr. Heath (see p. 265), it is important that the value to be attached to educational research of the kind upon which Mr. Sadler was engaged for eight years should be insisted upon, and that the paramount necessity of accurate knowledge of educational experience in schools of all grades, in this and in other countries, should be appreciated by the Heads of the Department entrusted with the administration of English education. That the best results may be obtained by investigators in any branch of scientific inquiry—and education is fortunately developing into a science—it is necessary to secure for them as much freedom as possible, and to hamper their work as little as may be by official restraints, subject, of course, to the due observance of the necessary minimum of departmental discipline. The revision of guiding principles which will naturally accompany the re-organisation of the Office of Special Inquiries will have great effect on the future development of English educational effort, and it is earnestly to be hoped that in defining the duties of Dr. Heath, the Board of Education will be inspired by broad views, and take special care that nothing is done to discourage the scientific study of educational questions, and the collection of data of the kind which Mr. Sadler has placed on record. Similarly, in deciding what particular inquiry should at any time engage the attention of the Director and his staff, very great importance should be attached to the opinion of the Director himself, who, from the nature of his position, is more likely to form correct views of the relative importance of various pieces of research than those engaged directly in the work of administration.

Some of the principles which Mr. Sadler has laid down in various Minutes contained in the Blue-book referred to are of importance in this connection, and the following extracts will prove of great interest to all who are concerned for the future of education:—

The Need for Scientific Inquiry in Education.

In no case should the regular and systematic collection and recording of educational work and experiments at home and abroad be broken into or suspended by reason of the urgent demand for the immediate supply of particular information needed in current administration or debate. In addition to the

¹ Cd. 1602. Price 7d.

direction of the scientific part of the work, the other duty of being prepared to furnish particular items of information at the shortest notice should be undertaken, if a sufficient staff of helpers is supplied. But no proposal which would wreck the regularity and systematic precision of the scientific inquiries by subordinating all such work to the hurried and hand-to-mouth collection of materials to meet administrative or parliamentary needs should be assented to. But provision can be made for meeting these needs without injuring or destroying the scientific work on which depends, in the long run, the power of the Special Inquiries Office to give sound, well-digested, and accurate information to the Board, and also to supply, at very short notice, trustworthy and sifted intelligence to meet unexpected emergencies in administration or debate. The scientific work of the Special Inquiries Section is the tap-root of its efficiency. It would be as wasteful to suspend that scientific work in order to meet administrative emergencies as it would be to interrupt any other form of scientific investigation (the value of which happened to depend on continuous and accurate record) in order to satisfy practical demands which could be quite well met without such interruption. But, if the necessary staff is provided, the Director of Special Inquiries can undertake the double responsibility of carrying on the scientific work of the branch (which, in the long run, is by far the most fruitful and practically suggestive), and of meeting the demands for immediate information over the wide range of educational controversy and administration. But it would be a ruinous mistake to sacrifice the scientific work of the branch to the needs of the immediately practical.

Aims of an Educational Intelligence Office.

The Director must avail himself of the reports and studies of other persons in whose judgment he has confidence, and who are prepared to undertake educational inquiries at home or abroad, for which he and his staff have no time, but which are likely to be fruitful and suggestive. Opportunities for obtaining such information unexpectedly present themselves. Someone is going abroad, and offers to prepare a report on some special educational topic which he is well qualified to investigate. The Director of the Special Inquiries Office ought to be in a position to seize such opportunities, and to be able to offer some small pecuniary acknowledgment for the service. This has proved an economical method of gathering information. A wide range of possible inquiries should be constantly in the Director's mind, and he should be on the look-out for opportunities of gradually completing that range of inquiries on economical terms and by the temporary employment of capable investigators.

In an educational intelligence office the most difficult responsibility lies not so much in the collection of documents, or even in the establishment and maintenance of friendly relations with persons at home and abroad who are able to give valuable information, as in forming a fair estimate of the relative value and real aims of different systems of education, and in finding out how far they (or any part of them) are separable from the social conditions of which they form a part. To arrive at this sort of judgment, and to be able to deepen and revise it, it is necessary to seize varied opportunities, which often come at inconvenient times, of consulting people with special knowledge and representing different points of view. In order to seize such opportunities effectively the Director of the Office of Special Inquiries must have at his disposal, as was originally planned by the Treasury, an allowance for expenditure at his discretion, subject, of course, to the requirements of vouchers for all expenditure made. Thus equipped with the means for collecting the necessary information, as unforeseen opportunities may present themselves, he should in turn be required to bear the responsibility of furnishing correct information on educational subjects referred to him.

The Value of such an Office.

The publication, at frequent intervals and under the auspices of the Board of Education, of accurate and well-digested information on educational progress abroad would further the interests of national trade and industry. In the present ferment of opinion as to national education, the work of a well-equipped educational intelligence office might do much to promote unity of educational effort, understanding of the need of the different types of schools, and clearness of educational aims. In the past, much public money has been wasted through failure to make a

careful study of educational methods and problems before embarking on schemes entailing large expenditure. It is probable that great saving would be effected by the supply of timely information on many educational subjects for the consideration of those locally interested in the supply and management of schools. The aim of the writers of such reports should be to give practical help to educational workers, without being narrowly statistical or *doctrinaire*. In their treatment of the subject they should endeavour, not to introduce foreign ideas or continental methods (at least without due modification) into English schools, but to throw light on English educational needs and opportunities by comparing work done here with what is done elsewhere. It should be their aim to disentangle what is valuable from what is obsolete or antiquated in our English educational traditions, and to preserve all that is good in our present educational arrangements. At the same time, it may be noted that the work of the present Office of Special Inquiries has been found useful by educational administrators in different parts of the Empire as well as in England and Wales.

AN EDUCATIONAL REVIEW.¹

By Dr. THOMAS MUIR, C.M.G., LL.D., F.R.S.
Director of Education for Cape Colony.

IF we cast over in our minds the principal events of the recent history of education in England, it is not difficult to separate out three main streams of tendency; and, as all such streams are in no sense the products of chance or artificial stimulation, but have to be viewed as the natural results of the operation of forces acting in accordance with the laws of evolution, it would be a fatal mistake anywhere to neglect the study of them. The mistake would, further, be all the greater if made in lands which have not yet reached the same stage of progress as England has, which, therefore, have still the same thorny road to travel as she has toiled through.

Modernisation.—First of the three I place the tendency to modernisation. The old curricula have been under a steadily increasing fire of criticism; the old methods of teaching have been held up to ridicule; and the old boards of management have been treated with scant respect. What thus began in fault-finding developed into the drafting of schemes of reform, into the formation of associations for promoting these schemes, and ultimately in numerous cases into modification of the Statute-book. We have only to think of the altered attitude towards such subjects as woodwork and cookery in elementary schools, the change in the position of French, German, and science in secondary schools, the initiation and development of separate schools for technical education, and the extensive widening of the curriculum in universities—we have only to do this to be conscious of the character of the great movement which has been and is in progress. The modernising stream would seem to widen as the years advance. "Nature-study" has quite recently been edged into the code of the elementary schools, and "brewing" and "commerce" have been honourably entered on the curriculum of a University which in more points than this prides itself on being "modern."

Organisation.—The next of the tendencies observable in English educational history is towards organisation; and it may at once be remarked that no prominent country of the world has stood more in need of a change in this direction. Up almost to the middle of the nineteenth century there was chaos

¹ Abridged from the presidential address to Section D of the South African Association for the Advancement of Science at the Cape Town meeting, April, 1903.

in every division of English education; and even in 1846, when the first step towards reform was taken, it was only elementary education that was thought of. The idea of a country's education being an organic whole, and requiring treatment as such, had crossed few men's minds.

During the last decade of the century people and Government both felt that an epoch-making step had to be taken towards the unification of the various authorities concerned with education. After the usual vexatious delays, an Act was passed in 1899 creating a Board of Education to take the place of the Education Department, the Science and Art Department, the Charity Commission so far as its educational work was concerned, and even the Board of Agriculture to the same extent. Great as this measure must be viewed, it was only the prelude to a greater, viz., the Education Act of 1902. While the former unified the Government departments dealing with education, the latter may be said to aim at ultimately bringing about a like unification of the local authorities. In view of the many diverse interests involved, a perfect unification was hardly at first possible; but much has been done by it towards placing all education, save university education, under the local control of the county and borough councils.

Nationalisation.—The third tendency which claims attention is the tendency towards nationalisation. Fortunately, it is so bound up with the second that a few additional words will suffice for it. So late as the early part of the nineteenth century the English State seemed unconscious of having any direct duty in regard to the education of its people. The provision of schools was apparently held to be the work of religious and philanthropic bodies, or a matter to be left to private enterprise. Wiser views must have been in circulation by the time (1839) a separate Department of Education came to be created; but the fully-developed principle that the State must insist upon the education of children, even in the teeth of opposing parents, had no legislative hold until the year 1870. In 1880 the hold was strengthened; and since then the principle has branched out in several fresh directions.

Science and Education.—Now looking back upon these three tendencies, and reflecting upon their character and history, it is impossible to doubt the assertion that nothing has contributed more to the development of them than the immense growth and diffusion of science. On every side social and national life are enveloped and affected by scientific discoveries, and the rapidity with which a purely theoretical result is forced to yield a practical application has become a matter of every-day experience. Our environment is daily changing because of scientific advance; we cannot live in the past even if we would. Hence the modernisation which has already taken place in the curriculum, and the persistent, not to say irritating, call for further "practicality." Hence also the recognition of the national duty in regard to education, as has just been pointed out. Even the pressure for organisation is not unconnected with the same cause, because it is mainly through scientific training that we have come to see the need for sound method in all our undertakings if high efficiency is to be attained. No true educationist can thus afford to let his eye wander from science, whether he is designing curricula, planning legislation, or seeking to improve administration.

The teacher has also much food for reflection in this connection. The last decade of the century saw great changes of opinion in regard to him and his work. With every additional enhancement attached to the value set upon education, his status has improved, and with every step towards the nationalisation of his subject the more willing has the State been to view him as an honoured and trusted servant. All credit to him that he has come to recognise the justice of the State's return demand that he shall adopt his profession in the proper spirit, and shall

seriously set himself to be trained for his life-work. The old delusion that he who has learned can teach has been an unconscionable time in dying, but there is not much life in it now. Even the most conservative bodies have during recent years changed their front in regard to the matter, and surely the last word on the subject has been said at the Conference which assembled at Cambridge in December last. The Conference was fully representative of the Universities, of the various teachers' associations, and even of unprofessional educationists, and the first words of the chairman, Sir Oliver Lodge, in summing up the points upon which all the members were agreed, were: "Training is necessary for teachers of all grades." In the last three words, "of all grades," there is much virtue. No stopping short at the elementary teacher, on whom for many years training has been obligatory, nor at the secondary teachers, whom even the English Headmasters' Association would now like to see moderately trained; but embracing all, even those who have to teach within the walls of a college.

Another point which has to be noticed in regard to teachers has a closer bearing upon our present meeting. This is, the fast-growing conviction that the teacher who wishes to be effective in his daily professional work must keep up a living interest in his subject, and, according to his opportunities, must be a contributor to its advancement. The latter obligation, of course, increases in weight with the rise in grade of the teacher; in the case of a university professor, the will and the capability to do research work should be considered indispensable, and should be valued at least as highly as the power to interest and to teach. With the removal of all school work from certain of our colleges, and with the consequently increased aid available for higher education and the increased interest taken by the public in their endowment, we may surely hope with confidence that an aim of this kind will be kept steadily in view in the future. The plea of want of originality, which has sometimes been set up in England as an excuse for no research output, shows a complete misunderstanding of the nature of the demand made.

VENTILATION OF SCHOOLROOMS BY WINDOWS AND FIREPLACES.¹

By W. T. HARRIS, LL.D.

UNDOUBTEDLY the ideal plan for warming and ventilating houses includes a fresh-air shaft, bringing down the air from the top of the building, heating the same, and forcing it into the schoolroom by a fan moved by steam or other power. The feet should be kept warmer than the head, consequently the foul-air flues should be placed near the floor. This ideal plan is generally considered an expensive luxury, too expensive for use in most places. I can remember that twenty years ago many of the buildings in Chicago were heated and ventilated on this plan. By simply turning a register the inflow of hot air could be stopped at once, and the inflow of fresh, cool air substituted. The steam engine which furnished the hot air was placed in a small building just outside of the building used for school purposes. I have never inspected schools elsewhere that were heated and ventilated in so satisfactory a manner.

The brief remarks which I shall make in this paper are devoted to the question of interest in the great majority of school-houses in the United States—houses that depend on windows and doors and chimney flues for their ventilation, and for

¹ Reprinted from the recently published Report of the U. S. Commissioner of Education (Washington, 1902).

heating depend upon stoves or hot-air furnaces, or steam coils. The universal tendency when the air of the schoolroom becomes too hot is to raise a window and let in the cold air from the bottom. The consequence of this is a direct draught upon the backs or shoulders of pupils sitting near the window. Pupils at a distance from the window get some of the fresh air without danger from the current of air caused. It seems to me that very many cases of ill health in later life can be traced back to carelessness in this matter of direct ventilation from the window upon the pupil. The seeds of future rheumatism were then planted. Rheumatism, it is well known, leads to heart disease. In case the lungs are the weakest point, consumption may set in first, especially where the effect of sitting in a draught of air produces a bad cold instead of rheumatism.

Inasmuch as the cold stream of air falls to the floor on entering the room and diffuses itself around the floor, it tends to produce cold feet. Hence the ventilation of the room from the bottom of the window is sure to be inimical to the health of the pupil.

But the child must have fresh air. Foul air deteriorates the blood and lowers the tone of the whole system, thus inviting disease. The child must have fresh air, but the fresh air must be introduced through the top of the window, and not through the bottom. This is the point that I wish to emphasise. If the window is not constructed so as to be lowered from the top, it can easily be changed. A portion of the supports of the window can be cut out with a chisel, so as to allow the upper sash to be lowered to the distance of 1 foot or more. Then two buttons may be fixed, one of which supports the window within 1 inch of the top and another that supports it when lowered a foot or more. This change should be made in all the windows and not merely in a few of them. Every schoolroom should have at least four windows. Each of these four windows should be so constructed that the upper sash may be lowered.

In cold, sharp weather, or very windy weather, when the air is mild, the upper sash of each of the four or more windows of the schoolroom should be lowered 1 inch from the top. The cold air from without enters the space above the window and meets the hottest air in the room. It is heavier and descends toward the floor, creeping down the side of the window and the wall of the room and becoming heated in its passage. During its descent it also diffuses itself more or less, and in no case does it strike the backs or shoulders of the pupils, provided that there is an aisle, as there ought to be, between the pupils' desks and the wall of the room. Moreover, when it reaches the floor it has become so much modified and warmed it does not cause a cold chill to the feet of the children.

If the weather is warm or mild, and there is little breeze stirring, the windows should all be lowered from 6 inches to a foot. This will introduce a much larger inflow of fresh air, but it will hold its course to the floor near the wall or down the window without striking the shoulders of the pupils. In case, however, of cold weather, or of windy, mild weather, the volume of air pouring through an aperture a foot wide would be projected forward into the room like a cataract, and would reach the pupils and do them harm. Everyone knows that the hot air rises toward the top of the room and remains as a sort of reservoir of air above the point at which fresh air is introduced. When the window is raised from the bottom and not lowered from the top, the persons seated on the other side of the room not affected by the inflow of air feel the oppressing effect on the body of stagnant air in the top of the room. This is instantly removed upon opening the ducts at the top of the room, because all of the air in the top of the room is set in motion by the process.

I have said that all of the windows, and not some of them,

should be lowered from the top. It will not do to fix one window alone and suppose that is sufficient for the purpose of ventilating a whole schoolroom. It will do something, but what it does will not be well done. For, in order to affect the air of the whole room, it will be necessary to lower the window too much, and the consequence will be the creation of a too brisk current, the formation of a cataract of air, as it were, which will flow outward from the wall into the schoolroom so far as to strike the pupils sitting nearest that window. All of the windows should be lowered, and no more than is necessary to produce the change of air in the whole room by the descent of a thin sheet of cold air down the windows and the wall to the floor.

This method of ventilating the rooms is not a matter of mere theory, but has been tested by me during many years' practice. Any schoolroom that has four windows to it may be ventilated by this process in a fairly serviceable way. But it is quite important that there should be ventilating flues at the bottom of the room opening into a large ventilating flue surrounding the smokestacks which carry off the heat of the furnace. There is a sort of sour schoolroom air which the school visitor remembers vividly. This schoolroom smell cannot be removed effectually except by ventilators at the bottom of the room. The ventilation by means of the tops of the windows that I have already described gives a fair supply of fresh air to all in the room, but it is not quite adequate to remove this schoolroom smell here spoken of. The ventilating flue at the bottom of the room opening into the smokestack is supposed to draw the air out of the bottom of the room by the draught of the heated air ascending the smokestack. By the term "smokestack," I refer to the iron pipes within the chimney through which the smoke and gases from the fuel escape up the chimney. A space left around this smokestack and open all the way to the top of the chimney furnishes the ventilating flue which is found to do the service in schoolhouses. When the building is not heated by furnace and the volume of air in the ventilating flues is not heated, there will not be a draught sufficient to suck out the sour and fetid air from the bottom of the schoolroom. An open fireplace in some part of the schoolroom will answer this purpose admirably if a small fire is kept in it constantly, even in summer. A kerosene lamp of small size will do wonders by causing an ascending current of air which draws out the bad air at the bottom of the room.

In case the room is heated by a stove, the stove should be a large one, so that the door may be left open after the coal is ignited. The draught which carries the steam and gases up the chimney also draws out the bad air from the lower part of the room. In case wood is used, and an open door occasions too rapid combustion of the fuel, some other plan must be adopted. The old Franklin stove or fireplace makes the best ventilator, though a poor heater. Its heating capacity may be increased sufficiently by lengthening the pipe and carrying it around the top of the room before connecting it with the chimney.

I should have said above that when the outdoor temperature is 80° F., or above, the windows may be raised from the bottom a foot or so, and lowered from the top as much as possible.

There are devices of oblique boards placed at the bottom of the window, or at the top of it, which are intended to deflect the current of air upward, and thereby prevent its injurious effects on the shoulders of the pupils. I do not doubt that these devices are of some use, but in my experience I have never known them to be so good as the plan of lowering the windows from the top simply—that is, 1 inch in cold weather and a foot or more in mild weather. The reason I suppose to be this: that the oblique board serves to prevent the inflow of air when there is no breeze stirring outside of the schoolroom. For air, when still, refuses to climb over the oblique board.

just as water, or any other fluid, refuses to climb over its bank. The oblique arrangement will work only when the wind blows towards the schoolroom.

Of all methods of heating the schoolroom by direct radiation, hot-water pipes extending around the room, connected with means of admitting fresh air under the pipes, is the best that I have seen. The steam coil is apt to overheat and injure the quality of the air, although this may be rendered unnecessary by a more liberal supply of coils. The stove and the fireplace heat the schoolroom unevenly, but they furnish a natural means of ventilation, while the steam coil or the hot-water pipes demand some auxiliary process for ventilation, a process which is sometimes neglected, however. If ventilation is not provided for, the steam or hot-water heating apparatus may prove quite injurious to the health of the pupils.

OXFORD LOCAL EXAMINATIONS. SET SUBJECTS FOR 1904.

Preliminary.

Religious Knowledge.—(a) The Reign of David, (b) St. Matthew x.-xxvii., (c) Acts i.-xii., (d) Church Catechism.

English History.—Either the Outlines from 1066 to 1399, or the Outlines from 1603 to 1715.

English Author.—Either Lamb's "Tales from Shakespeare," or "Select Poems of Tennyson," by George and Hadow, i.-xxi. (Macmillan).

Geography.—Full knowledge of Scotland and Ireland, and a general knowledge of (1) elementary geographical terms, (2) Europe.

Elementary Latin.—"Tales of Early Rome," by J. B. Allen (Clarendon Press).

Elementary Greek.—Sidgwick's "First Greek Reading Book," Exs. 1-35, 51-60 (Rivington).

Elementary French.—Perrault's "Contes des Fées."

Elementary German.—"Der Schlüsselbund" and "Jagderfolge" in E. S. Buckheim's "Short German Plays" (Clarendon Press).

Junior.

Religious Knowledge.—(I.) Either (a) The Reigns of David and Solomon; or (b) St. Matthew; or (c) Acts i.-xvi.; or (d) Prayer Book.

English Literature.—Either Shakespeare's "Richard II.," or "As You Like It," or Scott's "Lord of the Isles," or "Select Poems of Tennyson," by George and Hadow (Macmillan).

History.—Either (a) Outlines of Greek History from 510 B.C. to 404 B.C.; or (b) Outlines of English History from 1603-1715, with special questions on the period 1640-1658; or (c) Outlines of English History from 1066 to 1399, with special questions on the reign of Edward I.; or (d) Outlines of General European History from 987 to 1215.

Geography.—General: (1) Geographical Terms, (2) Physical Geography, (3) Asia and the British Empire. Special: United Kingdom.

Latin.—Cæsar, De Bello Gallico III.; Virgil, Aeneid I.; Lucian, Vera Historia.

Greek.—Scenes from Sophocles, Antigone (Clarendon Press).

French.—"L'Abbé Constantin," by Halévy.

German.—"Seines Vaters Sohn" and "Der Gespensterkampf," by Riehl (Clarendon Press).

Senior.

Religious Knowledge.—(a) The Reigns of Saul, David and Solomon; (b) St. Matthew; (c) St. Matthew in Greek; (d) Acts; (e) English Church History, 1042-1353.

English Literature.—Shakespeare's "Richard II." or "Hamlet," together with either Dryden's "Essay of Dramatic Poesy," with Pope's "Essay on Criticism"; or "Select Poems of Tennyson," by George and Hadow (Macmillan).

History.—Either: (a) Outlines of Greek History from 510 B.C. to 404 B.C., with special questions on the Ionic Revolt and Persian Wars; or (b) Outlines of General European History from 987-1215; or (c) English History from 1066 to 1399; or (d) English History from 1603 to 1715.

Geography.—In addition to general geography; a full knowledge of British North America and France.

Latin.—One prose and one verse author from: Cicero, pro lege Manilia, pro Archia; Cæsar, De Bello Gallico; Horace, Odes, Book I.; Virgil, Aeneid, I.

Greek.—One prose and one verse author from: Demosthenes, In Meidiam; Plato, Crito; Aeschylus, Persae; Euripides, Alcestis.

ITEMS OF INTEREST.

GENERAL.

SCHOOLMASTERS and parents have been deeply moved by the fire at Eton, in which Mr. Kindersley's house was destroyed, and two boys lost their lives. Perhaps the disaster is made less distressing by the acknowledged blamelessness of all the sufferers; but the comments and correspondence in the daily press have shown an excessive desire to fasten the blame on the College authorities. A disinterested spectator, looking at the house before the fire, would never have condemned it as unsafe. As a matter of fact, the wistaria creeper which covered it made descent particularly easy. A suggestion that the house should be pulled down would have met with indignant opposition from lovers of the picturesque as well as old Etonians. Some years ago a protest signed by this conservative body saved another beautiful old house. Eton has been remarkably free from fires, and nobody in the place would have imagined it possible that a fire could get complete possession of the ground floor of such a house without somebody noticing it. It is easy to be wise after the event, and schoolmasters may learn from this sad calamity to take certain special precautions in addition to ordinary fire-drill and life-saving apparatus. Three may be mentioned: (1) No window should be completely barred. If it is desirable to prevent its being used unwarrantably, it is easy to have part of it made of fixed glass, which can be broken if necessity arises. (2) Automatic fire-alarms can be easily attached to electric-bell wires, and hung in places where a fire may break out. (3) A night watchman is a useful institution.

THE President of the Board of Education has appointed Mr. H. F. Heath, B.A. (Lond.), Ph.D. (Strassburg), Fellow of University College, London, and Academic Registrar of the University of London, to the post of Director of Special Inquiries and Reports rendered vacant by Mr. Sadler's resignation. Dr. Heath obtained first-class honours, with a University exhibition, in English language, literature, and history, at the University of London. He was Professor of English Language and Literature at Bedford College, London, from 1890 to 1896, and was engaged as a teacher and examiner until 1896, when he entered the service of the University of London. Dr. Heath occupied the post of Assistant-Registrar until the reconstitution

of the University, when he was appointed Academic Registrar and acting treasurer. It has been his duty, among other things, to investigate the educational facilities, technical, scientific, and literary, existing in London, with a view to their co-ordination, and to organise the University system to this end. His work in both of these directions has been attended with marked success.

MR. MICHAEL E. SADLER has accepted an engagement by the Sheffield Education Committee to report independently upon the provision of "education other than elementary" in Sheffield.

THE committee stage of the London Education Bill was proceeding as we went to press with our last issue. We were able to chronicle the decision to exclude completely representatives of borough councils from the Education Authority for London, and consequently have little to add to the note of last month. The clause dealing with the management of provided schools was much modified; at present it reads as follows, but is liable to alteration at the Report stage:—(1) All public elementary provided schools within the area of each metropolitan borough shall have a body or bodies of managers, whose number shall be determined by the council of each borough, subject to the approval of the Board of Education:—Provided that three-fourths of such body or bodies shall be appointed by the borough council and one-fourth by the local education authority. Provided also that due regard shall be had to the inclusion of women on the said bodies of managers. (2) The site of any new public elementary school to be provided by the local education authority shall not be determined upon until after consultation with the council of the metropolitan borough in which the proposed site is situated, and in the case of compulsory purchase, if the council of the metropolitan borough does not concur in the proposed compulsory acquisition, the Board of Education shall be empowered, as a condition of its approval of the provisional order, to require, if it thinks fit, the substitution in the order of any other site proposed by the council of the metropolitan borough for that inserted by the local education authority.

NUMEROUS changes have been introduced in the regulations for the Oxford Local Examinations of 1904. In each of the examinations some of the sections—*e.g.*, history, geography, mathematics and natural science—have been divided, and the number of sections necessary for passing has consequently been increased. The regulations affecting arithmetic and mathematics have been altered, and the conditions for passing in religious knowledge for junior candidates, and in English language and literature for junior and senior candidates, have been modified. Geometry will be an obligatory subject in mathematics in the junior and senior examinations in 1905. Alternate papers, pass and advanced, will be set in English history, geography, French and German. Candidates offering any of these subjects must state on their entry forms whether they desire to take the pass or advanced paper. In introducing this system the delegates have had two objects in view:—(1) That candidates able to do well in the advanced papers shall have full credit for so doing; (2) That the work of the weaker candidates shall be fully and adequately tested by the pass papers. They intend that candidates of average ability and attainments who enter for an advanced paper shall have the prospect of gaining at least as many marks as if they enter for the corresponding pass paper.

THE School Management Committee of the London School Board reported, at the meeting on May 28th, that the committee have been informed by Mr. G. L. Bruce that he is allowed to offer another travelling scholarship of the value of £120 in order that one of the Board teachers may visit schools in some foreign

country to study the methods adopted, such teacher selected to have some knowledge of the country to be visited, and also to be qualified by character, experience, and ability to appreciate what he sees. It is therefore suggested that he should have at least eight years' experience. Two scholarships have been enjoyed in Germany, two in France, and one in America. The new scholarship is to be held in Germany. The committee proposed that the Board should accept the offer with thanks. The report was adopted.

THE Eleventh Summer University Extension Meeting will be held in Oxford from August 1st to 24th. The inaugural lecture will be delivered in the Examination Schools by the American Ambassador, Mr. Joseph H. Choate. There will be five sections, *viz.*, I.—History; A. Mediæval England (1215-1485) and B. Mediæval Europe. II.—Literature. III.—Natural Science. Designed to illustrate the relations of science to industry, with special reference to (a) bacteriology, (b) electricity, (c) chemistry. IV.—Social Economics. V.—Architecture and Fine Art. Certain special classes have also been arranged, and we notice these include classes for the study of the history, theory, and practice of education, with Mr. W. M. Keatinge as the lecturer. Conferences have been arranged on:—(i.) The Education Act of 1902 and University Extension. Chairman, Sir William R. Anson. (ii.) Free Libraries and Popular Education. Chairman, Viscount Goschen. (iii.) Science in its relation to Industry. Chairman, Sir Philip Magnus. The meeting is divided into two parts: the first extends from August 1st to 13th, and the second from August 13th to 24th. The total expense of attending either part of the meeting need not exceed £3 10s. for each person, and may be less if several people live together. The total expense of attending both parts of the meeting need not exceed £6 10s.

THE Technical Education Board of the London County Council announce that a course of training for young men and young women who intend to become teachers in secondary schools will be begun at the London Day Training College in October. The course of training will extend over one year, and will be confined to persons who are graduates, or who have undergone a complete course of university study, and passed an examination equivalent to that for a university degree in arts or in science. The students will receive instruction in the theory, history, and art of education, so as to prepare them for the examination for the teacher's diploma of the University of London. They will go through a course of practical work in approved schools under the general direction of the principal of the college, and under the immediate supervision of one of the masters of method or mistresses of method. All the principles studied in the lecture-room will be exemplified in the schools, and visits of observation will be made to schools of marked excellence or of special educational interest. The covering fee for the post-graduate course is £10. Special arrangements may be made whereby students who are receiving their practical instruction outside the college, but in accordance with a scheme approved by the Board, may be admitted to the lectures for graduates at the Training College at half the ordinary fee.

A MEETING was held on May 28th, at the Hartley University College, to consider the desirability of perpetuating the memory of the late Mr. T. G. Rooper, who, in addition to being his Majesty's Inspector of Schools for Southampton and the Isle of Wight and a governor of the Hartley College, was well known and much respected in the educational world. It was agreed that the memorial should take the form of a scholarship to enable children trained in elementary schools to obtain facilities for higher education. A representative committee was elected to organise the movement, and Profs. Hudson and Hearnshaw,

of the Hartley University College, were appointed general secretaries.

THE *Discovery*, with the members of the British Antarctic Expedition on board, is spending a second winter locked in the ice of south polar regions in lat. $77^{\circ} 51' S.$, long. $166^{\circ} 42' E.$ News of the expedition has been brought home by the relief ship *Morning*, and a short narrative of the voyage and sledge journeys was given at a special meeting of the Royal Geographical Society on June 10th. Details of the scientific results are reserved for the time when the expedition returns, but a few points of geographical interest have already been made known. From the information available, it appears that MacMurdo Bay is not a "bay," but a strait, and that Mounts Erebus and Terror form part of a comparatively small island; that the lowest temperature experienced was 92° of frost Fahrenheit; and the nearest approach to the South Pole yet reached has been made by a sledge journey from the *Discovery*, viz., to lat. $80^{\circ} 17'$ south. From this position, which beats all previous records, an immense tract of new land was sighted, with peaks and ranges of mountains as high as 14,000 feet. The *Morning* reached a point about eight miles from the *Discovery*, and was able to transfer by means of sledges a large supply of provisions and other necessities to the ship, which was left behind in a good position to bear the demands of a second winter on the ice. The relief ship will be sent out again at the end of this year, and if the ice breaks up the *Discovery* may return with her.

SEÑOR DON J. FRESNEDO DE LA CALZADA, whose unwearying supervision and thoughtfulness did so much to make the Spanish Course held last year at Santander a success, has originated, in that city, a noteworthy educational experiment. With the object of counteracting the ill effects of town life on the young, and of interesting them, through a more intimate knowledge of their province, in the general welfare of their country, he has arranged, with the help of the local schoolmasters, a series of lectures, during the winter and spring, on the topography, history and industries of the province. The lectures are made the basis of special lessons in the schools, and the more apt of the pupils receive free tickets for the excursions during the summer months. The cost of these excursions is met by the *Centro Montanes*, a non-political society of all citizens interested in the progress of Santander. Excellent arrangements have been made to ensure proper discipline during these visits in the neighbourhood, and they are evidently to be something more than mere pleasure trips. The authorities of the city are giving their warmest personal support to the movement, the success of which, however, must largely depend on the manager. Those who enjoyed Sr. Fresnedo's guidance last summer will be sure that, given the loyal support of the teachers, nothing will be lacking in this respect.

A REVISED edition of the Teachers' Registration Regulations has been issued by the Board of Education. Certain modifications have been made, and these are indicated in italics in the new issue of the regulations. The second condition which must be fulfilled by persons wishing to be registered under Column B has been amplified, and it is provided, "in the case of a student who has taken honours in the Final Examination for a degree after spending four academic years at some university in the United Kingdom, [he must] have undergone a course of training for two terms at least taken continuously." Acting teachers in secondary schools must, to be recognised under the conditions set forth in the regulations, apply within four years of the establishment of the registration authority. An addition has been made to the diplomas enumerated in Appendix A, recognised in the case of women seeking registration, viz.,

"that under the conditions prescribed by the Delegacy for Local Examinations she has (1) passed the second public examination of the University, or (2) has obtained honours in the Oxford University Examination for Women in Modern Languages." The following recognised examinations are added to Appendix B:—the Second Public Examination in Letters and the Final Examination for the title of A.Sc. of Durham University; a certificate of the University of St. Andrews, granted under the conditions regulating the L.L.A. diploma examinations, under certain conditions duly specified. In Appendix C, the higher certificate of the National Froebel Union and the diploma in education of the University of Wales have been added. To the list of institutions for the training of secondary school teachers, in Appendix D, have been added Bristol University College, Royal College of Science, London (Teaching Associateship), and St. Mary's College, Paddington. Copies of the new edition of the regulations can be obtained (price 1d.) from Messrs. Eyre and Spottiswoode.

MESSRS. H. BATEMAN and P. E. MARRACK, both of Trinity, are bracketed equal as Senior Wranglers this year. Mr. Bateman was educated first at the Ducie Avenue Board School, Manchester, and then at the Grammar School of that town, where he held a Derby Scholarship, and gaining a Sizarship entered Trinity College, Cambridge, in October, 1900. He has taken prizes in both his first and second year, and is now a Major Scholar of his College. Mr. Marrack was educated at Blundell's School, Tiverton. He is a Major Scholar of Trinity College, where he matriculated three years ago. There were in all forty-one wranglers. One lady, Miss H. P. Hudson, ranks as a wrangler, equal to seven. Miss Hudson (Newnham) is a daughter of Prof. W. H. Hudson, King's College, London, who was third wrangler in 1861. Her brother was Senior Wrangler in 1898, and her sister, Miss W. M. Hudson, was equal to the eighth wrangler in 1900.

As was expected, the changes in the regulations affecting the pass examinations of the University of Cambridge proposed by the syndicate appointed to consider the mathematical requirements, have been adopted by the Senate. The report of the syndicate was published in our June number, and by accepting it, the long reign of Euclid as the sole arbiter of geometry in schools is brought to an end.

MR. ALEXANDER DARROCH, lecturer on educational method and psychology in the Church of Scotland Training College, Edinburgh, is to succeed Prof. Laurie in the chair of the theory, art, and history of education in the University of Edinburgh. Mr. Alfred Hughes, Registrar of Victoria University, and formerly headmaster of the Liverpool Institute, has been appointed organising professor in education in the University of Birmingham. Mr. Hughes has had great experience in the relations between the Victoria University and the secondary schools in its district.

THE Council of Owens College has appointed Mr. J. J. Findlay, Headmaster of the Intermediate School for Boys, Cardiff, to the Sarah Fielden professorship of Education, vacant through the death of Prof. Withers.

MR. FRANK FLETCHER, assistant master in Rugby School, and formerly scholar of Balliol College, Oxford, has been appointed Master of Marlborough College, in succession to the Rev. G. C. Bell, who retires at the end of the present term.

THE Russian Ministry of Popular Education has resolved to erect a new university for the north-western provinces of the empire, and has finally decided upon Mohileff as its seat. Mohileff has a population of about 50,000, two-thirds of whom are said by Brockhaus to be Jews.

THE Report on Education in the province for 1900-01 shows that in Assam there were 102,463 children in Government schools; of these 10,322 were being taught English and 100,063 were learning a vernacular language. There were but fifteen Europeans or Eurasians receiving Government education, the great majority of the pupils being Hindus.

It is fairly generally admitted that the present method of advertising vacant professorships and headmasterships is not so satisfactory as it might be. Mr. Sidney Lee in a recent letter to *The Times* describes how the selection of professors is managed in America, where advertisement is never adopted. The president of the university in which a vacancy arises first consults the members of the faculty concerned, and invites their opinion as to the fittest person to fill the vacant chair. In addition to this it is part of a president's business to collect information as to the reputations that men are acquiring in academic work, and the president is in constant communication with other universities. After thorough investigation he forms his decision as to how the vacant post may be filled with greatest advantage to the institution over which he presides, and forwards an invitation to the chosen person. If managed in a thorough manner by the governors of schools, some similar process would probably be more likely to secure satisfactory headmasters than the plan at present in vogue.

THE Civil Service Commissioners have announced that an open competitive examination for situations as assistant examiner in the Patent Office, Department of the Board of Trade, will be held in London, commencing on July 21st, 1903. Not fewer than twenty-four candidates are to be appointed on the result of this examination, if so many should be found to be duly qualified. The limits of age are 20 and 25. The examination will be in the following subjects only:—English composition (including spelling and handwriting); geometry (plane and solid); mechanics and mechanism; chemistry (chiefly inorganic, including practical analysis); electricity and magnetism (including practical examination); general physics, hydrostatics, heat, light and sound (including practical examination); French or German (translation from the language into English). No subjects are obligatory. The questions set in the physical and mathematical papers are such as can be solved without the aid of the methods of the infinitesimal calculus. The salary of assistant examiners in the Patent Office commences at £150 a year, and rises by annual increments of £15 to £450. There is a prospect of promotion to higher classes with salaries ranging from £500 to £700. The fee for attending the examination is £5. Application forms can be obtained from the Secretary, Civil Service Commission, W., and must be returned to him on or before July 2nd.

THE Civil Service Commissioners have announced that an open competitive examination for three situations as Student Interpreter in China, Japan, or Siam, will be held in London commencing on July 20th. The limits of age are 18 and 24 on the first day of the examination. The subjects of examination are handwriting, arithmetic, and English composition. The following subjects are optional—*précis*, geography, Euclid (Books I.-IV.), Latin, French, German, elements of criminal law, and principles of British mercantile and commercial law. The fee for attending the examination is £4, and the last day for the receipt of application forms is July 2nd. The commencing salary is £200 per annum.

THERE is a vacancy for a Junior Clerkship in the Consolidated Accounting Office of the Supreme Court in Ireland, carrying a salary of £100—£10—£300, and an open competitive examination is announced to commence on July 22nd for the selection of

candidates to fill this post and any other similar posts in the High Court of Justice, Ireland, which may be vacant within six months of the announcement of the result of the examination. The limits of age are twenty and twenty-five on the first day of the examination. The subjects include handwriting and spelling (including copying MS.), English composition (including *précis*), mathematics, English history, literature, geography, elementary principles of law, Latin, book-keeping, French, German, and shorthand. The last three subjects are optional. The entrance fee is £3, and the last day for the return of entry forms to the Secretary, Civil Service Commission, S.W., is July 2nd.

SCOTTISH.

THE Scotch Education Department have just issued an explanatory memorandum in regard to the Code of 1903. It is therein made clear that the "Supplementary Courses" are typical only, and that proposals for their modification by a different combination of the subjects, or by a substitution of others which are thought more suitable to the circumstances of the district, will be entertained provided the essential object of these courses is kept in view, viz., the application to practical ends of the knowledge of elementary subjects already acquired. A concession that will be greatly appreciated has been granted to rural schools in which instruction in the distinctive subjects of secondary education is at present being carried on. These subjects may, with the approval of the Inspector, still be taught, and will be accepted in lieu of some of the other subjects of the Supplementary Course.

AT an Educational Conference held in Edinburgh Prof. Laurie gave an address on "The Code in 1903 and Freedom in Education." Prof. Laurie, in an outspoken address, condemned root and branch the proposed "Supplementary Courses" for pupils between the ages of twelve and fourteen. The whole principle upon which they were based illustrated, he contended, the greatest of all educational heresies, the introduction of young and unformed minds prematurely to the future occupations of life—the vital mistake of supposing that you prepare the future ploughman and artisan best for their daily tasks by anticipating these tasks in the school. If the policy of the Code were carried out in the spirit of its framers, the higher instruction in rural schools would be at an end, and the school time occupied with work which anticipated the occupations of life, but did not really prepare for them, and the bridge, over which for generations many a poor country boy in Scotland had passed to professions which he had adorned, would be broken down. Prof. Laurie closed his vigorous address by an attack upon what he called the bureaucratic despotism which at present controlled elementary education in Scotland. Secondary teachers had been looking on at all this with an amused smile which was beginning to have a painful dubiety about it. But let them be under no delusion; their day was coming. Only theirs was the privilege of Ulysses—to be eaten last.

THE "Supplementary Courses" of the new Code seem, indeed, to have few supporters. The Scottish School Board Association at its last meeting passed a resolution protesting against the institution of these courses on the ground that they encouraged premature specialisation. Prof. Paterson, of Aberdeen, speaking to the General Assembly of the Church of Scotland, said that the Code gave its imprimatur to the teaching of snippets of bread-and-butter subjects to the neglect of those infinitely more valuable subjects which had a disciplinary value and were suited for all occupations alike. Teachers and managers for once present a united front against the new proposals, and the concessions referred to above have not greatly lessened the outcry. In fair-

ness to the Department it should be pointed out that while the high-sounding names—commercial, industrial, &c.—attached to the courses give some ground for the criticism of premature specialisation, a careful study of the subject-matter shows that nothing more is demanded of the pupils than is already possessed by well-trained children of twelve to fourteen years of age. The Department are determined to ensure that the additional school time is not spent in marking time, or in acquiring a smattering of subjects which will be of no use to them.

THE Report of the Committee of Council on Education in Scotland, which has just been published, contains no distinctly new features, but presents a mass of digested information that is invaluable for all interested in the progress of education. The report, as in previous years, emphasises the unsatisfactory nature of the school attendance. According to the present estimated population there should be 904,238 pupils on the registers and 753,532 in average attendance; but the returns show only 768,598 on the register, and 646,501 in average attendance. That means that for every 100 children who might be on the registers, there were only 85, and of these only 71 were in daily attendance. Neither the Department nor local authorities can rest satisfied so long as over 100,000 pupils are unaccounted for on the school registers.

THE figures given in regard to the existing supply of teachers show that, of 4,366 male teachers, 80·67 per cent. have been students in training colleges or King's students, while of 7,158 female teachers, 61·97 per cent. have received a similar training. It should not be forgotten, however, that of the minority many have obtained, otherwise than in the training colleges, a training of a very valuable kind. It is satisfactory to find that of the students at present in training no fewer than 1,864 are being instructed either in whole or part at the Universities. There can be no doubt that this source of supply will greatly help in maintaining the high standard of attainment which has always been a traditional feature in Scottish education.

SIR HENRY CRAIK, K.C.B., Secretary of the Scottish Education Department, addressed a meeting in Ayr, on June 6th, under the auspices of the Educational Institute of Scotland. Sir Henry replied at length to the criticisms that had been directed against some of the provisions of the new Code. He showed that the Education Act of 1901 had extended the school life of the great mass of the scholars by about two years. For that Act the Legislature and not the Department was responsible, but once it was passed it became the bounden duty of the Department to see that these all-important two years were spent to the very best advantage. They must make the education during this period of real value and of practical interest; it should tell more directly on the future life of the pupil, and it should help to make him a better citizen, and to increase his contribution to the general prosperity of the country. In the Code of 1903 the Department had outlined various courses which they considered were fitted to attain this end. But, as had been repeatedly explained, these courses are laid down only as models, and teachers and managers were encouraged to come forward with alternative schemes which they considered more suited to the needs of their district. In conclusion, he urged school managers and teachers to aid the Department in trying to keep Scotland not merely on the level of the past, but in the forefront of educational reform.

THE principle of the distribution of the Equivalent Grant due to Scotland in view of the increase in the English education grant by the Act of last session is laid down in a special minute just published by the Department. The larger part of the grant will be distributed as a capitation grant on the same basis as the

fee grant. The rest of the grant is to be assigned for the purpose of giving special aid to small schools which occur chiefly in sparsely populated districts, with the object of affording improved educational provision, otherwise possible in such schools only at a very heavy cost to the localities.

IRISH.

THE new Intermediate Rules and Programme for 1904 contain no startling innovation, but have some changes which are worthy of notice. The main principles of grades and courses, pass and honour, remain the same, with the introduction of a new pass subject—music—in all the grades, and of one compulsory language—Latin, French, or German, in the mathematical courses in the three higher grades. In the preparatory grade, algebra is allowed as an alternative to arithmetic. The *fiasco* of last year's examination has led to a lowering of the percentage of pass marks to 30 on the pass papers, 20 on the mathematical honour papers, and 25 on the other honour papers. Composition prizes are offered in the junior grade as well as in the middle and senior. For the special encouragement of Greek and German, prizes are offered to those who obtain the highest marks in these subjects; these prizes will not exceed the value of £10 each in the senior, £7 in the middle, £5 in the junior, and £3 in the preparatory grade. It may be pointed out that this reintroduces the principle of competition in the preparatory grade.

WE notice further that the Intermediate Board have in contemplation rules for supervising the health, recreation, sanitation, and physical exercise of schools.

TURNING to the Department's side of the programme for 1904, we find that its subject is now called experimental and practical science. In the first and second years this means experimental science and drawing—is drawing now classed as practical science?—and for the third and fourth years any one or more of the following courses:—(1) experimental physics; (2) chemistry; (3) mechanics; (4) botany; (5) domestic economy (for girls only); (6) drawing as a separate subject; all these will be two years' courses; and (7) physiology and hygiene; and (8) geology, both one-year courses. It is further announced that in and after 1905 a two-years' course of experimental science and drawing will be compulsory on all students except those who take the classical course. Students may take the course of any year twice but only twice.

THE Intermediate Board still refuses to allow a student to enter for more than one course, even though the subjects he takes make him eligible. Why are not the Department's programme and the Intermediate programme published together, and why is a pamphlet weighing 3½ oz. marked as costing 1½d. extra by post? Is it so valuable?

It is stated that the amount of result fees and school grant paid last year was £57,573 as against £56,759 for 1901. This may be taken as practically the whole of the Government endowment for Irish Schools.

THE numbers of students entering for the Intermediate examinations this year are 6,459 boys and 2,091 girls as against 6,545 boys and 2,509 girls last year. The figures, especially for the girls, are instructive as to the effect of last year's examinations.

SEVERAL important educational reforms are announced from Trinity College. The admission of women has been approved of by the Council and was brought before the Senate on June 9th, when it was sanctioned by an overwhelming majority. The Board and Council have both approved of the abolition of

compulsory Greek, and a student will shortly be allowed to substitute French or German. The course for history moderatorship has been remodelled. Jurisprudence is abolished, being now provided for in the new moderatorship of legal and political science, and a knowledge of ancient history, constitutional, political, and economic, becomes essential; the course of reading prescribed is wider and more diversified than before. The change will come into operation in the moderatorship examination of 1904.

WELSH.

THE tercentenary of Beaumaris Grammar School has just been celebrated in rather discouraging circumstances. The Chairman announced that the school was in such financial difficulties that the Governors were by no means certain that they could hold out another year. The Headmaster, however, showed that, in spite of the unsatisfactory financial state, the number of pupils for the last three years averaged seventy-three, within two of the number provided for in the educational scheme for the county. Criticism was offered by the Headmaster himself as to the smallness of the number of girls in the school. He considered that many parents still thought that girls did not require the education which was ungrudgingly given to their brothers. Yet the Beaumaris School specially provided instruction in domestic economy, laws of health, and cookery.

THE possibilities of the Eisteddfod as an institutional force in directing national development were well exemplified in the recent meeting at Blaenau Festiniog. What was called a "sectional" meeting entirely concerned itself with literary questions. The meeting has been pronounced an unqualified success. The significance is that it was a thoroughly popular movement, joined in by all classes of the community. They met together to be led on literary questions. Principal T. F. Roberts, of Aberystwyth, presided. He struck the note from the academic side when he said that he came not to give but to receive renewal of vigour and enthusiasm from contact with the young men of Festiniog, and especially the large body of those who were earning their bread by the labour of their hands.

PROCEEDING, Principal Roberts said that he had come "from amongst a large body of youths who were receiving the advantages of a university training to another body of the same blood and the same aspirations who were already in the school of life and daily toil. Upon their coöperation depended the future of Wales: separated for the moment they would soon be intermingled and would stand side by side for progress and rich and many-sided social life in the Wales that is to come." The Rev. Rhys J. Huws then addressed the meeting on present-day Welsh poetry, and particularly dwelt first on the defects in the excess of its qualities in: (1) a morbid tendency to sing of death and depict the gloomy side of life; (2) on abuse of scriptural diction and subjects; (3) on attachment to petty local themes; (4) a proneness to sing to order; (5) a tendency to sing of abstract subjects.

MR. T. DARLINGTON, H.M. Inspector of Schools, then spoke on the racial relations between the English and the Welsh. After submitting material to the audience for forming a judgment, he offered his own opinion, that "such differences as existed between the English and the Welsh were less profound and fundamental than those which divided, say, Southern and Northern Germany." This was followed by an estimate as to the present system of competition meetings of Welsh choirs in singing from Mr. David Jenkins, Mus. Bac. There is much for the English mind to ponder over in the possibility of a thoroughly popular meeting spending an evening in the consideration of such vital questions concerning national educational progress.

OWING to the breakdown of the negotiations between the followers of Mr. Lloyd George and the authorities in connection with Voluntary Schools, the County Council Conference at Swansea re-considered their attitude to the whole question. Mr. Lloyd George declared for a "fighting policy." Resolutions were passed, in effect, stating that since teachers will in future be officials of the County Councils and will be paid out of public funds, complete control must be placed in the hands of the County Council as to their appointment. The final resolution ran: "Until the Act is so amended as to give them (the County Councils) full control over schools not provided by them, the County Councils of Wales and Monmouthshire be recommended to refrain from applying rates to the support of such schools."

THE Governors of the Machynlleth County Schools have decided to write to the Central Welsh Board and the County Governing Body to draw attention to the fees payable for the pupils who sit for the Board's examinations. These are stated to be 10s. for honours, 7s. 6d. for the senior certificate, and 5s. junior certificate, as compared with 5s. honours and senior, and 3s. 6d. junior formerly.

THE Committee of the Welsh Language Society have proposed a scheme for a holiday course in Welsh, which they suggest should be held at Aberystwyth, for teachers in elementary and in secondary schools.

CURRENT HISTORY.

THERE has been some danger, and more fear, that King Edward's projected visit to Ireland might be used for party purposes, and great care is being taken that this shall not happen. There was a time in English history when the King was certainly a party man. To say nothing of our Tudor monarchs with their various ecclesiastical policies, or of our Stuart kings with their conflicts with Parliaments, and to confine ourselves to those monarchs who have reigned since formal parliamentary parties have existed, was not William III. a Whig, as well as the first two Georges? Bolingbroke might write his "Idea of a Patriot (*i.e.*, a non-party) King," but George III., who attempted to carry out the principle into practice, succeeded only in making a new Tory party. All this was possible while the King of Great Britain not merely reigned but governed, and that in the region of party politics. Bolingbroke's ideal could not be reached till, by the Reform Acts of 1832, the Kingship was practically thrust out of home politics. Now, the King is, at least officially, of the opinion of his ministers for the time being, and is neutral in party politics. What field the British Kingship may find in Imperial politics is a question of the future.

THE budget speech of the Canadian Minister of Finance is interesting and instructive. It seems that the object of taxation in our North American colony is not primarily or mainly to raise revenue. It does effect that object, it is true, and yields a surplus. But to judge from Mr. Fielding's speech as reported in the papers, quite other interests than the raising of necessary government expenses occupy his attention. "Preference for British goods," "reciprocal arrangements with the United States," "a surtax on German goods by way of retaliation," "to encourage alluvial gold-mining in the Yukon," these and such like are the considerations which shape the Canadian budget. All which, to those of us who remember or have read of Cobden, Bright, and the principles of free trade, supplies much food for thought. How far we have travelled from the days of "*laissez faire, laissez passer*"! Our orthodox text-books

of economics teach us that trade should be free, governed at least mainly by considerations of easy production. Now, the object of Government seems to be to make each country self-sufficing, whatever the cost. What a burden such a budget lays on the Minister! How thoroughly he must know every man's business, and what is good for him, and how far, if at all, others may be injured while one class is benefited! How the good of producers is studied, and that of consumers is neglected! Yet we are all consumers.

AMONG the deputations which waited on King Edward at Holyrood was one from the University of Edinburgh, whose address drew attention to the coincidence that their founder and their present monarch had both married Danish princesses. We may add to this that the last Stuart sovereign of England, as well as the first, had a consort from Denmark. A word or two about each of these Danish marriages. James VI. of Scotland, afterwards James I. of England, was born in 1566, was crowned King the next year after his mother's flight into England, and was sixteen years old when he founded "the College of King James," which has grown into the University of Edinburgh. He did not marry Anne of Denmark till 1589, and she lived till 1619, thus becoming Queen-consort of England by Cecil's management of her husband's hereditary claims. Anne, the daughter of James Duke of York, married George of Denmark in 1683, when there was little prospect of her succeeding to the English throne. He was an unimportant person who received the nickname of "Est-il possible?" and who deserted his father-in-law in 1688. He lived till 1708, and thus was the first consort of a sovereign of Great Britain. The third consort from Denmark had expectations at her marriage of succeeding to the crown of these realms, for Albert Edward was heir-apparent when in 1863 London welcomed the Princess Alexandra, and quoted from "Hamlet, Prince of Denmark," the words, "The expectancy and rose of the fair state" in its illuminations.

THE railway strike in Victoria had a curious development. The railways of that State belong to the Government, and legislation has been rapidly made to make illegal the affiliation of railway servants to an employees' association which might conceivably call them out on strike. The Premier, Mr. Irvine, is reported as saying that "it was in the highest degree detrimental to the service if men who were employed by the State . . . should render themselves liable to be called upon to take part in labour troubles, go out on strike, and thus cause disaster to public interests and public property." It is difficult, in these days of great industrial combinations, to distinguish between "disasters" arising from strikes of Government employees and of those of private enterprises, but we are irresistibly reminded of the parallel between such employees and the Army which we maintain in Great Britain. It is a force attracted to that employment, at least partly, by the pay offered. The contract between the Government and the soldier is a free one. Yet, since the Revolution of 1688, a Mutiny Act or an Army Act has annually given to the Government extraordinary powers over its soldiers, and what is merely a breach of contract in ordinary citizens becomes "mutiny" in the case of soldiers. Does the Victoria incident point to the fact that similar measures must be applied to the Civil Service?

A MASTER of an elementary school recently sent a batch of "howlers" to the *Globe* for publication. Some were old, others are at least new to us. On the nature of gases, "An oxygen has eight sides"; in natural history, "A cuckoo is a bird which does not lay its own eggs"; "a mosquito is a child of black and white parents"; and "a blizzard is the inside of a fowl."

RECENT SCHOOL BOOKS AND APPARATUS.

Modern Languages.

Mérimée, Colomba. (1) Edited by E. T. Schoedelin. viii. + 236 pp. (Blackie.) 1s. 6d. (2) Edited by A. Schinz. xviii. + 226 pp. (Ginn.) 2s.—There are already three English editions of "Colomba," at least one of which is distinctly good. It seems a pity to waste energy by preparing still further editions which are not manifestly of greater value. Both Mr. Schoedelin and Mr. Schinz have done their work conscientiously, the former giving fuller notes, the latter a better account of Mérimée's life and works. In both cases words similar in form to English words have been omitted from the vocabulary, but not consistently. Editors should either compile absolutely full vocabularies, or state clearly what principle they have observed in excluding words from them. The American (2) book has the clearer type and more convenient size.

Poèmes choisis. Edited by R. L. A. du Pontet. xxxvi. + 137 pp. (Arnold.) 1s. 6d.—We can warmly recommend this selection of verse (chiefly lyrical), which represents French poetry from the earliest time to the present. In his introduction M. du Pontet gives a very brief and, on the whole, accurate survey; in dealing with Villon and Ronsard he appears too ready to accept Boileau's mistaken views. In the section devoted to prosody, he gives perhaps as much as is essential; the rule about alternation of masculine and feminine rimes should, however, have been expressed more clearly, and it is a pity to perpetuate the word *hexamètre* for the French Alexandrine. In the sonnet (p. xxix.) there should be only two rimes in the two quatrains (not four). The sonnet by Baudelaire (No. 110) is irregular. The editor has also given an alphabetical list of authors, with concise biographies. The text occupies 124 pages, the notes 12; but the latter are really quite sufficient. By a curious and somewhat misleading omission, it is not stated that Bertran de Born wrote Provençal, not Old French. The book will prove a serviceable companion to the prose text read in a class; it may be given to older pupils for private reading; it may be used in connection with lectures on the various phases of French poetry.

About, Le Roi des Montagnes. Edited by F. B. Kirkman. vi. + 122 + xvii. + xv. pp. (Black.) 2s.—Another edition of this over-rated book, and we hasten to add, the best. The editor's name is a sufficient guarantee that the work is well done; his method of annotation has been improving steadily, with the result that anyone interested in good teaching will welcome this book and learn from it. We are referring particularly to the exercises on the text, which are excellent. Doré's queer illustrations have been reproduced. Indeed, everything has been done to galvanise into life this grotesque tale of what is no more.

H. A. Guerber, Contes et Légendes. Première Partie. vii. + 178 pp. (Harrap.) 1s. 6d.—An admirable collection of twenty-five short fairy tales, very few of which are familiar. Indeed, the editor has sought for them in quite unlikely places, and has been amply rewarded. We quite agree with his sensible remarks in the preface. There are no notes (except for a few explanations of subject matter, at the foot of the pages); but a vocabulary is added, which does not seem to be complete. The book is suitable for many purposes, and can be utilised both by those who insist on much translation in the intermediate stage, and by those who teach on reform lines; the latter would prefer an edition without the vocabulary.

Carnet de Notes d'un Voyageur en France. Par A. C. Poiré. viii. + 169 pp. (Macmillan.) 1s. 6d.—An excellent idea, very well carried out. M. Poiré takes his reader through the various *départements* of France, describing their industries, flora, fauna, &c., in a bright, attractive way. The most difficult words (1898 in all) are translated at the foot of the page. With the aid of this book and a good wall map, a teacher will be able to give his class many an interesting and profitable lesson; and it will prove equally acceptable to the private student. We know of few books so well calculated to give a knowledge of French geography, especially from the social and industrial point of view; and we therefore recommend it warmly.

Systematic Vocabulary of German and English. No. 1. 26 pp. (Relfe.) 3d.—A booklet containing sixty short lists of words and phrases, with the English in parallel columns. It is a careful little piece of work, of which the anonymous author has no reason to be ashamed. We have hardly noticed a slip; on p. 16, December has for some reason been omitted from the list of months, and on p. 19 *Tunke* might have been given as an alternative to *Sauce*. We do not usually order "fowl with ham" (p. 20).

Arnold's German Reading Books. General editor, Walter Rippmann. (1) *Andersen, Bilderbuch ohne Bilder.* Edited by Walter Rippmann. 67 pp. 1s. 3d. (2) *Marie Petersen; Prinzessin Ilse.* Edited by C. F. Herdener. 72 pp. 1s. 3d.—These little volumes are competently edited on reform lines and are suitable for pupils who have had a year's oral teaching. They contain text, conversational exercises, lists of strong verbs and a glossary. We are glad to see that the glossary contains the equivalents of the German words in *English*: this is a concession on the part of that thorough-going reformer, Prof. Walter Rippmann, that we are pleased to note. Nothing spoils a good cry so much as exaggeration; and the faddists who wish at all costs to exclude the mother tongue from the modern-language class-rooms are, we hope, on the decline. We commend the volumes before us to the notice of modern-language teachers, many of whom, we feel sure, might derive considerable profit from the general editor's introduction to the series.

Classics.

A History of Greece, for Beginners. By J. B. Bury. xv. + 472 pp. (Macmillan.) 3s. 6d.—Prof. Bury's larger history of Greece has received a welcome from students, and with good reason, in spite of the occasional rashness of the author in accepting new views. No book is without faults, and that of Prof. Bury is conspicuous for great merits; a mastery of his subject, lucidity in exposition, insight and often brilliancy. But it does not follow that an abridgment of such a work would be equally suited to the young. This volume has been made from the other by omissions, without other change except such as were made necessary by the omissions. Young readers, however, need a subject to be presented in a different proportion from that which the older need; what is elementary to the older, and may be passed by with a hint, must often be elaborated and explained for the younger. The style must be simpler for these, the words shorter. We cannot feel that Prof. Bury has been wise in allowing his book to be abbreviated. He should have re-written it, as Prof. Gardiner did so successfully with his *English history*. This is quite an interesting history of Greece for middle forms, but it will hardly do "for beginners."

Greek History for Young Readers. By Alice Zimmern. With illustrations and maps, eight of which are printed in colours.

xxiv. + 373 pp. (Longmans.) 4s. 6d.—Miss Zimmern's book is better adapted for the beginners whom Prof. Bury speaks of. Miss Zimmern knows less of Greek history than Prof. Bury, but she knows more of children, we should judge; and her book will be useful for those who are "not quite unfamiliar" with Greek legends and stories. Miss Zimmern uses the word "Aegeans" for the early inhabitants of Greek lands. It is, perhaps, not wise to use a term which will not be met with later, although it does avoid the difficulty of committing oneself to a theory. The illustrations are good, except that someone has emasculated all the statues, a foolish thing, surely, to do. What is the use of pretending that there is no sex? The best Greek statues are not prurient or harmful in any way, but we think much harm is done by well-meant humbug in sexual matters. Miss Zimmern is a practical story-teller, and we like her book.

Plays for Amateur Performance: Sophocles, Antigone Adapted and arranged for amateur performance in girls' schools. By Elsie Fogerty. With costume plates by Isabel Bonus. xxxiii. + 63 pp. (Swan Sonenschein.) 2s. 6d. net.—We have already had occasion to recommend Miss Fogerty's adaptation of the "Alcestis" for schools, and the present volume is quite as good. It contains everything necessary for the practical staging of the piece: pictures of the characters, directions for dress, arrangement of the hair, &c., the grouping of the company at important moments, and in the margin of the text the stage "business" is carefully indicated. The translation is one by Mr. A. S. Way, hitherto unpublished. Even the classical student may learn much from this book, in the way of intelligent understanding of the drama in action. For its practical purpose the book is quite admirable.

Xenophon's Anabasis. Book III. Edited by E. C. Marchant. With map and twenty-two illustrations. viii. + 96 + xxxi. pp. (Bell.)—Mr. Marchant is a practised editor, but the whole of this series goes on the principle that as much as possible is to be done for the pupil, instead of done by him. Hence the grammatical analysis, with examples taken from the text; hence such notes as "accusative of space travelled over" (p. 86), "ὅδ 'where'" (p. 82), also given in the vocabulary, which are too common. On the other hand, the notes on *ἡλασίων ἰσόλευρον* and other military matters are quite legitimate and to the point. The pictures are interesting, but when they are put in the text in so small a book they make it difficult to attend to the text.

Edited Books.

Chaucer's Prologue. By A. W. Pollard. 161 + lxxiv. pp. (Macmillan.) 2s. 6d.—Mr. Pollard's name is a guarantee for the sound, accurate, and comprehensive scholarship which is displayed in this volume. He tells us that it has taken four years to complete instead of an anticipated four months, but the time has been well spent. Nothing better has appeared on Chaucer for years than the material found in the introduction to this volume. An interest of quite an unusual kind will be aroused by the seventh section of it, which deals with Chaucer's Astrology. The notes are diversified by some woodcuts representing most of Chaucer's principal personages as they were adorned for the world-renowned pilgrimage to Canterbury.

Macaulay's First Essay on William Pitt, Earl of Chatham. By D. Salmon. xx. + 143 pp. (Longmans.) 1s. 6d.—This is a very well-done volume. The introduction is clear and read-

able, though the remarks on Macaulay's much-vaunted style are not quite strong enough in adverse criticism. Perhaps for many a long day to come schoolmasters will tell boys to write short sentences and to study Macaulay. It is a fashion to do so; but it spells ruin to any real mastery of the bewitching rhythms which good English prose can be made to bear. The notes to this volume are singularly good. The portrait of Macaulay is not.

The Golden Treasury of Songs and Lyrics. Book III. By J. H. Fowler. xvii. + 161 pp. (Macmillan.) 2s 6d.—Mr. Fowler continues the useful labour of editing this magnificent anthology in sections, and the selection included in this volume consists of eighteenth-century poetry exclusively. Consequently we have here some of the most absolute classics of the English language. The notes are happy instances of condensed information and exact scholarship.

Adonais. Edited by Susan Cunningham. 125 pp. (The Norland Press.) 1s. 6d.—This is another admirable example of the excellent work Mr. Speight is publishing for the Norland Press. Miss Cunningham's present work is thoroughly good. She calls it a class study in English poetry, and the volume justifies its sub-title. There is an introduction of high educational value, because it opens such a wide field for reading outside this volume; but it is when the "outline study" is examined, and the "study in detail" which follows it, that the author's thorough grasp of her subject becomes manifest, as well as her originality in handling her material. We have looked carefully into her method and can cordially recommend it.

Scott's Ivanhoe. Abridged for Schools. xv. + 273 pp. (Macmillan.) 1s. 6d.—This abridgment has been skilfully done, and the portions omitted are very briefly related in notes at the end of the volume, so that nothing is really lost in the process. The introduction is well adapted to the purpose of this edition, and the illustrations are excellent. The notes are numerous, condensed, and useful.

History.

An Inaugural Lecture. By J. B. Bury. 42 pp. (Cambridge University Press.) 1s. 6d.—To the advantage not only of those who were crowded out of the lecture-room at Cambridge, but of those at a distance as well, the recently appointed Regius Professor of Modern History here prints his inaugural lecture of last January. The main points of the discourse are that history is a science, "neither less nor more," that it is continuous in time, that we are probably only at the beginning of the world's life, and that scientific history includes "all the various manifestations of human brain-power and human emotion." The professor uses these thoughts to urge the usefulness of history both as a training and for practical purposes.

The Tutorial History of England. By C. S. Fearenside. xxiii. + 532 pp. (Clive.) 4s. 6d.—This is a combination into one volume of two previous works of the author, viz., the "Matriculation History of England" and the "Matriculation Modern History," both of which we have previously noted. The combination is complete (the two indexes, *e.g.*, have been combined into one, not merely reprinted one after the other), so that the result is a history of these islands from Roman times to the present day. It is carefully written, with great precision and method, and is all but perfectly up to date in its presentation of facts. Indeed, the only statements which we feel disposed to

call in doubt are the definition of the Domesday Hide (as to which Mr. Round has quite revolutionised previous ideas) and the apparent certainty as to the methods of raising John's ransom (which Sir James Ramsay says are absolutely unknown). The book is abundantly provided with tables, maps, and plans, and the only fault we have to find is an inevitable one—in so short a book, it is impossible to be "delightful."

The Age of Shakespeare. By T. Seccombe and J. W. Allen. (2 vols.) xxix. + 292 + xiii. + 232 pp. (Bell.) 3s. 6d.—Two years ago we welcomed a volume of Mr. Seccombe's on the "Age of Johnson" in this series (Handbooks of English Literature). This reminds us of his previous work. There is the same familiarity with the subject, the same enthusiasm for it, which inspires us with the desire to follow our authors through the whole literature of the period. At the same time there is a moderation in the appreciation of even the greatest of the Elizabethans, and we are glad to see that even specialists in that literature find some of the sonnets wearisome reading. The criticism which Messrs. Seccombe and Allen pass on the Elizabethan drama outside Shakespeare and Jonson goes far towards justifying the Puritan objections to the stage. There is an introduction by Prof. Hales, and the volumes (devoted respectively to the Drama and to non-Dramatical works) are provided with chronological tables and useful indexes.

The Tweeddale History Readers. Book III. viii. + 310 pp. (Oliver and Boyd.) 1s. 6d.—This volume maintains the excellent character of its predecessors, noticed in previous numbers of THE SCHOOL WORLD. It is provided with numerous good illustrations and maps, a list of chief events and genealogical tables. We may repeat here that, dating from Edinburgh, its special feature is attention to the affairs of other parts of the British Isles than England.

Extract from Outlines of English History. By Geo. Carter. 32 pp. (Relfe.) 9d.—Obviously a reprint of part of a previously published book, covering English history from 1216-1495, interleaved for MS. notes, and intended to serve as a manual for examination purposes.

Stories from English History. By A. J. Church. viii. + 679 pp. (Seeley.) 3s. 6d.—To praise Professor Church's "Stories" is by this time impertinent and unnecessary. This is a new edition of his English history stories brought up to the date of King Edward VII.'s coronation. The book does not profess to be a history, and therefore much is omitted. There are many good illustrations.

Hero Stories from American History. By A. F. Blaisdel and F. K. Ball. xii. + 259 pp. (Ginn.) 2s. 6d.—These are fourteen chapters, entirely military or naval, intended for pupils between twelve and fifteen in elementary schools, and chosen from the first fifty years of the history of the United States of America. The chapters are illustrated, and are followed by questions for review, pronunciation of proper names, a bibliography and an index. The whole makes a readable and useful companion to a text-book on "American" history.

Questions on Professor Oman's History of England. By R. H. Bookey. 64 pp. (Arnold.) 1s.—This consists of fifty-six sets of questions corresponding to the several chapters of Oman's History, followed by eight test papers. For the most part, they are just such questions on the book as any intelligent teacher could ask for himself, and many sets end with the old-fashioned, absurd question, "Assign events to the following dates. The test papers are somewhat better, being topical.

Geography.

Globe Geography Readers. Intermediate. By V. T. Murché. vi. + 288 pp. (Macmillan.) 1s. 6d.—A reading-book for children; subject, "Our Island Home." An Uncle Tom instructs two of his nephews, Dick and Harry, in the geography of the United Kingdom. The book has a large number of illustrations, plain and coloured, and is, on the whole, trustworthy. We regret to find that Dick and Harry may claim avuncular authority for the climatic effects of "a very wonderful stream of warm water, which is named the Gulf Stream."

Philips' Atlas of Comparative Geography for Junior Classes. Edited by George Philip. A Series of Forty Plates containing over Ninety Maps and Diagrams, with Eight Pages of Introductory Letterpress and Index. (Philip.) 2s.—This excellent atlas embodies the recommendations of a special advisory committee of the London School Board, and has besides received the approval of the Geographical Association. It should greatly assist the rational teaching of geography. We feel certain that its many excellencies, combined with its reasonable price, will together ensure a wide popularity for the atlas.

The Class-Room Atlas. Edited by E. F. Elton. 48 plates + index. 11 pp. (W. and A. K. Johnston.) 5s.—In many respects this is the most useful atlas, at a moderate price, for secondary schools that we have seen. The climate charts are especially valuable, showing, as they do, the temperature, winds and rainfall for January and July. The vegetation chart is also very good. There are physical maps of each continent and of the British Isles, France, the Alps, India, and New Zealand. These are all very clearly printed, but it seems a pity that there are not more of them. As it is, for the relief of the other countries, the boy will have to turn to the continental maps, which are, of course, on a smaller scale. Clearness is the dominant feature of the political maps; and, throughout, the same colouring is used for a country and its foreign possessions. Another characteristic of these political maps deserves commendation, their up-to-dateness, e.g., the recent boundary settlements in Africa and South America. The last five charts are devoted to classical maps. Teachers on the look-out for an atlas, clearly printed, accurate and useful in practical work, cannot do better than send for a copy of "The Class-room Atlas."

The Web of Empire. By Sir D. M. Wallace. x. + 254 pp. Illustrated. (Macmillan.) 1s. 6d.—An abridged edition for the use of schools, embodying an account of the memorable voyage of the *Ophir*, 1901. It will prove a welcome addition to the numerous "readers" used in schools of all grades, and will doubtless serve its object of "drawing closer the strong ties of affection which bind together the old motherland with her numerous and thriving offspring."

Science and Technology.

Practical Chemistry. By Walter Harris. (3 vols.); 91 + 172 + 146 pp. (Whittaker.) Vol. i., 1s.; vols. ii. and iii., 1s. 6d. each.—These volumes are intended for students in day secondary schools and evening schools. Vol. I. is restricted to 58 experiments on measurement of distances, areas, volumes, density, and relative density. Vol. II. describes 149 experiments on mixtures and compounds (2 experiments), fundamental laws (6), the atmosphere (18), water (16), heat without chemical change (8), heat causing chemical change (4), common substances, (23), metals (14), oxides and bases (13), acids (18), and salts (27). In Vol. III., Part I. describes the qualitative analysis of simple salts and of mixtures, and Part II. describes the simpler determinations in gravimetric and volumetric analysis. The

author states, in the preface, "that the student will not be able to do every experiment, but the teacher will be able to choose those that he wishes his students to perform," but "in the first volume a list of requisites is given for each experiment, and the student is told how to carry out each experiment." "In the second volume the student is expected to make out his own list of requisites, and to devise and sketch the apparatus he proposes to use." "The omission of all illustrations is a new departure. Such illustrations may be classed under two heads: (i.) drawings of permanent apparatus; (ii.) apparatus constructed by students themselves. The book being for laboratory use, the former are unnecessary, while the latter should not be depicted, but the student should devise his own apparatus, and it may even be advisable to allow him to start his experiment with an unsuitable piece of apparatus of his own devising; he will learn much from his own failures." The individual teacher must determine whether these general principles are practicable, though he may agree that they are desirable, since a small class of keen and intelligent students is vastly different from a full class, many members of which lack both these faculties. It is a bold innovation to omit all illustrations from a practical text-book; even the attractiveness of the volumes from which a student works is a quantity which has not yet been proved to be negligible. The volumes afford a thoroughly sound course of instruction, and deserve the attention of teachers.

Electric and Magnetic Circuits. By Ellis H. Crapper. 379 pp. (Arnold.) 10s. 6d.—This forms the introductory volume of a treatise on electrical engineering, subsequent volumes of which will treat of generation, transmission, and distribution of electrical energy. The present volume contains chapters on practical electrical units, electric circuits, principles of distribution, magnetism, magnetic circuits, coil-winding, electro-magnetic induction, types of direct-current dynamos and motors, efficiency, and systems of electrical units. An extensive appendix contains many useful mathematical and physical tables. A great feature of the volume is the large number of actual calculations worked out for the student, and the ample series of examples given at the end of each section. The mathematical treatment is comparatively elementary, although sufficient for a clear explanation. Students in electrical engineering will find the volume to be of great use.

Elementary Botany. By J. Reynolds Green, F.R.S., and F. L. Green. viii. + 191 pp. (Nelson.)—This small volume is full of matter, well arranged, clearly expressed, and thoroughly up to date. It is mainly concerned with flowering plants; but, we are glad to see, contains concise descriptions of a few typical cryptogams—plants the existence of which the beginner is too often allowed to ignore. Abundant instructions for practical work, and several excellent photo-micrographs, are among the features for which the book may be cordially recommended, not only to the class worker, but to the solitary student.

A Laboratory Guide for Beginners in Zoology. By C. M. Weed and R. W. Crossman. xxvi. + 105 pp. (Heath.) 2s. 6d.—Several excellent books on practical zoology are already in existence, but there was distinct room for the present "guide," which is of a much more elementary character than "Huxley and Martin," "Marshall and Hurst," and the allied manuals. A student who works through the course here laid down will gain a sound, though not a detailed, knowledge of many types of animal structure.

The Families of British Flowering Plants. By Mary Simpson. With a preface by Prof. L. C. Miall, F.R.S. 51 pp. (Leeds: Richard Jackson.) 1s. net.—Classification is the *bête noire* of most serious students of botany, and this little book, which

shortly describes the principal natural orders in plain language and in systematic order, supplies a real want. Interesting remarks on special adaptations and mode of life add considerably to its value. It ought to gain a wide circulation.

Mathematics.

Plane Geometry. Adapted to Heuristic Methods of Teaching. By T. Petch. viii. + 112 pp. (Edward Arnold.) 1s. 6d.—An unpretentious, but useful and well-arranged book. The author explains his method of teaching in the preface: the text gives enunciation and complete proofs of the propositions, which include the most useful parts of Euclid I.-IV., VI., with the mensuration of the circle. Attention may be drawn to the remarkably simple proof of Pythagoras' theorem on p. 77. Proportion and mensuration are treated analytically: nothing is said about incommensurables.

A Complete Short Course of Arithmetic: mainly practical. By A. E. Layng. viii. + 220 pp., with answers. (Blackie.) 1s. 6d.—Like the author's other works, this is clearly and simply written: it contains everything that is practically important, but not more, and may be recommended as a thoroughly good book by an experienced teacher. The chapters on fractions, decimals, and proportion are excellent.

Academic Algebra. By W. W. Beman and D. E. Smith. x. + 384 pp. (Ginn.) 5s.—Besides the usual course up to the binomial theorem with an integral exponent, this treatise contains chapters on complex numbers and on logarithms. The examples are very numerous and well graduated: among the problems are several of great historical interest, while others show that even equations may have some bearing on practical affairs. The absence of a chapter on graphs is rather remarkable. The aim of the work is "to cover the subject of elementary algebra with sufficient thoroughness to prepare the student for college:" for this purpose it seems very well suited, and it has the cardinal merit of not suggesting to the student erroneous ideas which he will have to correct afterwards.

Elementary Geometry. By W. M. Baker and A. A. Bourne. xxx. + 474 pp. (Bell.) 4s. 6d.—In its complete form this includes an introductory chapter on experimental geometry, and seven books, the last two of which deal with solid geometry. In dealing with proportion, the authors have adopted the sensible plan of giving the arithmetical theory, valid for commensurables, and also the Euclidean theory. Altogether, this is an interesting contribution to the increasing number of new text-books on geometry, and will probably be found very serviceable. It is not always above criticism: thus (p. xix.), "Fit these triangles together, and discover something. See if this is true for all triangles" (an example in the "experimental geometry"), is a model illustration of the dangers of the heuristic method. No experiment can prove anything for all triangles; to assert the contrary is a pernicious heresy.

Plane and Spherical Trigonometry. By G. A. Wentworth. 2nd revised edition. viii. + 208 + 26 pp. (Ginn.) 4s.—This is a good and practical treatise, distinguished by its really beautiful figures. In spherical trigonometry the right-angled triangle is discussed first, and the formulæ for oblique triangles are deduced afterwards.

Miscellaneous.

The Encyclopædia Britannica. The ninth of the new volumes, Vol. XXXIII. of the complete work. Str—Zwo. xviii. + 945 pp. (Black and The Times).—Like its predecessors, the concluding volume of the new series contains a number of

articles which make a direct appeal to students of education. Among such pedagogic contributions the papers on technical education by Sir Philip Magnus and President Hadley, the appreciation of Thring by Sir Joshua Fitch, Dr. Rashdall's essay on European Universities, and Dr. Gilman's account of the Universities of the United States, may be mentioned. Teachers of geography will find the latest particulars about the countries the names of which fall alphabetically between "Sudan" and "Zululand." The science master is especially well catered for, and we can only name a few of the large number of scientific articles. Telegraphy is discussed by the highest authorities in the respective branches from the point of view of theory, land, submarine, and wireless telegraphy. The telephone and telescope, thermochemistry, the tides, vaporisation, ventilation, electric welding and zoological distribution are other subjects of science included in the volume. There can be little doubt that a distinct improvement in the answers to the general knowledge papers will be noticed in those schools where the "Encyclopædia" has been added to the school reference library, and the boys have been taught and encouraged to consult the new volumes. To learn to know what use to make of reference books is an important part of education and a part which is too often neglected.

Private Schools Association (Incorporated) Hand-book, 1903. Edited by Henry C. Devine. 72 pp. (Published by the Association: 29, Old Queen Street, Westminster.) 1s. net.—The fresh issue of this useful hand-book contains a full account of the general meeting of the association held last January, the report of the council, the memorandum and articles of association, together with lists of branches, sections, and members of the association. It should be useful to all teachers in private schools.

Cassell's Union Jack Series Readers. Book II. 142 pp. 9d.—This reader is on the same plan as the first book, noticed in our April, 1903, issue. The national songs are repeated, and a picture of Queen Alexandra is given as well as a short account of a few of her Majesty's many good deeds. The lessons are interesting and the coloured pictures will delight children.

Three Sermons preached in the Cathedral Church of Christ, Canterbury, on March 29th, 1903, being the Sunday after the Death of the Very Rev. Frederic William Farrar, D.D., F.R.S., Dean. 38 pp. (Longmans.) 2s. net.—These sermons, preached by the Master of Pembroke College, Cambridge, Archdeacon Spooner, and the Master of Trinity College, Cambridge, respectively, will appeal to all who know anything about Farrar's life and work.

Recollections of a Town Boy at Westminster, 1849-1855. By Captain F. Markham. xiv. + 232 pp. (Arnold.) 10s. 6d. net.—Captain Markham's recollections of his school-life as a town boy at Westminster serve admirably to supplement the "Annals of Westminster School" of Mr. Sargeant published a few years ago. In the present book lessons seem to be relegated to the background, and the prominence given to athletics, scrapes, and out-of-school life generally, leads the reader to the conclusion that boys fifty years ago were uncommonly like those of to-day. To past and present Westminsters the book should prove welcome and interesting.

A Descriptive Guide to the Best Fiction, British and American, including Translations from Foreign Languages. By Ernest A. Baker. viii. + 610 pp. (Swan Sonnenschein.) 8s. 6d. net.—The greater part of this book consists of short descriptions of best fiction, ingeniously and helpfully grouped under natural headings. This is followed by a historical appen-

dix, in which historical novels are grouped by countries, and then arranged chronologically; and the whole is concluded by two very full indexes (120 pp.) dealing respectively with "Authors and Titles" and "Subjects." The books described in the early part of the book are first arranged in natural groups—English (nine sub-divisions), Scottish, Irish, Colonial (three sub-divisions), America (two sub-divisions), Belgian, French, German, Italian, &c.—and in each of these groups or their chronological sub-divisions the books selected for description are placed under the authors' names arranged alphabetically. The descriptions themselves are excellently done, considering the immense range of the book: and besides being useful for reference are entertaining in themselves. Altogether, Mr. Baker's industry and enthusiasm deserve the warmest commendation, especially in the first part, where he is a pioneer, and really supplies a felt want. The historical appendix is less meritorious in itself, and is rendered unnecessary by the guides in this department of fiction supplied by Messrs. Bowen and Nield—to both of whom, by the way, Mr. Baker is clearly under very considerable obligations, which he has strangely omitted to acknowledge. It is quaint to find that "the Bert Fiction" includes "The Mystery of a Hansom Cab," but not "The Picture of Dorian Gray."

Philips' Nature-Study Drawing Cards. Flowers, Insects, Birds, Animals. By A. F. Lydon. (Philip.) 1s. per set of 16 cards.—Each card contains an outline drawing of a common plant or animal, or groups of parts for comparison, and a short note upon the chief characters of the object represented. The drawings are apparently intended to be coloured by the pupils, and if used, whenever possible, with the actual object on view at the same time, so that the various parts can be identified, and the colour imitated, the cards should be helpful. In similar cards which have previously been published for kindergarten teaching, hints are given as to the colours which should be used, but it is certainly a better plan to make the pupils try to imitate natural tints if they know how to use a box of paints or crayons. As the scientific name is given of each object, the word "mammals" might have been used instead of "animals" in describing one of the sets of cards. In the case of all the animals, the scale ought to have been roughly indicated; otherwise a child may think an eagle is not much larger than a chick, and that a water vole is nearly as large as an otter, as represented upon the card on which they both appear.

Herbart and the Herbartian Theory of Education. A Criticism. By A. Darroch. xii. + 1-148 pp. (Longmans.)—It would be a pleasant task to recommend this book to friend and foe by wholesale quotation and to fill three columns; and, indeed, we shall quote one or two sentences. The rank and file of teachers are, and will be, for a long time, unaffected by the writings of Herbartians or anti-Herbartians, for the simple reason that they belong to and set up their tabernacle in one of the two camps without knowing it and without any particular interest in the skirmishing. But the real men-at-arms will continue to publish and to say among the trumpets "A-ha," Dr. Hayward, whose little pro-Herbartian book we noticed a short time ago, fighting with the weapons of primitive man and Mr. Darroch preferring the rapier. The present series of lectures, printed as delivered, is destructive and constructive. It is destructive in so far as it denounces "the fundamental fallacy of the emphasis laid on instruction, which, in its turn, is based on the empirical psychology of Herbart"—for which neither our author, nor, we take it, any one else, has much respect. "Instruction is only the initiatory stage," "Self application of principles is required," "the Herbartian doctrine of morality is simply the Socratic doctrine that virtue is knowledge dressed up in a new garb," "Man is Reason," are

a few of the *dicta* which go right to the heart of the question. Indeed, Mr. Darroch's motto might be "you cannot *make*, you must *take* the character." The book is constructive in that it admits the use of much in Herbart's work, the use of concentration, the value of interest, the truth of apperception to a degree; but *in medio tutissimus ibis*. All these valuable hints, for hints they are, will be useless if separated from the teleological aspect. "The unity of life consists in the unity and subordination of the various minor purposes of life to the one ethical purpose." "Unless we can make an effective appeal to the emotional side of the character, our mere instruction will be ineffective." Herbart, says the writer, is popular; he walks the primrose path to—self appreciation. "It is so easy to understand, it imbues the teacher with the idea that his power in the work is almost absolute, and in this way is pleasing to his self-conceit." The religious question, which in its less intelligent forms is so repugnant, so they say, to real teachers who are climbing the mountain, is thus only pushed further back, and when we have done with and forgotten board and voluntary schools, denominationalism and undenominationalism, and a hundred other catch-words of the hour, still on a higher peak in front will be found the highly improved descendants of Mr. Thomas Gradgrind waving defiance at the enemy. Would it be possible, or advisable, frankly to face the question now and admit that there are two kinds of education going on and likely to go on, based on fundamentally different psychological schemes, and raised on views of life, its meaning and "teleological aspect," which are absolutely irreconcilable. "Under which king, Bezonian?"

Heart of Oak Books. Fables and Nursery Tales. Edited by C. E. Norton. 168 pp. (Heath.) 1s. 6d.—Our old friends the Three Bears (by the way, why is not Southey's name attached to it?) Tom Thumb and others, are here along with some well-chosen verses. The feature of the book is the *telling of the stories* by illustrations. When a child has read the text, an excellent recapitulation may be obtained from a "perusal" of these well-drawn pictures. Indeed, a capable teacher might easily get oral composition from pictures. This, we think, is new and worth thinking over.

The Comprehensive Method of Teaching Reading. By Emma K. Gordon. Book I. 102 pp. (Heath.) 1s. 6d.—This little book, with its letter squares, its suggestive sounds, and its combination of work and play, ought to do well with teachers who believe in phonic drill rather than in the old letter, or the newer look-and-say method. How American the book looks. What is an "individual recitation?" or a "chipmunk?" or a "rubber boot?" or a "sled?" and has any English child ever seen a steamship, or a locomotive, or a chestnut, like those depicted here? But we suppose it would be hard to write a book (Frank Stockton could and W. D. Howells can do it) which would contain no single word or idiom strange to either us or our cousins. The book is beautifully printed, as all this firm's books are.

Macmillan's Brushwork Cards. Selected and arranged by F. C. Proctor. Series A, Animals. Series B, Birds, &c. 2s. each.—These are two decidedly good series of advanced brushwork cards. The animals, with a few exceptions, are much better than those generally given as brushwork copies, and the birds are really, on the whole, excellent. Both sets of cards are carefully graduated, and range from fairly simple animal forms to quite advanced work. With examples such as these before them, pupils would have no excuse for producing the slipshod work which we so often see allowed to pass muster as "brushwork."

TEST EXAMINATION PAPERS IN GEOGRAPHY.

Cambridge Locals.

SENIOR.

- (1) Draw an outline map of the West Indies. Name the chief islands and indicate the country to which they respectively belong. Draw the course of the Tropic of Cancer. Mark the positions of the following:—Organos Highlands, Blue Mountains, Nassau, Port au Prince, Port of Spain, Gulf of Paria, St. Pierre, Kingston.
- (2) If the earth were a homogeneous globe, what would be the direction of an isotherm?
How do you account for the irregular course of an isotherm in existing circumstances?
- (3) Describe the river-systems of North America with special reference to effects on human activities.
- (4) Draw a sketch-map of the British Isles showing the distribution of minerals.
- (5) Write a short comparative study of the Atlantic and Pacific oceans.
- (6) Explain the following terms:—Date Line, Divide, Roaring Forties, Doldrums, Prime Meridian, Equinox, Great Circle Sailing.
- (7) State what you know about:—The Chaudière Falls, Sherwood Forest, The Bad Lands, Giant's Causeway, Yellowstone Park.
- (8) What vegetable productions have the United States and the West Indies in common? Explain this fact. How do you account for the existence of the Prairies of the United States?
- (9) Describe the course of the "All-Red" Cable. The New York Stock Exchange opens at 10 a.m. How is it that the opening prices of American stocks are not known in London till about 3 o'clock.
- (10) Draw a political sketch-map of South Africa showing the present position of colonies and "spheres of influence."

JUNIOR.

- (1) On an outline map of North America indicate the distribution of highlands and lowlands; trace the courses of the rivers Mackenzie, St. Lawrence, Mississippi-Missouri, and Colorado; and locate Long Island, Queen Charlotte Island, Great Salt Lake, Great Slave Lake, Montreal, Galveston, Boston, Philadelphia, Chicago, San Francisco.
- (2) Classify the West Indian islands according to the Powers by whom they are governed.
Which group is the least fertile of the West Indies? Why?
- (3) Where are the following and for what are they noteworthy:—New Orleans, Port au Prince, Halifax, Key West, Yellowstone Park, Los Angeles?
- (4) Describe clearly the courses of the following rivers and mention two towns situated on each:—Ohio, Clyde, Severn, Trent.
- (5) Name some parts of the British Isles that are densely populated, and give reasons for this fact in each case.
- (6) Draw a sketch-map of the English Channel, showing the chief harbours and islands: mark the usual steamship routes across the Channel.
- (7) What are the causes of monsoon winds?
- (8) Which ports in the British Isles are engaged in ship-building? What foreign countries buy their ships from us?
- (9) Explain the terms *zenith*, *overland-route*, *atoll*, *isotherm*, *snow-line*.
- (10) Many of the peninsulas of the world have islands at their extremities. Illustrate this fact.

PRELIMINARY.

- (1) On an outline map of Great Britain, between the Humber and the Firth of Forth, trace the courses of the chief rivers, locate the sea-ports, and show the positions of:—Leeds, Lanark, Hexham, Falkirk, Darlington.
- (2) Explain these terms, in connection with rivers:—*right bank*, *source*, *basin*, *estuary*, *bed*.
- (3) Make a sketch-map showing the positions of the chief mountain ranges in Great Britain.
- (4) Where and what are the following:—Himalayas, Titicaca, Vesuvius, Hwang-ho, Constance, Black Forest, Golden Horn, Mackenzie?
- (5) Name countries that produce large quantities of:—wheat, rice, silk, sugar, silver, tin?
- (6) Make a diagram showing the direction and, as accurately as you can, the distance from London of:—New York, Calcutta, Moscow, Madrid, Peking.
Name the countries of which these places are the respective capitals.
- (7) In the case of the following rivers, name (a) the sea into which each flows; (b) the highland in which it rises; (c) its general direction:—Rhine, Amazon, Ganges, Volga.
- (8) Explain the importance of:—Glasgow, Manchester, Birmingham, Aberdeen, Cardiff, Dover, Yarmouth.

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 New Examinations for the Army.

ONCE again the Army Examinations are to be altered, and once again, in all probability, regulations will be issued without consultation with "experts"—with those who have devoted their lives to practical teaching, or with those who have devoted themselves to the theory of education. Were we, masters and educationists, a professional body, like barristers, doctors, or amalgamated engineers, we should long ere this have presented to the War Office, through our governing council, a well-considered scheme for the examination. Even now, some man of light and learning in the modern side of education, some head of an army class in one of our great public schools, might well issue a circular to all engaged in the training of boys for the army and send an epitome of the answers he received to the War Office. Such a circular would naturally consist of a series of questions to be answered, with a space for any suggestions that might occur to the men to whom it was sent. Such an expression of opinion might possibly have some weight with the authorities.

Let us sketch a few of the suggestions that might be offered. In the first place, there can be no doubt that the principle of a distinction between knowledge or "cran" subjects and those which test brain power should be clearly laid down. Again, in the former set of subjects, there is a natural division between those which are directly required for the officer's work in after life and those which are rather necessary as tests of a general education. These three groups may be termed preliminary, intermediate, and decisive.

In the first-named class would come history and geography, reproduction of an easy piece of English prose which has been read out, or the writing of a letter *on facts which are given*, elementary arithmetic and algebra, with possibly such elements

of geometry, as are chiefly memory work. The test of spelling should be rather from the boy's own English than from a formal dictation. In this class no marks should be given, since the subjects lend themselves to "cram;" but a good standard of knowledge should be required. The old "Preliminary Examination" was a failure because this condition was neglected.

The intermediate class might consist of (1) a modern language; (2) elementary science; (3) drawing, geometrical and freehand. In the modern-language examination knowledge should be tested by composition and unseen. Emphasis should be laid on a good vocabulary of an ordinary type—technical expressions being excluded, except possibly those which are military and naval, and in this case notice should be given that a knowledge of these expressions will be required. Within our own knowledge pieces have been given to boys with words which were unintelligible to them, and not unnaturally so, when translated into English. The grammar should be tested by the composition. In this class nothing under half marks should count, but everything above half marks should be doubled, so that a thorough knowledge would pay.

The decisive class is intended to test brain power, and should consist of (1) Latin, unseen and composition only. The unseen should be written for the occasion, since at present it is extracted so exclusively from certain authors that there is a very good chance of the boy having read it. The questions in lieu of Latin verse should be abolished. They lend themselves to "cram"—*experto crede*: a second piece of prose in a different style might be given as an alternative to verse. (2) Mathematics. The style of the papers during the last three years has been such an improvement on the old style that nothing need be said about them. (3) *Précis*. This is a most excellent test of brains. The late Mr. Almond was very strongly in favour of an English essay. He did not seem to realise that, if the subject was within the grasp of the ordinary army candidate, the number of such subjects was so limited that it became a matter of "cram." The reproduction of a *hard* piece of English prose—an argumentative piece of writing—if long enough to exclude simple memory work, with the permission to make notes as the piece was read out, would doubtless be an excellent test. (4) Further questions on the science subject offered in the intermediate class, if such subject could be made a test of brains.

The Report of the Commission on Physical Education of 1885 or 1886 might very well be reconsidered. The difference intellectually, as tested by the examination between the last fifty who are successful and the first hundred who are not is so small that allowance might well be made for physical abilities. In connection with this it would be interesting if some credit could be given to the testimonials of headmasters to those who had been heads of the school or house, prefects or monitors, captains of cricket or football. Positions such as these are tests of whether a boy is likely to manage men well, and the natural enthusiasm of headmasters would be checked by the knowledge that if their prophecies were ill-founded no credit would be given to them afterward.

In conclusion, one may perhaps be allowed to air a fad which has now reached its "majority," for it is of fully twenty-one years' standing. Let the age for the army be fixed from 18-19, so as to give every boy two chances. Let those who have passed provisionally then have six months' leave to go to the country, France, Germany, or Italy, whose language they have offered in their examination, for six months, and at the end of that time let them have a really stiff colloquial examination. If they pass, let them be paid a fair sum for the necessary expenses; but in case of failure, let them go back for another six months, without any payment, and if they fail then they should be disqualified.

TWENTY YEARS AN ARMY-CLASS MASTER.

The Stereoscope in Education.

MAY I be permitted cordially to endorse all that Mr. Daniell has said in favour of the stereoscope as a factor in education? I do not think one can over-estimate the value of placing a stereoscopic view before a class, and asking its members to explain what they see and to deduce facts therefrom.

The modern stereographs are so exceedingly well "got up" that the pupil's interest is at once aroused, whilst some, too, are so beautiful that they would appeal even to the latent artistic taste of the average school-boy. The stereoscope may also be used to correct erroneous impressions, and to convey perfectly accurate ideas. For instance, most school-boys have a very vague idea of the appearance of a desert, but once let them see a stereograph of it, and they will retain a lasting impression of the vast billow-like formation of the sand. One can imagine, too, that a class preparing Kingsley's "The Heroes" would look forward to the lesson with far keener interest if it were illustrated with a dozen or so well chosen stereographs showing the glories of the Greece of the Ancients.

Unfortunately, however, the stereoscope has to live down the reputation of being merely a toy, and not always an entertaining one; but if headmasters and managers of schools will only forget this unhappy reputation, and give the "magic carpet" its fair trial, one feels certain that they will be astounded at the remarkable effects of the stereoscope when used for a purely educational purpose.

In looking at a stereograph one seems to be present at the scene depicted, and a vivid and accurate impression is conveyed to the mind, so vivid and complete, indeed, that not the finest verbal explanation, even aided by photographs, could give so complete and correct an idea.

One cannot help feeling convinced, therefore, that, if headmasters will but introduce the stereoscope into their schools, they will find it an invaluable factor in education, for in the hands of an enthusiastic teacher it can be put to almost limitless uses.

GILBERT J. PASS.

Craufurd College,
Maidenhead.

French Pronunciation.

In two recent numbers of THE SCHOOL WORLD the question of French pronunciation is discussed. With the exception of two points, I am willing to subscribe to everything that has been said. But it seems to me that more should be added, which might be useful to many teachers who are anxious to teach their pupils a really correct pronunciation. The great difficulty of French pronunciation lies, for English people, chiefly in the sounding of the vowels, very few of which are the same in the two languages. The following seem to me the most common mistakes:—

(1) *a* short in *patte*, &c., is obstinately pronounced like the English *a* in *hat* &c., which offends a French ear. There is no English equivalent for this short *a*; but we may say that it can be sounded like the long *a* in *pâte* shortened. Through this shortening the sound becomes naturally clearer, and will closely approximate to the correct pronunciation. This vowel scarcely needs much special practice; constant attention is here, as in other cases, the only thing that can lead to satisfactory results.

(2) With the different *e* sounds the difficulties are greater. English boys will keep on sounding *e*, both the open and short sound, as the diphthong *ei* in *maie*. The French *aile* is by no means pronounced like the English *ale*; there are two differences: first, *ai* (*ei*, *è*, *é*) is a broader sound than is *a* in *ale*; it corresponds to the *ai*, *a*, in *air*, *bare*, &c.; secondly, there is no

intermediate *i* sound between the *a* and the *l*, *i.e.*, the sound is a simple one, not a diphthong.

The pronunciation of *e fermé* is best shown by an English sound which comes *very near* to it—besides, a little exaggeration does no harm. I mean the short *i* in *it is*: *lé* is sounded like *it is* minus the *s*. A proof of this may be seen in the fact that *shilling* is spelt *schelling* in French—*i=é*. In words like *purité*, however, care must be taken that the final *é* is not made too short.

(3) There is only one French *i* sound; English people have a tendency to pronounce it like their short *i* in *animal*, *purity*, &c. In the corresponding French words, *animal*, *purité*, &c., this pronunciation needs to be constantly corrected.

(4) *o fermé* must be absolutely free from the *u* sound, by which it is followed in the English *rose*, *known*, *no*, &c. As to the physiology and phonetics of this sound, it cannot be discussed here; full particulars must be sought in the books.

(5) Though the French *ou* has an equivalent in the English *oo*, not a few boys have some difficulty in producing the proper sound when *ou* stands in certain positions. Here, too, it will suffice never to let the sound pass, unless it is perfectly clear of all admixtures of *o* or *ü*, which it is apt to take.

(6) Young boys can easily acquire the *ü* sound. I explain to them the position of the speaking organs, directing them to press the tongue against the lower incisors and to push the lips forward as in the pronunciation of *ou*. But even after having learnt to pronounce this sound aright, it frequently comes out badly in the word. A little extra practice and much attention will overcome the difficulty.

(7) *eu* offers some difficulties at the outset, for it must not be sounded like the short English *u*. The shortest and surest way to teach its pronunciation is to tell the learner the position of the tongue and lips. *eu ouvert* derives from *e ouvert*. Let this sound be formed; then push the lips forward without altering the position of the teeth and tongue, and the proper sound is produced.

To pronounce *eu fermé* we start from *e fermé*, proceeding as in the case of the open sound. I may add that children are quick to follow these phonetical explanations.

(8) English people learn the pronunciation of nasal sounds easily. I find, however, that our boys often do not open their mouths sufficiently to give *an* its full sound. The teeth should be the breadth of the two first fingers apart.

The consonants, taking them singly, are all pronounced well (with many boys *r* gives some trouble). But it is difficult to keep boys from careless articulation when they come to speak or read a little faster. In words like: *tombe*, *ronde*, *rendent*, *longue*, *mêle*, *profane*, *rompent*, &c., &c., the final consonants get skipped over. It is, however, very important that the *b*, *d*, *g*, *m*, *n*, &c., and especially final *r*, be articulated. *A plus forte raison* should double consonants be clearly sounded: *je nomme*, *il sonne*, *la patte*.

As the question of the *accent tonique*, the only really important thing is to get pupils not to accentuate at all. In a word like *alternative* let each of the four syllables have the same amount of breath: *al-ter-na-tive*. It will be found useful to practice this a little whenever a mistake occurs, in type-words like: *fraternité*, *résolution*, *intéressant*, *retourner*, *géographie*, &c., &c. Paragraph I. in Mr. de V. Payen-Payne's article deserves special attention.

Written explanations on matters of pronunciation are necessarily inadequate; but to those already conversant with the difficulties these remarks may have some interest. I have aimed at mentioning only those points which seem to be sometimes inadequately dealt with.

Clacton College
Clacton-on-Sea.

E. DICK.

Simple Experiments in Electricity and Magnetism.

WILL you allow me to thank your reviewer for his kind remarks about my little book, "A course of Simple Experiments in Electricity and Magnetism," in your last issue. May I add, with regard to his two criticisms, that the student is expected to use the electric mains under supervision; a foot note on the voltage is given, and the student directed particularly to connect with only one terminal, which could do no harm.

If your reviewer will try the experiment for showing the magnetic field round a wire, as I describe it, he will find it a complete success. I have personally performed every experiment described under the conditions named.

A. E. MUNBY.

IN reply to Mr. Munby's letter, I still think that young students should not be allowed to experiment with electric-light terminals. The experiment described is safe if done *under supervision*, but it is the sort of observation which tempts an inquisitive student to repeat it for himself (and perhaps with variations in procedure). Mr. Munby does not mention the variation in the experiment in cases where the three-wire system is used.

With reference to the magnetic field round a wire by iron filings, I have always considered that about fifteen ampères is necessary, and it is worthy of special note that a single voltaic cell will show the effect satisfactorily.

YOUR REVIEWER.

Geometrical Treatment of Angles and Parallels.

MY criticism of Mr. Woodall's proof of Euclid I. 32 does not depend, as he suggests, on sliding motion; I used this modification of his process only to make quite clear

- (i.) What is the complete angle turned through, and
- (ii.) What portion of this angle is the sum $A + B + C$.

The only assumption I made is fundamental, *viz.*:—that a straight line sliding along itself turns through zero angle *from itself*.

Taking, however, Mr. Woodall's process as he gave it—(the italics give my own conclusion at each stage):

(i.) Turn a straight edge, pivoted at B in a triangle A B C through the angle $+ B$ from B C to B A;

Total angle turned through from B C = $+ B$.

(ii.) Pivot at A, turn through $+ A$ from A B to A C; angle turned through from A B = $+ A$; additional angle turned through from B C = $+ C' - B$, where C' is the exterior angle at C.

(iii.) Pivot at C, turn through $+ C$ to C B.

The total angle turned through from B C in the processes (i.), (ii.), (iii.) is two right angles = $B + (C' - B) + C$.

But without assuming an equivalent of the parallel axiom we do not know that $(C' - B)$ is the same as A ; for A was the turning from A B, whereas $(C' - B)$ was the turning from B C. To put the matter kinematically:

"If the straight edge turns through A from A B at uniform angular velocity, we do not know, from the turning definition of angle alone, that it increases uniformly its angle from B C."

In fact, all we know is that a complete¹ turn about BC is effected in the same time as a complete¹ turn about A B. We do not know that a given fraction of a turn is effected in the same time about each line.

Thus we do *not* know that—

$B + A + C = B + (C' - B) + C =$ two right angles.

With regard to the theorem that the exterior angles of a poly-

¹ Or half.

gon are four right angles, I said that the *corresponding* proof (*i.e.* based on the turning definition of an angle *alone*) was vicious. If the proof follows the results of Eucl. I. 27-29, it is quite rigorous. This is probably the case in Casey's and Prof. Minchin's books.

E. BUDDEN.

FROM Mr. Budden's two letters I gather that he holds that, if a straight edge slides along a straight line fixed in a plane, it does not turn through any angle *from itself*, but it may turn through an angle from some other straight line fixed in the same plane. This is surely contrary to common sense. Sliding and turning, whether as operations or conceptions, are entirely discrete. The moving about of the pivot (see p. 164) in no way affects the amount of turning. This is self-evident, and may be as abundantly illustrated from every-day experience as any other axiom. Mr. Budden's "additional angles" are merely ultra-axiomatic abstractions which, if admitted, lead to manifest absurdities. To the beginner who has been well drilled in the relationship between angle and time the long hand of a stop-watch is a natural substitute for my straight edge (in proving this theorem of the triangle); it takes exactly half an hour, by the watch, to turn negatively through the three angles of the triangle; and, incidentally, its angle *increases uniformly*.

Casey (El. of Euclid, 8th ed., p. 299) says: "The discovery of the proposition that 'the sum of the three angles of a triangle is equal to two right angles' is attributed to Pythagoras. Until modern times no proof of it, independent of the theory of parallels, was known. We shall give here two demonstrations, each independent of that theory. These are due to two of the greatest mathematicians of modern times—one, the founder of the Theory of Elliptic Functions; the other, the discoverer of the Calculus of Quaternions."

H. B. WOODALL.

St. Asaph.

A Nature Study Library.

WILL you allow me to make two comments on Mr. Latter's very useful article?

In the first place, the price stated for the geological map—8s. 6d.—is unfortunately correct at present for the London neighbourhood and some other parts of England, for which only the old huge sheets are available; but over a large part of the country the published sheets cost only three shillings, and lately a few have been issued, *colour-printed* at 1s. 6d. All new sheets, issued as the re-survey of the country proceeds, are at one of these two latter prices. In these circumstances, as an eight-and-sixpenny map is sometimes a distinctly antiquated one, it seems doubtful whether it is ever worth while for a nature-student to spend so much on one. There is an excellent series of colour-printed "index maps" published by the Geological Survey at half-a-crown (scale, four miles to an inch), and for nature-study purposes these will often be as useful as the eight-and-sixpenny ones.

In the second place, the nature-student who orders a geological map should be careful to order the "drift" edition, when there is one. If he does not get this edition he may be puzzled to account for the relation of flora to soil. The edition "without drift" will show a certain hill as composed, say, of chalk, but on it he may find no chalk flora, but quite other plants: the "drift" edition will show him that at this point the chalk is covered perhaps by gravel. Unfortunately, the eight-and-sixpenny maps mostly are "without drift," which

is another objection to them. The Index maps also are without drift.

To all nature-students within about thirty miles of London I strongly recommend "Soils and Subsoils," a Geological Survey memoir by H. B. Woodward, price 2s. 6d., including a coloured "drift" map.

A. MORLEY DAVIES.

PRIZE COMPETITION.

Result of No. 19.—Most Popular School Class-Books of General Geography.

THE competition announced last month was not a popular one, for the number of competitors was much smaller than usual. The following six books received the highest number of votes:—

Longman's "School Geography." By G. G. Chisholm. 3s. 6d.

Gill's "Oxford and Cambridge' Geography." 1s.

"School Geography." By J. M. D. Meiklejohn. (Holden.) 4s. 6d.

"School Geography." By J. M. D. Meiklejohn and M. J. C. Meiklejohn. (Holden.) 2s. 6d.

"General Geography." By H. R. Mill. (Macmillan.) 3s. 6d.

"Modern Geography." By W. Hughes. (Philip.) 3s. 6d.

The prizes for the lists which most resembled the final list of books named above have been awarded as follows:—

The first prize to

A. L. Randall,
The High School,
Alderley Edge,
Cheshire;

and the second prize to

Mary Gray,
St. Winifred's,
Seaford,
Sussex.

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

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SIXPENCE.

FIRE PREVENTION IN SCHOOL BUILDINGS.

By FELIX CLAY, B.A.

PART I.—EXISTING BUILDINGS.

THE recent terrible disaster at Eton has brought home to everyone with renewed force the danger to which every building is exposed from fire—in particular, of course, those used for school purposes, and on all sides school authorities are no doubt making efforts to provide against these risks. The chief danger from fire lies in its comparatively rare occurrence, and whenever a serious fire does occur there is at once an outbreak of excitement, accusations of neglect are freely bandied about, innumerable remedies and precautions practicable or impossible are suggested, the papers are full of advice, active steps are taken, fire drills and practices are set on foot; but after a little time, in most cases, things slip gradually back into the old routine, the lessons of the calamity are forgotten, the new apparatus deteriorates, the fire drill enthusiastically carried out while an attractive novelty is abandoned, the staff and the inmates change, and upon the outbreak of a fire the buckets are empty, the hose full of holes, and no one knows where anything is kept or what to do, the first few minutes when the fire could have been easily coped with are lost, and serious damage results.

The present article contains a few suggestions as to the apparatus that ought to be found in every school, and the precautions that must be taken in order to reduce the danger of fire to at all events a remote risk as far as actual loss of life is concerned, but it cannot be too strongly stated that the provision of apparatus is in itself of little use unless occasional practice with it forms part of the regular school routine. These remarks are intended to apply to existing buildings where no provision in the way of hydrants, &c., has been made. It is proposed in a subsequent article to discuss the arrangement and fitting of a new building.

In time of peace prepare for war, and it must be always borne in mind that fire is and as far as can be seen always will be, a possible contingency,

whatever form of construction is used or whatever materials are employed. Nothing can be said to be really fireproof, and, though a building may be constructed of highly refractory materials, there will still be enough combustible matter to suffocate the inmates; and it is in the smoke and gas produced that the real danger to life lies. Prompt and energetic treatment in the early stages of a fire, provided that the few and simple requirements are kept ready to hand, will in nearly all cases be effectual, and, if the building has been properly constructed of slow-burning materials, arranged so that the fire can be confined to the immediate neighbourhood of the outbreak, the damage caused by fire can, in most cases, be reduced to a very small quantity.

With regard to day schools, the problem, as far as actual danger to life is concerned, is simple, and a properly arranged fire-drill carried out at frequent intervals, and tested by an occasional experimental alarm, say once in three months, will practically ensure the safety of those in the building. A few simple rules should be observed: care should be taken to have a clear arrangement as to which classes are to go down each staircase, and the order in which they are to go, the younger children naturally going first; it would be as well that this list should provide for clearing the school in case one or other of the staircases were stopped. The London School Board direct that this order of going out in case of emergency should be hung up in each classroom. Where there are roof playgrounds a special drill should of course be practised. The alarm should be given by the school bell, supplemented if not loud enough by a policeman's whistle. It is as well that the school-keeper should have orders to close at once the gates in case of fire, except in the case of a very small playground, to guard against an inrush of excited parents and others.

It is essential that the alarm should be occasionally rung without the knowledge of anyone in the school, so that teachers and children may be accustomed to a sudden alarm, as the accidents due to panic are the real source of danger, and safety lies in the knowledge and experience that everyone can get out of the building in a few moments.

There is probably no class of building, except perhaps dangerous factories, which is so open to the

risk of fire as a boys' boarding-school. Fire itself has an extraordinary attraction for boys: games are not unknown in which matches play a large part, being flipped ingeniously off the box, so that they fly across the room lighting as they go; waste-paper baskets in studies are set alight, partly as an amusement, partly as an easy means of getting rid of the contents; making cocoa over spirit lamps, illicit smoking, reading by means of concealed candles after lights are supposed to be out, and so on; all serve to emphasise the necessity of providing means for dealing promptly and effectually with small outbreaks of fire.

In boarding-houses means should be taken not only to provide means of escape, but some method of arousing the inmates before their faculties are deadened by smoke must be provided. This is of especial importance in the case where boarders sleep in separate rooms. Automatic fire-alarms are now made in various forms that can be set to a great degree of accuracy; the initial cost of these is not very high, and it does not seem too much to ask that they should be provided. Perhaps the safest precaution of all is a watchman, provided that means are taken to ensure regularity in his rounds, but this could hardly be expected except in large institutions.

As a means of escape from a building when the staircases are cut off there is probably nothing better than the canvas-chute, as made by Messrs. Merryweather; it can be used by anyone, young or old, weak or strong; from ten to twenty can come down it in a minute; it can be easily fitted to any window, is not expensive, and is always ready for use. It is, of course, essential that practice in the use of the chute should take place occasionally; there is little danger in this if precautions are taken to avoid any risk of cutting or slitting the canvas; accidents have resulted from a cut made by a projecting nail in a boot, and it is as well to make a rule that boots should be taken off before using the escape. In use, if there is no one below, the first person goes down checking his pace by projecting his elbows and knees against the sides of the chute. This is far easier to do than it sounds. He then holds the end of the chute for the others, pulling it to one side if fire is issuing from the windows below. It is probably not necessary at the present time to emphasise the danger of having windows barred; every room must have a second means of exit, by the window in case of necessity.

In order to deal with small outbreaks of fire every building should be provided with a sufficient number of small, portable, hand fire-pumps. The best pattern is that carried on the London Fire Brigade engines; these cost only £3 10s., can be operated by one person, and throw a strong jet of water some thirty feet, this gives sufficient force to make the water effective, as the force with which the water is thrown is of far more importance than the amount; it "knocks" the fire out. It is probably not too much to say that about half the fires in London annually are extinguished with these hand-pumps; every fire-engine carries two or

three; the firemen carry them into the house and put out the fire. Each of these pumps, which should be distributed about the house in convenient and accessible positions, should have three or more buckets hung by it, so that while one person operates the pump others keep filling it up with the buckets. The pump should be worked with short, sharp strokes, and kept about three parts full; the water in it and the buckets should be changed once a week.

These water hand-pumps are, on the whole, much to be preferred to any of the many forms of portable chemical pumps. The chemical engines have undoubtedly been very successful in putting out small fires, especially in trained hands, but it is hardly safe to rely upon them; they cost some shillings to charge, so that they are not likely to be used for practice; servants are often afraid of them; they are useless if they fail to put the fire out straight off; the chemicals do a considerable amount of unnecessary damage in the case of a very small fire. If unused for any length of time they are likely to corrode and get out of order; and finally, the result is hardly more effective than a jet of plain water thrown with force from a plain water-pump, which can be filled as fast as it is used. Their chief use is to throw a jet of liquid without any manual power being required; but this is more than counter-balanced by the difficulty of bringing them into action and the necessity of a supply of chemicals to recharge them, which would be an awkward matter to do in the excitement of a fire, even if the necessary ingredients were ready at hand.

It is suggested that the following apparatus should be kept ready in easily accessible positions in every building:—One or more portable force-pumps, according to the size of the house and the number of inmates; cost £3 10s.; extra length of pipe to each, £1. Three or more buckets always kept full of water by each pump. One canvas chute for each dormitory, or, at all events, to each floor; cost, from £7 to £10 according to height of floor. In addition to these there should be kept in a convenient spot a hatchet, to break open a door, or to get at a fire under the floor; a long-handled hook to pull down burning curtains, &c.; a thick blanket, and some lengths of rope. A light ladder to get to the roof should be kept on the upper floor if there is no other access.

The really important points are frequent practice, and regular trial and inspection of the apparatus. In the case of high buildings, where there are large numbers of inmates and an insufficient supply of staircases, it may be necessary to put up outside iron-staircases, either leading directly to the ground or, in some cases, to a neighbouring roof whence the ground can be easily reached. The arrangement of these naturally depends entirely on the nature of the particular building. It should be remembered that, when a fire does break out, the doors and windows should be as far as possible kept shut, in order to cut off the supply of air.

As so many fires arise from causes that a little

care and foresight would prevent, it may be of use to suggest a few of the more common ways in which they are caused.

If the school is in a very old building there are certain points that should be carefully looked to:—
 Defective flues: this is particularly the case if wood has been used for fuel at any time, owing to the corrosive action upon the mortar by the pyro-ligneous acid formed; timber built into flues, or used to support the hearth stones. Wood becomes highly inflammable if allowed to remain in contact with hot brick-work or pipes for any length of time, owing to the facility with which it absorbs oxygen as soon as it becomes a little charred. Exposed timber on a roof is a great source of danger; snow boards will often accumulate soot and sooner or later a spark may fall upon it. Fires are often caused by the sun's ray focused by means of some glass instrument, or a bottle of water standing in the window. There are, of course, all the dangers connected with carelessness on the part of servants and others, with lamps, candles, matches, drying linen, putting away kitchen utensils with fire still adhering to them, raking out fires at night, &c. Schools have, of course, in addition to all the ordinary risks those due to the character of their inmates as suggested above, and no school can be considered properly equipped or well managed that does not provide the necessary apparatus for protection in case of fire, and insist upon regular practice in its use.

LITERATURE FOR LEISURE HOURS.

By ERNEST A. BAKER, M.A.

"I HAVE learnt as much," says one of George Meredith's noblest characters, "from light literature as from heavy—as much, that is, from the pictures of our human blood in motion as from the clever assortment of our forefatherly heaps of bones. Shun those who cry out against fiction, and have no taste for elegant writing. Not to have a sympathy with the playful mind is not to have a mind." Good fiction is a pleasure and a recreation, and also something more excellent. There are novels—we are inundated with them—to read which is a kind of intellectual debauchery, an indulgence in a species of hypnotism, a round of nervous shocks. Intelligent people do, I believe, read this sort with avidity, but it is bad for their intelligence. On the other hand, there is the "noble fiction" which Meredith exalts, and of which he has written so many admirable examples. Such work as this deserves careful study, but it demands, in the first place, careful selection from the mass of contemporary writing. Since George Meredith and Thomas Hardy left off writing prose, there has not been much of this greatest fiction written, but there has been a good deal of a like kind. The object of this paper is to help those who have not

time to keep abreast of the reviews to find out some of the finer examples of imaginative literature that have been published during the last twelve months or so. Historical fiction, being dealt with elsewhere, is for the time being left almost entirely out of account, although some of the best English and American novels of the last year or two belong to that category.

One of the most characteristic and peculiar literary forms of the latter part of the nineteenth century was the country novel. Thomas Hardy was the writer who gave it such immense vogue, and it will be appropriate to lead off with three novelists who are not only his successors in a literary sense, but have also chosen to cultivate the same part of England as he selected for himself and re-named "Wessex." Mr. Eden Phillpotts is a singularly close imitator of Thomas Hardy, and out of his ten or twelve volumes he has produced three, "Children of the Mist," "The Striking Hours" (Methuen, 6s. each), and a recent novel that comes within our purview, "The River" (Methuen, 6s.), which may stand on the same shelf as the works of his master. "The River" is a story of life in the presence of Nature, the central character, Nicholas Edgecumbe the keeper, living in the wilderness near the headwaters of the Dart, a man whose "books are running brooks," save that he is a profound student of the Bible. The story of his outraged love for Hannah, and the events that lead him at last to choose the worthier Mary, is very dramatic; but it is the man's deep and strong character that leaves an indelible impression on the mind. "Zack" has within the last week or two published three stories of the Wessex country, under the title of "The Roman Road" (Constable, 6s.). Her first book, "Life is Life," published in 1898, had something of the intense life and passion of the Elizabethans. Her stories have always been dramas of the soul, representations of a moral crisis, and the like. Such are the present three, in which she has cultivated a parsimony of phrase, of description, of narrative, that demands of the reader a certain measure of thought and imagination. They have the abstract, riddling manner of the apologue, and readers will differ, probably, as to their final significance. In "The Balance," for example, there are three principal figures, a decadent novelist, who is a mere wreck morally, his loyal friend, and a girl whom both love. Attention is focused on the soul of Richard East, the novelist. What interests at first is the struggle in his soul between the physical attraction of this beautiful girl and loyalty to his friend. But the deeper lesson is that in such a mind as his woman may be the ruin both of the man and of the genius. In the title-story, Roland, inheriting Groot—the wherewithal to pay his debts—learns that he is illegitimate; shall he keep silence, or deliver the property over to the rightful heir? The foolish, guilty soul of the mother is, however, the absorbing object to the connoisseur of character. There are phrases in "Zack's" stories that seem to snatch away a bandage, to scorch the

sight with their sudden baring of truths that are wont to lie hidden. "Orme Agnus," another cultivator of Wessex soil, is a much less strenuous thinker. "Zike Mouldom" (Ward, Lock & Co., 6s.), and "Sarah Tuldon" (Ward, Lock & Co., 6s.), are pleasant and entertaining pictures of the rustic, though not without a definite moral intent. Sarah is a shrewd and strong-willed village girl, who subjugates her lazy and slatternly parents, makes the whole family clean and industrious, and marrying a rich farmer, becomes queen of the village, and carries out a general crusade against ignorance, filth and neglect. Her story is full of broad comedy, and the rustic types are true to life. Zike, according to the author, represents the angel that is to be found, side by side with the demon, in the nature of a Lancashire navvy. His is a character prone to extremes, a powerful will that riots in sheer devilry, or is capable of the utmost self-sacrifice. The author's optimism is perhaps of a too comfortable sort, yet the difficulties are met with manifest seriousness.

It is not difficult to discern the influence of Thomas Hardy in the highly cultivated feeling for nature that pervades "Love with Honour" (Lane, 6s.), Mr. Charles Marriott's last book. "The Column" (Lane, 6s.) was remarkable for its exaggerations of Mr. Meredith's style. This is not so far-fetched in subject or in manner. It is a curious problem in the moral casuistry of love—a girl having to choose between a splendid inheritance, to which her claim is legally indisputable, but morally invalid, and honour with the man who loves her. The characters are of a more ordinary stamp, yet with peculiar veins of interest to the critic of life—the hero, a young man who has read "Lavengro," Carlyle, and Whitman, and burns to put their gospel into action; the heroine, a girl of lofty and delicate principles of conduct; a fine old martinet; an æsthetic villager; and so on—characters that touch comedy and tragedy. The scene is a beautiful village in Gloucestershire.

"The Squireen" (Methuen, 6s.), by Shan F. Bullock, author of "Irish Pastorals," is an Irish story. It records the brief wedded life of a loving, sensitive, patient woman and a masterful, egotistic man, a gentleman farmer in Donegal, where there is a colony of Presbyterians, whose harsh, inflexible natures remind one of the stiff-necked people in the New England novels of Miss Wilkins. The subject is not alluring, but the book is an honest and sympathetic portrayal of the faults of character and the imperceptible steps that lead irrevocably to happiness or unhappiness.

Mrs. Humphry Ward has forsaken the sociological novel for the novel of manners. "Lady Rose's Daughter" (Smith, Elder, 6s.) is based on the famous story of Madame du Deffand and Mademoiselle de Lespinasse (see the recently published memoirs of the latter, and Sainte Beuve's "Causeries du Lundi"). The *dénouement* has been altered, but the main lines of the novel correspond. Among the portraits we are probably right in recognising several soldiers, statesmen, and other celebrities of recent times.

Frank Norris, author of that strong, Zolabesque novel of San Francisco, "McTeague," has been cut off prematurely, leaving his great sociological epic half finished. "The Octopus" (Richards, 6s.) dealt with the incessant conflict between the Californian wheat-growers and the great Railway Trust that has this food traffic in its grip. "The Pit" (Richards, 6s.) is a similar study of the elemental maladies that threaten human organisation with ruin. Its subject is the Chicago Wheat Pit. A quieter study of actual conditions, it is just as tragic and prophetic in its denunciation of greed. Mr. H. G. Wells, in his latest fiction, touches upon actual life in a merrier spirit, reserving his weightier disquisitions for the pages of the *Fortnightly*. In the "Sea Lady" (Methuen, 6s.), the visitant from the "Great Outside," who turns mundane things topsy-turvy, with absurd consequences, is a mermaid who comes ashore promisingly among a bathing party at a watering-place. The comedy has its graver side in the criticism of our common and ignoble ideals from a far other point of view. George Gissing is another serious critic of our times. In "Our Friend the Charlatan" (Chapman, 6s.), he studied a decadent type of modern character, the clever, but weak and conscienceless young man, product of advanced education, whose defects come to light in the stress of events. The analysis is searching; the comedy is of the kind that makes you think how unpleasant everything is, every one in turn being placed in the most embarrassing situation imaginable.

Mr. Gissing's "Private Papers of Henry Ryecroft" (Constable, 6s.) belongs to the same literary class as the "Autocrat of the Breakfast Table." Ryecroft, one cannot doubt, is more or less autobiographical, not as to the facts of his life, but as to the interpretation of his mind. He is a retired literary man, who keeps a journal of his meditations. Authorship, the struggles of his past life, old age and death, the hereafter, walking, reading, favourite authors, the country, flowers, birds, inns, the conduct of life, these are among the multifarious subjects which are talked about with an arresting frankness and a pleasant lack of order. The author is more persistently grave than Dr. Holmes, he has none of that ebullient humour, and, on the other hand, little of that profound originality—it is a refined and thoughtful common-sense.

Turn now to novels with a stronger tincture of romance. Mr. A. E. W. Mason's "The Four Feathers" (Smith, Elder, 6s.) is curiously similar in theme to Mr. Conrad's "Lord Jim." It is at once a study of the stern, moral ordeals by which high character is forged and tempered, and an exciting narrative of action and adventure. The feathers mean cowardice. Harry Feversham, son of a line of warriors, though really brave in the highest sense, has dreadful misgivings that he will fail at the moment of trial. This error of his involves himself, his betrothed, and his best friend, in a long succession of troubles; but he atones for it nobly. The unravelling of the mystery by Durrance,

whom blindness has made preternaturally acute, has some of the intellectual zest of the detective novel. In a grisly fashion, the scenes of captivity and escape at Omdurman are most impressive. "The Star Dreamer," by Agnes and Egerton Castle (Constable, 6s.), is not so serious a piece of work as this, but it has much charm. The Star Dreamer is a young baronet whose heart has been turned to gall by a love crime. He shuts himself up in his tower and studies the stars. Into this lonely life comes the daughter of his kinsman, an old alchemist and collector of simples. They love, but almost insuperable obstacles confront them. The characters are quaint, their surroundings full of glamour, and the style is quite in tune therewith. The scene is a weird old manor-house in Wilts, a century ago. A romance of our own time, with very different claims to interest, is "The Vultures," by Henry Seton Merriman (Smith, Elder, 6s.). A plot of Russian Nihilists and insurgent Poles furnishes the action, and Warsaw the principal scene. The Russian Merejkowski planned a trilogy of historical novels on a grandiose scale, and called it "Christ and Anti-Christ," the general theme being the eternal struggle between Christian renunciation and pagan lust of life, or, as he puts it, between the Man-God and the God-man. In I. "The Death of the Gods" (Constable, 6s.), he depicts, in a magnificent series of tableaux, the wars and schisms and persecutions of Julian the Apostate's reign. In II. "The Forerunner" (Constable, 6s.), he gives us the Renaissance and the career of Benvenuto Cellini. This is the Resurrection of the Gods, and the next and final act will be "Anti-Christ," with Peter the Great as protagonist.

Short stories are very abundant nowadays, but how many of them are anything but indifferent? It is certain that, whatever Mr. Conrad's final place may be in the literary hierarchy, his short stories will stand among his strongest claims to rank. "Youth" (Blackwood, 6s.) and "Typhoon" (Heinemann, 6s.) are both recent collections. In "Youth," an officer in the mercantile marine, a man of imagination who looks at the real significance of the things he recounts, regards them as histories of men's souls, relates three stories to his friends. "Youth" is from his own life, the story of his voyage to the East in a coffin ship, a long-sustained struggle with the sea, with accidents in port, and with a burning cargo, a story steeped in the glamour of youth and the glainour of the sea. "Heart of Darkness" interprets in the same imaginative fashion the unutterable gloom and strangeness and isolation of a European's life among African savages. "Typhoon" would sustain comparison with the masterly descriptions of storms in the Indian Ocean by that exquisite impressionist, Pierre Loti, in "Mon Frère Yvès."

Mr. W. H. Hudson, who has recently published a delightful account of wild nature in the New Forest, under the title, "Hampshire Days," a book that deserves to be shelved alongside White's "Selborne," is the author of "El Ombu" (Duckworth, paper 1s. 6d., cloth 2s.), imaginative

stories of South America. El Ombu is a deserted house on the Pampas, with which a terrible history of crime and calamity is associated. Stern, vengeful men, men with devil in them, who seem to have grown akin to the aboriginal savages; fierce deeds never repented of; and a state of society where might is right—these characteristics of life there less than a hundred years ago are rendered powerfully and convincingly in this and the three other tales. The gloomy story of Marta Riquelme, driven mad by the cruelties of the Indians and of a heartless husband, persuades the Jesuit priest who relates it that malignant spirits exist in that unhappy region, warring against God and righteousness.

Forsaking the realism that made him famous, Mr. George Moore has thrown in his lot with the new Irish movement. "The Untilled Field" (Unwin, 6s.) has national importance as a deep-sighted study of the present state of the Irish. In every story there is a broad hint of the author's message to his people—his warnings against emigration that depopulates the land, and against ecclesiasticism killing the joy of life. "Julia Cahill's Curse," "A Play-house in the Waste," and "The Wild Goose," are forcible arguments as well as dramatic stories. The last is a wise and tender story of a marriage between two patriots who differ about religion. The other long stories, "Some Parishioners," and "The Wedding Gown," tap the deep vein of poetry and mysticism that is in the humblest Gaelic peasant. The authors of "The Pride of Jennico," K. and Hesketh Pritchard, mother and son, have in "Roving Hearts" (Elder, 6s.) produced a number of delicate and thoroughly artistic tales on all manner of subjects, and with scenery from all quarters of the globe. An admirable example of their humour is "The Flying Squadron," an absurd story of that absurd island, Hayti. The Black Republic commandeers a navy of one old steamer, and declares war upon Europe. "The Undersong" (Constable, 6s.), Australian bush-tales by H. C. MacIlwaine; Mr. R. Nisbet Bain's "Tales from Gorky" (Jarrod, 6s.), a sheaf of masterpieces from that portentous Russian who has for awhile eclipsed Tolstoy and Turgenef in popularity; Mr. Israel Zangwill's "The Grey Wig" (Heinemann, 6s.), are all worthy of thoughtful reading. And I would there were space enough to call attention to the most admirable series of translations from foreign writers, old and new, that have been among the most encouraging literary phenomena of the last few years.

It would seem better that reading matter should be continuous in scope and interest than that it should consist of short disconnected fragments of anecdote and description. Picturesque and graphic readings from history, rather in the "historical-novel" style than that of the conventional history-book, geographical readings, narratives of discovery and adventure, of travel and commerce, the fairy tales of science, systematised into a series, might not only have the advantage of connectedness, but would also go far to justify the giving up of more time than has been usual to the threshold-stage of English teaching.—A. S. Way.

SOME HOLIDAY READING IN FICTION.

ILLUSTRATING THE HISTORY OF THE BRITISH EMPIRE, 1763-1878.

By C. S. FEARENSIDE, M.A.

SOME months ago I was permitted to give in these pages a few hints on serious reading on the history of the British Empire, 1763-1878; and it has since occurred to me that a list of some of the works of fiction illustrating the same subject might be of use to teachers and pupils who are thinking of books for the holidays. My list will be neither select nor exhaustive, for if I set down only such works as I know to be good, I should doubtless omit many books combining value with interest; and a complete list, even had I the materials to compose one, would be rather overwhelming than helpful. I merely jot down books which I either know or know of, in the hope that either the subject-matter or the author may attract some readers who like to make their leisure-hour reading illustrate their studies. And it happens just now that the Cambridge Local Syllabus and political discussion alike are concerned with the rise of the modern British Empire.

Though the headline contains the term "history," it will be better to adopt a geographical than a chronological system of arrangement; and I hope that this method of grouping may provide an occasional hint for a geography lesson. Probably common knowledge or a hasty inspection of the books themselves will in most cases enable teachers to distinguish between books for "juvenile" reading and those which are best reserved for adult consumption.

(i.) THE OLDER BRITISH COLONIES IN NORTH AMERICA.—Here we are practically limited to the "American Revolution." This is one of the favourite fields of the worker in historical fiction; and I think it will be better to select a few books of repute rather than give a string of sixty or seventy titles. There are several such books, e.g., R. W. Chambers, "Cardigan"; Winston Churchill, "Richard Carvel"; P. L. Ford, "Janice Meredith"; and R. N. Stephens, "Philip Winwood"—which roam widely over time and space; but some are practically restricted to one or other of the very distinct phases or theatres of the struggle.

(1) *Beginning of the Struggles in the North*: Fenimore Cooper, "Lionel Lincoln, or the Leaguer of Boston" (1775); in the South, J. Esten Cooke, "Henry St. John" (Virginia, 1774-5).

(2) *Hudson Valley and Burgoyne Campaign*: Harold Frederic, "In the Valley" (often considered one of the best historical novels ever written); D. P. Thompson, "The Green Mountain Boys"; and E. F. Pollard, "Green Mountain Boys" (a familiar name for the men of Vermont, who did so much to ensure Burgoyne's surrender).

(3) *Paul Jones*: Fenimore Cooper, "The Pilot";

Sarah O. Jewett, "The Tory Lover." (Paul Jones also figures in "Richard Carvel" and many other books.)

(4) *The War in the West* (the campaigns of G. R. Clarke, which practically cut off the region south of the Great Lakes from Canada): D. P. Thompson, "The Rangers"; Maurice Thompson, "Alice of Old Vincennes."

(5) *The André Episode*, 1780: Fenimore Cooper, "The Spy"; Mary A. M. Hoppus, "A Great Treason."

(6) *The Tories*: Ogden, "A Loyal Little Red Coat"; G. A. Henty, "True to the Old Flag." [I do not know of any books that deal in detail with the migration of "United Empire Loyalists" to the St. Lawrence colonies.]

(7) *The Warfare in the South*: J. P. Kennedy, "Horseshoe Robinson"; W. G. Simms, "The Partisan," "Mellichampe," "Katherine Walton," "The Scout," "Woodcraft," "The Forayers," "Eutaw." [These books were nearly all written during the first half of the nineteenth century by southern writers living amidst the living memories of the bitterness of the southern conflict.]

(ii.) BRITISH NORTH AMERICA AFTER 1783 seems to have been rather neglected by writers of fiction, but at least three notable aspects of life can be adequately illustrated from novels.

(1) *The Relations between British and French*, especially in Canada proper. Sir Gilbert Parker deals with the early part of the nineteenth century in "When Valmond came to Pontiac," and "The Pomp of the Lavillettes," and with various undefined periods in the stories contained in "The Lane that had no Turning," and "The Right of Way." T. C. Haliburton, "The Old Judge," introduces various episodes, mostly humorous, of life in Nova Scotia during the Rebellion of 1837-8; and the Fenian scare of 1866 forms the background of Robert Barr, "In the Midst of Alarms."

(2) *Fur-Trading in North-West and North-East* is illustrated in Agnes C. Lant, "Lords of the North" (c. 1800); in R. M. Ballantyne, "Ungava" and "The Red Man's Revenge" (Red River Expedition, 1870); and in many of the short stories by which Sir Gilbert Parker made his reputation: e.g., "Pierre and his People" and "An Adventurer of the North." [The colonisation of the North-West, which was only just beginning at the end of the period, is dealt with in various works described in Mr. E. A. Baker's "Guide to the Best Fiction."]

(3) *Cod-Fishing* off the Great Banks of Newfoundland is admirably depicted in Rudyard Kipling, "Captains Courageous" (though the principal characters are citizens of the United States, not British subjects).

(iii.) THE WEST INDIES, during the Great War, are the scene of numerous episodes in Captain Marryat's novels and of Michael Scott's classic tales, "Tom Cringle's Log" and "The Cruise of the Midge." The negro problem is illustrated in Harriet Martineau, "The Hour and the Man" (Toussaint L'Ouverture in Haiti); in Noël de Montagnac, "Negro Nobodies" (Jamaica); and in

James Rodway, "In Guiana Wilds" (British Guiana).

(iv.) THE EAST INDIES.—The old style of sailing voyage home from India round the Cape is wonderfully described in Joseph Conrad, "The Nigger of the Narcissus"; and notable "half-way houses" to India appear in James Grant, "Frank Hilton" (Aden), and Sir Walter Besant, "My Little Girl" (Mauritius). Works of fiction descriptive of life in the East itself may be divided into our main groups.

(1) *The Establishment of British Paramountcy*, 1780-1820, is treated in Sir Walter Scott, "The Surgeon's Daughter" (1780); in Meadows Taylor, "Tippoo Sulstaun"; and G. A. Henty, "The Tiger of Mysore" (1789-99); in Herbert Compton, "A Free Lance in a Far Land"; in an anonymous work entitled "Pandurang Hari," and in G. A. Henty, "At the Point of the Bayonet" (Mahrattas).

(2) *Frontier Wars and Problems* may be broken up into the following divisions:—

(a) *Burmese Wars*: G. A. Henty, "On the Irawaddy" (1824-6); S. K. Levett-Yeats, "A Galahad of the Creeks" (Mr. Kipling's ballad, "Mandalay," is memorable in this connexion). Some of the stories of Hugh Clifford and Joseph Conrad take us further east, into the Malay Peninsula and Malaysia respectively.

(b) *Afghan Wars*: G. A. Henty, "To Herat and Cabul" (1836-8) and "For Name and Fame" (1877-8); Sir H. M. Durand, "Helen Trevelyan" is based on a first-hand knowledge of the War of 1878-9, which is also treated in James Grant, "The Duke of Albany's Highlanders."

(c) *Sikh Wars*: John Lang, "The Wetherbys," and W. D. Arnold, "Oakfield," were both written immediately after the wars; G. A. Henty, "Through the Sikh War," is a later compilation.

(d) *The Conditions of Frontier Defence* are depicted with marked insight in four connected books by Sydney Grier, "His Excellency's English Governor," "Peace with Honour," "The Warden of the Marches," and "The Advanced Guard." There are various frontier sketches in "On the Edges of Empire," by E. Jepson and D. Beames.

(3) *The Indian Mutiny* is treated in over a score of novels, of which the best are reputed to be Sir George Chesney, "The Dilemma"; R. E. Forrest, "Eight Days," and F. A. Steel, "On the Face of the Waters." Mr. Baker gives the titles of fifteen others.

(4) *The Conditions of Modern Anglo-Indian Life* provide the subject-matter of numerous stories, long and short, by Mr. Kipling, Mrs. Steel, and Mrs. E. Cotes. One of the more typical and comprehensive of these books is F. A. Steel's, "The Potter's Thumb." There are capital short sketches in Phil Robinson, "In My Indian Garden," and Eha "Tribes on my Frontier." Somewhat earlier phases of life are depicted in H. B. Rowney, "The Young Zemindar"; Sir W. W. Hunter, "The Old Missionary"; Meadows Taylor, "The Confessions of a Thug"; Sir H. S. Cunningham,

"The Chronicles of Dustypore," and Alex. Allardyce, "The City of Sunshine."

(v) SOUTH AFRICA.—The Kaffir wars about the time of the Great Trek are handled in Rider Haggard, "Swallow," in Anna Howarth, "Sword and Assegai," and Bertram Mitford, "The Induna's Wife." The relations between British, Boers, and natives during the 'seventies are illustrated by Mrs. Carey Hobson, "The Farm in the Karoo"; Olive Schreiner, "The Story of an African Farm"; and Rider Haggard, "Jess." The Zulu and Transvaal wars beginning about 1878 (and therefore falling outside our period) form the subject of many works by Bertram Mitford and others: of these Mr. Baker gives an extensive list.

(vi) AUSTRALASIA AND OCEANIA.—Mr. Baker (pp. 247-254) gives the titles of nearly one hundred works of fiction, mostly written by Australians, dealing with life in these regions. From these and other books the following may be exhibited as illustrative of different districts and phases of life.

(1) *Early Days in New South Wales*: G. L. Becke and Walter Jeffery, "A First Fleet Family"; Herbert Compton, "The Inimitable Mrs. Massingham"; G. M. Fenn, "This Man's Wife"; E. W. Hornung, "The Rogue's March."

(2) *Tasmania*: Marcus Clarke, "For the Term of His Natural Life." (The classic novel of convict life.)

(3) *Victoria* (Port Phillip District): James Mouat, "The Rise of the Australian Wool Kings"; Rolf Boldrewood, "Nevermore"; B. L. Farjeon, "Grif"; W. T. Walker, "Native Born"; R. L. Outhwaite and C. H. Chomley, "The Burden of Erin." The last four deal with the gold rush to the Melbourne District in the 'fifties.

(4) *New Zealand*: G. A. Henty, "Maori and Settler"; H. B. Marriott-Watson, "The Web of the Spider"; and Rolf Boldrewood, "Tanata Maori" (Maori wars in the 'sixties); A. A. Grace, "Tales of a Dying Race."

(5) *Queensland*: H. C. MacIlwaine, "Dinkinbar," "The White Stone" and "Fate the Fiddler"; Hume Nisbet, "Bail Up!" and "In Sheep's Clothing"; G. Firth Scott, "Colonial Born."

(6) *Bush Life and Bushrangers* in general form the staple of many books by Rolf Boldrewood (e.g., "Robbery under Arms"), Mrs. Campbell Praed (e.g., "The Head Station"), and Henry Lawton (e.g., "When the Billy Boils"). The same subject appears in such older works as Charles Reade, "It is Never Too Late to Mend," and Henry Kingsley, "Geoffrey Hamlyn" and "The Hillyars and the Burtons."

(7) *The South Seas*: Price Waring treats of convict life on Norfolk Island in "Tales of Australian Early Days" and "Tales of the Isle of Death." G. L. Becke and Walter Jeffery collaborate in "The Mutineer" to tell the story of the Mutiny of the *Bounty*; and the former writer has used the relations of trader, missionary and native for many dramatic little stories contained in "By Reef and Palm," "The Ebbing of the Tide," and "Rodman the Boatsteerer." The same subjects

appear in Herman Melville, "Typee," "Ornoo," and "Moby Dick" (all written in the 'forties); in "Island Nights' Entertainment," by R. L. Stevenson, and in "The Ebb Tide," by Stevenson and Lloyd Osborne. The charm of the Pacific and the troubles of a "Remittance Man" in Sydney form two of the varied ingredients in the same writers' delectable farrago entitled "The Wrecker."

PHOTOGRAPHY WITH A PIN-HOLE AND WITH A TELEPHOTO LENS.

By E. SENIOR,

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WITH the advent of summer weather and the near approach of the holiday season, enthusiastic amateur photographers will be turning their attention to the question of fresh subjects for the camera and methods more or less novel in their application for obtaining the results. It is in connection with the latter that the employment of a plain aperture—a so-called pin-hole—in place of a lens might well claim attention, and although the definition obtained by its use does not compare with that given by a high-class lens, the results are by no means blurred and fuzzy. As in nature we do not find that uncompromising sharpness which so many photographs exhibit, a good photograph taken with a plain aperture would probably give a more artistic representation of the scene depicted, from possessing the qualities termed by artists "atmosphere," "breadth of effect," &c.

One great drawback to the employment of a plain aperture instead of a lens is that snap-shot work and moving objects cannot be taken by its means; in fact, only in still-life subjects is its application possible. The advantages attending the use of plain apertures are: the ready adaptability to the production of images of various sizes by the simple shifting of the plate further from, or nearer to, the aperture, the sharpness of the image practically remaining the same, the only alteration being in the size of image formed and the amount of subject included; whereas a lens will only form a sharp image when at one particular distance from the plate, depending upon the distance of the objects away, and, consequently, the scale of size of objects is fixed.

Moreover, in photographing buildings or objects having straight lines, the image will be absolutely rectilinear, straight lines in the subject coming out straight in the negative. As much or little as desired can thus be included in the photograph by simply placing the plate nearer or further from the aperture, the amount of subject, or "angle of view," depending upon the relation between the length of plate and its distance from the aperture.

The principal disadvantages attending the use of so-called pin-hole cameras are the length of exposure required and the want of sufficient sharpness for many purposes. From the foregoing

remarks it may be inferred that the image will be equally sharp whatever be the distance between aperture and screen or sensitive plate. Theoretically, however, such is not the case. By reducing the size of the aperture the definition may be increased up to a certain point; but beyond this, "depending upon the distance of image and object respectively from the aperture," the sharpness of the image would decrease, a result explainable on the wave theory of light.

It thus appears that, in order to obtain the sharpest possible result, the size of the aperture must bear a fixed relationship to its distance from the plate, and this is dependent upon the wave length of the light employed in taking the negative. In its simplest form, Sir William Abney has given it as the one-hundred-and-twentieth part of the square root of the distance in inches of the aperture

from the plate, which is expressed thus— $\frac{1}{120}\sqrt{l}$

where l is the distance in inches from the aperture. Taking four inches as the distance, the size of aperture best suited would be found:—

$\sqrt{4} = \frac{2}{120} = \frac{1}{60}$ in., so that an aperture of one-sixtieth of an inch should be employed to get the best results when the plate is four inches distant from it.

The writer has obtained excellent results with an aperture made with a No. 10 needle in the centre of a piece of very thin aluminium, three-quarters of an inch square, this being fitted between two pieces of card, the whole being blackened and fixed in position in the centre of the front board of a quarter-plate camera. Care must be taken in piercing the hole and any slight burr on the edge carefully rubbed down, so that there is no appreciable edge to interfere with the passage of light through the aperture.

In practice, as the image cannot be seen on the ground-glass screen in the usual way, resort has to be had to a method for ascertaining when the subject is correctly in position on the plate. A very simple device serves this purpose. Draw a line on a piece of white card equal in length to that of the plate, bisect this and erect a perpendicular, on this mark off "from the base line" a distance equal to that of the aperture from the plate, join the extremities of base line to this point and we have at once the angle of view or amount of subject included on the plate. Placing this squarely on the top of camera and glancing along these two lines, the position of the subject is readily seen.

The same construction can be applied vertically; only, in this case, the line that represented the length of plate previously must now equal the depth of the plate. That something of this nature is really necessary will be readily understood, for without it difficulty will be experienced in knowing when the scene is well placed on the plate.

If careful attention be paid to these points no difficulty should be experienced in obtaining the objects well placed on the plate. We now come to the most important part of all—the length of time the plate shall be exposed in order that the light reflected from the different parts of the subject

shall properly impress the sensitive surface. The rule, however, which governs exposures in the general way equally applies here. Suppose we have a lens of four inches focus and an aperture of half an inch in diameter, which gives the value of the stop as $f/8$; now let us substitute the plain aperture of one-sixtieth of an inch in diameter, then the exposures will have to be in the proportion of 60^2 to 2^2 , or 3,600 to 4, so that the plain aperture requires 900 times longer exposure. Thus, supposing the exposure required with the lens was one-tenth of a second, the same subject with the plain aperture would require ninety seconds, or one and a-half minutes.

It is therefore evident that the required exposure can be readily calculated from the intensity ratios of the apertures. In arriving at the result in this manner the distance of the plate from the source of light (aperture) must be the same in both cases, as the exposure required varies as the square of this distance. Suppose we attempted to determine the required exposure by comparison with a lens of six inches focus and stop three-quarters of an inch in diameter ($f/8$). By the rule, the exposures will be as $\frac{16}{9}$ and $\frac{32}{9}$, or the plain aperture will require 2,025 times longer, or in the case above assumed, 3'375 min. But this is just over double what has been found, but then the plate is now at a greater distance from the source of light than that which has been taken as most suitable when the aperture is one-sixtieth of an inch in diameter; and the square of this extra distance has to be taken into consideration in making the necessary correction, thus:— $3.375 \div 2\frac{1}{2}$ (square of extra distance) = 1.5 min., the exposure required when the plate is four inches from the aperture.

In order to avoid any calculations at the time of taking the photographs, it is a good plan to draw up a table giving the relative exposures required with a lens and a plain aperture (derived from the method already given), under various conditions, such as speed of plate, distance of object, state of light, time of day, time of year, &c. And now, in concluding this part of the subject, I will add that anyone taking it up will have wide scope for work, as its application is not confined to landscapes and architecture, for interiors and even portraits can be taken by means of a plain aperture used in place of a lens. With regard to the photographs themselves, they possess a character peculiarly their own, and the method of production is of the simplest and most inexpensive nature.

A TELEPHOTOGRAPHIC LENS—THE "ADON."

Every photographer has experienced, when working with only one lens, the great drawback he labours under in photographing many objects, which, from their distance, become only mere specks on the negative. True, if he has a good symmetrical lens he may, by using half of it, practically double the focus, and so obtain a larger image, but this, of course, involves the extra length of camera extension, which is not always available. With a telephotographic lens these difficulties to

a large extent vanish, as the instrument places at the disposal of the operator a means of obtaining a very considerable range of foci without a corresponding increase of camera extension, so that within certain limits he can make the subject as large as he wishes. A power of this kind is of immense value in photographing distant objects, architectural details, &c., as it enables images of different sizes to be obtained from the same point, and greatly magnified as compared with those obtained in the ordinary way.

In construction the telephoto lens consists of an ordinary or positive-focus lens system, with a negative focus-attachment screwed into the end of a tube at the back, the distance between the component systems being adjustable, and by the alteration of this the focus may be lengthened and the image magnified to an extent only limited by the degree of the camera extension. In order to meet more generally the requirements of the large number of persons who use the folding-pattern form of hand camera, Messrs. J. H. Dallmeyer have introduced a form of telephotographic attachment which can be fitted in front of an ordinary positive lens, and to which they have given the name of the "Adon." This accessory consists of a positive lens at the front of four and a-half inches focal length, and at the back a negative lens of two and a-quarter inches focus; these are mounted in aluminium, and by means of a rack and pinion the distance of separation between the lenses can be varied, so that when the instrument is used on the front of a lens, objects at different distances can be readily focused without any variation in the extension of the camera. An adaptor is used to screw on to the front of the camera lens, and when using the "Adon" in this position the black lengthening tube must be removed.

Before attaching the "Adon" to the camera lens the latter should be set at its infinity focus, or, if the ground-glass screen be used, a distant object should be focused upon it; the "Adon" is then screwed into position, and the focus again adjusted by means of the rack and pinion, when a well-illuminated image of about twice the scale given by the lens without the telephoto attachment will be obtained. The whole of the plate, however, is now no longer covered. If it is desired to cover a larger circle the "Adon" must be reduced to its shortest length by means of the rack and pinion, and the camera extended until the image is in focus again; although to obtain the sharpest definition in this case the iris diaphragm in the "Adon" must be reduced in size, and the camera lens must at all times be used at full aperture, or the field will be considerably reduced.

If greater magnification than from two to two and a-half times be desired, the "Adon" must be used alone, and forms a telephotographic lens complete in itself. With a camera extension of five inches a quarter-plate would be covered, and the equivalent focus fourteen and a half inches, the size of the image obtained would be practically three times that given with a five-inch lens, and the intensity aperture $f/13$. With an extension

of ten inches the focal length would be twenty-four and a-half inches, and the largest aperture $f/24$, with a magnification of about five times.

Messrs. Dallmeyer have worked out a camera-extension table giving particulars of focal lengths and $f/$ values for extensions from five to twenty inches, thereby reducing the practice to its simplest form. It must, however, be remembered that for each extension of camera the distance of separation between the positive and negative lens must be altered, and this is accomplished by means of the rack and pinion on the lens mount, and is to be preferred to any alteration in the camera extension to suit the separation of the lenses. The introduction of the "Adon" should tend to increase the number of telephotographic workers, as the price is so moderate as practically to place it within the reach of all.

SOME MODIFICATIONS OF THE TEACHING OF LATIN PROSE.

By H. W. AUDEN, M.A.

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"THE gaining of classical scholarships at Oxford is the aim and object of all English public-school education." This was the definition given by an intelligent foreigner after a careful investigation of the subject. This may be true or not: that is a question for headmasters to decide; but this much is certain, it touches a spot where reform is needed, a point of view which calls for alteration. I mean the recognised fact that in the classical curriculum of a school the sixth form are the standard, and every item of method, every book used, every suggestion made, has to be submitted to the one test, "will it be good for the VIth?" The average public-school boy is still educated mainly on classical lines, but of, say, ten boys who learn Latin and Greek for two years, only about one ever reaches the VIth. Do we pay enough attention to the wants of this large majority; are we careful enough about the preparation of their mental pabulum? Classical teaching may surely, without any sacrifice of efficiency, be made more humane and more useful for those victims who are destined for the most part never to reach the higher paths of scholarship or literary appreciation. The reform of the Classics is "in the air" just at present, but this is not the place to discuss the question as a whole, but to attempt to deal with one detail, though an important one—Latin prose; and it will be enough merely to summarise the general lines which experts tell us classical reform must follow. With regard to all attempts at improvement of classical teaching, in view of the fact that nowadays boys stay for a much shorter time at school than was usual twenty years ago, and that parents demand

a far larger number of subjects taught and, in the main, a higher standard of attainment—

(1) "Modify and limit" must be the watchword; time must be spared, methods must be simplified.

(2) We must get as soon as possible to the end in view, *i.e.*, in our case, the knowledge of Latin language and literature by,—

(3) Methods as truly educative as possible, *i.e.*, which develop logical thought, criticism, and power of independent work, and give a sound basis of general linguistic study,—

(4) By methods, too, which develop interest and avoid unmeaning mechanical drill.

(5) Lastly, every boy's requirements must be considered, whether he is superannuated in the lower second or gets a Balliol scholarship from the VIth.

The ordinary educational apparatus for Latin teaching in a public school consists of a grammar, a text-book, a Latin prose-book, and a master to "hear lessons" out of the books and to distribute due rewards and penalties. This article proposes to deal with only one of these factors—Latin prose—to consider its relative position in the Latin curriculum and to deal with the problem. Can we save time and temper in it and get more out of Latin prose? In other words, can we bring Latin prose into closer connection with the object of Latin teaching, which is the knowledge of Latin language and literature, making it a better mental training and at the same time making it help towards the appreciation of the subject-matter?

The average teacher holds, reasonably enough, that the object of Latin prose is to help towards a knowledge of the Latin language (especially the Ciceronian variety of it) and at the same time teach method and exactitude. In the case, too, of boys who attain to the higher stages it is an excellent training in literary style and criticism, but in the main it is the acquisition of a knowledge of the idioms and syntax of the language which is most emphasised in discussing the object of Latin prose. The present system of Latin prose attains this object fairly satisfactorily; it helps towards a mastery of Ciceronian prose and encourages method and logical correctness. The question is, cannot it be made to do more by a modification which at the same time removes some of the uninteresting, un-human features of present methods? The general principles of these methods are too well known to need mention, I mean the principles which are followed in the average public-school.

In this system two points are specially noteworthy.

(1) Little encouragement is given to thought in the proper sense; there is no independent work and criticism, but a great deal of mere mechanical drill.

(2) There is almost no connection between the Latin prose and the reading-book; Latin prose is not made to help in mastering the contents of the subject matter of the authors.

It is, I think, pretty well recognised now that the axiom, "all instruction must centre round and

be based on the reading-book," holds good for Latin, just as in the teaching of modern languages "the spoken speech must be the centre of all instruction;" yet in England, at least, very little has been done towards simplifying the complicated system of text-book, grammar, Latin prose-book. A plain text with short notes, a painstaking teacher, and a note-book should in reality suffice.

With regard to the first point—that *thought* is not trained sufficiently under the present system—educational reformers seem hardly to realise the value of Latin teaching in this respect.

John Stuart Mill says somewhere in his essays, "The nation which has its work always found for it loses all power of initiative." May we not, in a way, apply this to the modern boy and his training? It is a common complaint¹ nowadays not only amongst teachers, but amongst all employers of brain-workers, that the modern² boy and young man has not the power of initiative, the capability of independent thought and work, which his father had, or is thought to have had, at his age. Many causes probably contribute to this, but surely schoolmasters themselves are to a great extent responsible. Our system now is that the master should do everything, the boy nothing; where we were content to receive a suggestion from a master, say, as to some important point in history to be followed up, and laboriously to work it out for ourselves, the modern boy expects, and gets, a careful *résumé* of the question dictated to him by his master. In the same way, we give a boy a Latin prose-book full of English sentences, with all the necessary information for their translation in type before him. The boy's part of the business is made as mechanical as possible.

Reform, then, of Latin prose will concern itself with two points: a fuller appreciation of the subject matter of the reading-book, and such modification of methods as will give the maximum amount of thought-training from Latin prose.

My contention is that, by substituting a system of "*précis*-prose" from the earliest stages, *i.e.*, the writing of plain logical abstracts³ of any literary unit (*e.g.*, an event, a speech, a character), in sound but simple Latin, adopting the vocabulary of the original, not only is a method employed which is easier, more interesting, more natural than the present, but the pupil is helped really to grasp and appreciate the subject matter of the author he is reading, whilst the mental discipline of a thoughtful, logical *précis*-work, training the pupil to concentrate his thoughts and stimulating him to independent activity and criticism, is added to the ordinary curriculum of Latin teaching. Thus Latin prose may be made to secure three educational points, whereas it now usually attains

only one—the acquisition of a knowledge of Latin vocabulary and idioms.

The value of *précis*-work in any language as a means of education has only received a moderate recognition. What is meant is not only *précis*-work in the narrow, government-office sense, but also the training of the faculties to make a logical summary of anything, to work out the meaning of a given passage, to seize on the salient points, and then write down the result in concise, vigorous sentences—this, surely is education in every sense of the term.

"But," asks the sceptic, who is never absent from the master's common-room, "will it work?" The answer to this is that it *does* work, and is practicable; many masters employ a sort of modified variety of the method and speak well of it. It may also be mentioned that in Germany, where the reduced number of hours given to classics has led to greater efficiency of teaching, the system is strictly adhered to with good results;¹ but that is an argument of only moderate value, as English boys and German boys are not of the same species, for, roughly speaking, the German boy wants to learn, the English boy does not.

It remains to consider the practical details of working in the various forms.

LOWER SCHOOL. (*Forms I. to III.*)—As mentioned above, the object here will be to use Latin prose in such a way as to make boys *think*, to ensure a knowledge of the contents of the book they are reading, and to acquire by thought-compelling methods an acquaintance with the structure and usages of the Latin language. This enforcing and bringing home a knowledge of accidence and elementary syntax lies outside the compass of this sketch, the growing belief in inductive methods having placed this part of elementary Latin teaching on a satisfactory basis. It is the first consideration with which we are concerned, "How can a boy be taught to grasp the thought of what he reads? how far can a system of *précis*-prose be applied to the lowest forms of a school?" If a boy is really to understand what he reads, his work *must* be divided into units of some sort, some central points must be found on which he can concentrate his mind, in order that he may get a well-defined picture in his head. At first a small boy, when asked to make anything like a summary, or even to collect from what he has read any words which apply to any one central idea, will shew up a blank sheet simply because he does not know how to tackle the difficulty. The master must help him in the right way, and map out blank schemes or headings,² according to the subject with which he is dealing and the capacity of the learner; he must divide the work into units and frequently summarise their contents.

Suppose, then, a simple narrative unit translated and mastered, the class can be asked to write

¹ Cf. Prof. Armstrong's speech at the British Association, *vide* THE SCHOOL WORLD for September, 1901.

² Perhaps rather "the modern English boy." Since writing this I have made the acquaintance of 300 Canadian school-boys, and, unless I am much mistaken, these remarks about lack of initiative do not apply to them; they are more hardworking, self-reliant and more interested in things in general than the average English public-school boy.

³ For details of methods *vide infra*.

¹ Cf. "Dettweiler, Lateinische Unterricht," pp. 169-177.

² N.B.—A master should *always* make the exercises for a low form himself.

answers, in Latin, to questions framed in some such way as this:—

- (1) What is the extract about in general?
- (2) Who is the chief actor?
- (3) What did he do?
- (4) Why did he do it? the real reason, the pretext.
- (5) How did he do it? The occurrence, (a) beginning, (B) middle, (γ) end.
- (6) What other people are mentioned? Their character.
- (7) What places? Their description (scenery, animals, agriculture).

For larger summaries:—

- (8) Any great personality; (a) origin, (b) exploits, in (i) peace, (ii) war, (c) characteristics and judgment of others on him.
- (9) Nations, character in (i) peace, (ii) war, their weapons, methods of fighting, &c.

As an example of (8) from Nepos: (a) *Themistocles, Atheniensis, generosus, liberius vivebat, postremo summa industria.*

(b) In war: *classis centum navium, bellum Aegineticum; totidem triemes, pugna Salaminia.* In peace: *triplex Piræi portus, muri; testularum suffragiis e civitate eiectus; Argos, Corcyra, Molossi, Ephesus, Magnesia.*

(c) *Totum se dedidit rei publicae, callidissimus peritissimos belli navalis fecit Athenienses, universae Græciæ saluti fuit, Europæ succubuit Asia.*

Similar simple schemes or headings can be easily drawn up based on any of these central points, and boys be thus led on gradually to more independent work. At first the grammatical connection of sentences need not be insisted upon, the words of the text being merely written down under the various headings. For the development of thought the arrangement of anything in categories is valuable, and even in the lowest forms the power of criticism can be strengthened by encouraging comparison, e.g. of the characters of Miltiades and Themistocles, and discussion of what is typical, e.g., Cæsar as type of a great general, &c.

MIDDLE FORMS.—Here the same principles can be followed, but more allowance can be made for individual activity, and more exactitude can be demanded. Detailed schemes and headings can gradually be dropped, though of course a certain amount of guidance will be still necessary. What is wanted at first is to teach boys *how* to make an abstract, how really to grasp the sense whilst reading their author; in this connection the system adopted in some editions of printing in spaced type the emphatic words and "topic-sentences" is of very considerable value.

HIGHER FORMS.—In these a much higher standard of *précis*-prose can be reached, larger units dealt with, e.g., a whole speech of Cicero, more attention paid to idiomatic phraseology, &c. In fact, the old-fashioned Latin essay can be revived in a modified form, the subjects being points of Roman history, antiquities and criticism, and always chosen from the book that is being

read. These subjects can easily be found: to take some from authors commonly read:—

Cicero pro Lege Manilia. Influence of Mithradatic wars on Roman private life. The blood-suckers of the Roman provinces (*proprictores, publicani, feneratores, negotiatores*). Political parties in Rome in Cicero's day.

In Catilinam. Catiline's life and character. The Allobroges incident. Catiline's party—how composed. Catiline's plans according to Cicero.

Livy.—Hanno's speech. Causes of defeat at Trasimene. Comparison of Scipio's and Hannibal's speeches before the battle of Ticinus.

Cicero pro Archia.—Roman citizenship; its value. Cicero's criticism of the Greek language.

These are only a few out of the many subjects that will suggest themselves during the reading of an author, and the list can of course be amplified to almost any extent.

It is the manifest duty of those interested in the Classics, whether from the bread-and-butter point of view or otherwise, to take the various units of classical teaching and by mutual discussion and co-operation strive to set right what is amiss. Is there anything amiss with our methods of teaching one of the most important branches of the Classics—Latin prose? If there is, discussion may point out the way towards improvement; if there is not, discussion and the combined evidence of experts may, at any rate, serve to help those who doubt to a conviction that their misgivings on that score are unfounded.

SOME TYPES OF PHYSICAL DEVELOPMENT.

By CECIL HAWKINS, M.A.
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THE scheme of growth and type of development of individual boys may be easily studied by means of the system of grades of height, weight and chest-girth mentioned in THE SCHOOL WORLD of last November, p. 431. If we take a sheet of paper ruled in squares, and number the horizontal spaces to represent the various grades, and the vertical spaces to represent the quarter years of age, for the period under examination, it is quite easy to mark the position of a boy's grade of height upon the paper at each age at which his height has been observed. By joining the successive points obtained we get a graph which indicates correctly his relative position at each age, and records his general scheme of growth and any fluctuations or marked changes in his rate of development. The horizontal line between the tenth and eleventh grade denotes the scheme of growth of the average boy. Any graph which runs parallel to this denotes that the boy represented is making exactly the correct growth

¹ Cf. Dettweiler, *op. cit.*, p. 166.

to maintain his relative position amongst his fellows. It rarely happens, however, that this is exactly maintained for many consecutive years.

Precisely similar graphs can be constructed for

for chest-girth of the same boy. The deterioration of type at the age of 17½ is partly explained by the entry on his record "three months absent—influenza;" but the graphs show that this deterioration began a year and a-half before this entry was made.

The continuous lines in Fig. I are the corresponding graphs for a boy of the short sturdy type. They record that as development went on the type became exaggerated.

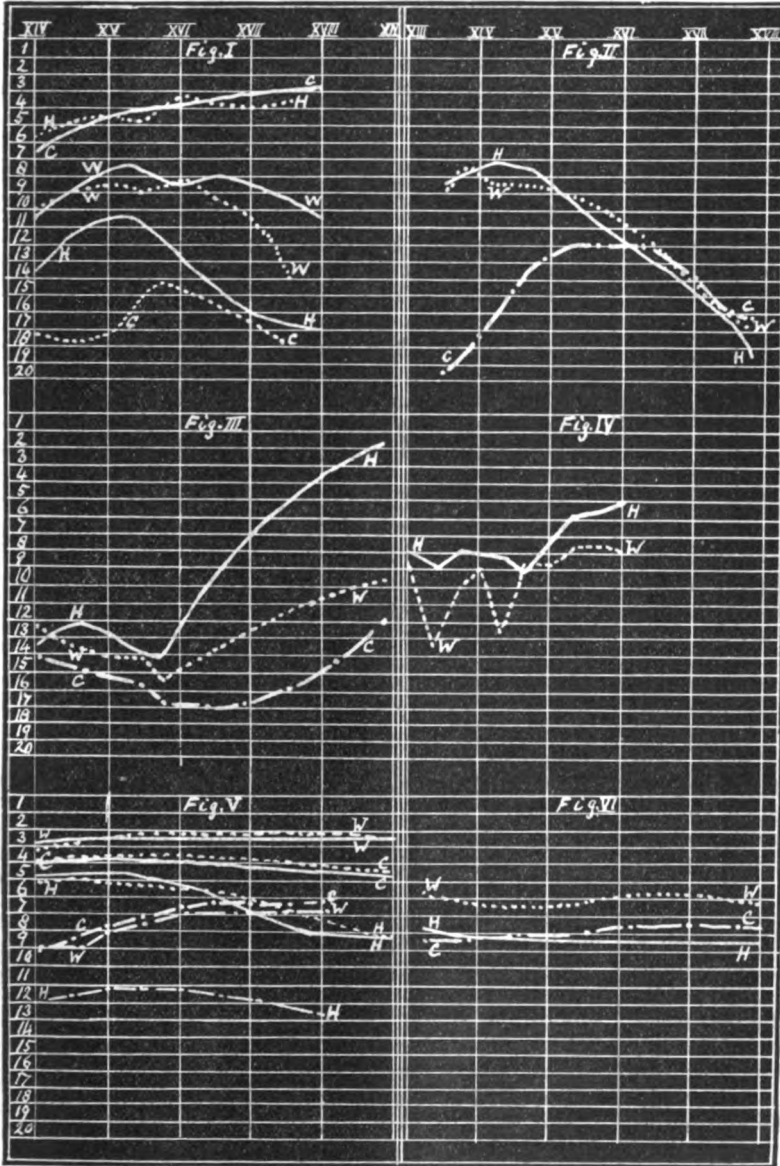
As a rule, the type remains fairly fixed throughout a boy's growth, the graphs rising or falling together, as in the second half of Fig. II. In the first half the record shows that the boy represented had a very badly developed chest when he first went to school, which improved rapidly until the chest graph took up its normal position in the scheme of growth. Such cases are not uncommon, but proper attention to the physical training of young boys ought surely to reduce their number very considerably.

Fig. III. is an interesting record showing considerable deterioration of type, which accompanies, and to some extent precedes, very rapid growth in height, subsequent to a short period of arrested development.

Marked fluctuations in the height graph are generally accompanied by corresponding fluctuations in the other graphs, but the corresponding fluctuations do not always synchronise exactly. Fig. IV. is a good example of this.

In this graph the lowest points in the weight graph are determined by measurements made in the month of March. Weakly boys are very apt to show arrest of development in that month, due either to illness or to the fact that the struggle for existence is keenest during the wintry months of the year. In order to determine to what extent

this arrest of development is a general feature, I examined more than 500 complete yearly records in which measurements were noted every March, June and October, or November. The result of this examination is shown in the following table, in which the figures denote the percentage, who reached a higher grade, remained in the same grade, or dropped to a lower grade in each of the three intervals stated.



The figures on the left refer to grades, 1 is the highest grade, 20 the lowest. HH are height graphs, WW weight graphs, CC chest-girth graphs.

weight and girth of chest. By drawing these on the same form, preferably in different coloured inks, we are enabled to see at a glance the boy's type of development, and to note at once any improvement or deterioration of type which may accompany fluctuations in his scheme of growth.

In Fig. I. the dotted lines denote a marked example of the tall weedy type, HH being the graph for height, WW that for weight, CC that

IN HEIGHT.

	March to June.	June to October.	October to March.
Improved	25'4	33'1	14'2
Made Normal } Increase	53'0	45'7	47'3
Deteriorated	21'6	21'2	38'6

IN WEIGHT.

	March to June.	June to October.	October to March.
Improved	33'5	35'9	24'4
Made Normal } Increase	41'2	41'6	37'6
Deteriorated	25'4	22'7	38'0

These figures seem to indicate that the tendency of the rate of growth to decrease during the winter months, and increase during the summer, is well marked, but that such variation is very far from being the general rule.

From the records of individuals we can obtain typical schemes of growth, and types of development, for any class whose physical attributes we wish to examine. To do this we need only pick out the records of individuals belonging to that class, and strike an average. Such typical schemes will have the minor irregularities eliminated; but the general physical features of the class, and typical peculiarities of its scheme of growth, will be faithfully reproduced.

The continuous graphs in Fig. V. give such a typical scheme for the winners of the champion cup at the athletic sports in a large English public school, a class of athletes who must be possessed of very great activity and endurance. We are struck at once by the regularity and height of the weight graph. This is probably about one grade higher than it ought to be, owing to the method of measurement adopted at the school in question, but, after all, allowance is made for this, the fact remains that our typical athlete is heavy for his height, with well-developed chest. This peculiarity of figure is less noticeable at the age of fourteen; but the graphs of weight and chest-girth keep up, while the height graph steadily declines, until at the age of nineteen, when his athletic successes are probably obtained, we find him but one and three-quarter grades above the mean in height, and more than five grades above it in weight and chest-girth. This result was so unexpected by me that I thought I must have been led astray by an insufficient number of observations, the number of athletic champions

available being only seventeen. To test this I combined with the athletic champions a number of members of the cricket eleven and foot-ball fifteen, bringing the numbers of athletes whose schemes were examined up to fifty. The result appears in the dotted graphs of the same figure and is markedly similar, though the decline in the height graph is more gradual and continuous. The number of cases examined is still small; but the regularity of the curves, and the marked resemblance of the two schemes, seem to point to the type which they represent as being fairly correct. For various reasons we are much less likely to be led into error by taking the average grade than we should be in taking the average measurement of the same number of boys, and I do not think that the inclusion of a larger number of all-round athletes would lead to any great change in this typical scheme. The scheme teaches us that the highest physical type is not, as some writers contend, the perfect symmetry which the mean boy is assumed by them to possess, but a type slightly above the mean in height and considerably above it in weight and girth of chest.

The third set of graphs in Fig. V. (denoted — — —) is a typical scheme of development for gymnasts, derived from the schemes of twenty-five members of the Gymnasium VIII. The type shown is what one would expect, below the mean in height, but a good deal above it in weight and chest-girth. The graphs in weight and chest-girth show a considerable rise up to the age of sixteen, after which they remain fairly steady. The height graph does not show the same decided drop as it does in the scheme of the earlier-developed, all-round athlete. This fact is an additional argument against the commonly accepted theory that gymnastics stunt the growth, and the typical graph supports the contention, which I have maintained elsewhere, that good gymnasts are generally short because this enables them to be good at gymnastics, and not because gymnastics makes them so.

Fig. VI. is a typical scheme of development for exhibitioners to the Universities from the same school, a school which has a reputation for industry second to none. The type is a good one, height two grades to one and a-half above the mean, good development in weight and chest-girth.

We look in vain for the narrow-chested, ill-developed type popularly associated with the name of scholar. Of the sixty individuals examined, practically all are junior or foundation scholars of the school, and scholars of Oxford or Cambridge colleges. I was quite prepared to find evidence of arrested development at the various ages at which special pressure of work would be put on in order to secure junior or senior scholarships, open scholarships at the University, and exhibitions from the school. These ages would be nearly the same for all, so that any general tendency to suffer from over-pressure must make its mark upon the graphs. In these circumstances, the story told by the graphs is a very satisfactory one.

LONDON UNIVERSITY IN RELATION
TO SCHOOLS.¹

By T. WIDDOWSON, M.A.

IN its broad features, as outlined by Sir A. Rücker in his "Report on the work of London University for the year 1902-3," the scheme for Inspection of Schools and School-leaving Certificates makes a great advance towards a closer connection between the work of the universities and that of secondary schools, which should act to the advantage of both. The School-leaving Certificate is not a new idea, but the combination of this with inspection and examination by the University is an attempt to bring higher education into direct touch with secondary, which should have very beneficial results.

How long shall we have to wait for the time when the universities and schools will become united in their aims? When the School-leaving Certificate will stand in the place of the various examinations which at present are recognised instead of Matriculation, Little-Go, Responsions, or the Preliminary Examinations of the various Professional Bodies? When, in fact, the top of the ladder in secondary education is (not may be) the first rung in the ladder of higher education. The incentive, which a sensible and thorough examination for a Leaving Certificate (made compulsory for all who wish to enter the universities or the learned professions) would give to the pupils in our secondary schools, would be an immense aid not only to those engaged in teaching the upper forms, but right through the school.

We gladly recognise in the scheme of the London University a long step towards the realisation of this end. The examination for the Certificate is to be taken as a whole; there will not be a chance of cramming up one or two subjects, passing in them and forgetting all about them, while the others are treated in the same way.

The examiners as at present appointed are men who have been engaged in teaching in secondary schools, and the papers will be set so as to suit the aims of the authorities of the schools examined. All this is in the right direction, but a still further step towards the compulsory Leaving Certificate would be the recognition by London University of the certificates of other universities as equivalent for a pass in its Matriculation Examination.

In its desire to get into closer touch with secondary schools, the university has not confined itself to the Leaving Certificate, but has developed a broad scheme of inspection and examination. This inspection, to quote from the report, "will include an enquiry into the aims of the school, a consideration of its curriculum as adapted to those aims, an inspection of the school buildings and fittings, and of the teaching staff as tested by an

inspection of the classes at work." It is not clear whether such inspection of the school buildings and fittings would include the arrangements made for the convenience of the teaching staff, or the review of school libraries, where such exist; but if it did there is no doubt that it would have an excellent result. The teaching power of a master would not be diminished by proper accommodation, and the help which more advanced scholars would derive from even a small reference library, the expense of which is obviously beyond the means of most parents, would certainly make it worthy of being included among the other fittings of a school.

After the inspection and examination would naturally follow the report, and it is in this that we consider the university has its great chance of assisting the work of secondary education. Obviously the report should be open for the inspection of all the school staff, so that each member may see what in his methods of work calls for improvement and what is considered satisfactory. If the inspectors are really qualified to do their work they ought to be able, from their knowledge of different schools and different methods of teaching, to give many valuable hints to those whose work they inspect, and it would certainly tend to help this end if inspectors and teachers were able to exchange views on their aims and objects. The stimulating effect which a careful report on their work in school would have on all teachers who are really proud of their calling, and desire to do their best for those under their care, would certainly not be diminished if they knew it to have been drawn up by one who was not a mere doctrinaire, but who was actuated by the same aims and objects as themselves, and with whom they knew that they could have an interchange of views.

As the university has been recognised by the Government as an authority for the inspection of schools, the qualifications of the inspectors are of the greatest importance, because on them will depend the success of the scheme. Should those who have been, or will be appointed, be chosen solely on their reputation for scholarship, or because they have some particular educational craze which makes their name celebrated, then the value of their reports to most teachers will be seriously diminished.

We are pleased to see that the university has not appointed as examiners either professors or faddists, but that "all those so far appointed have themselves been schoolmasters."

In adding to the list we trust that the university will appoint those only who have had considerable teaching experience in secondary schools; that a certain proportion may be men of varied attainments and not specialists in some particular branch of knowledge; and some may be men who are actually engaged in teaching in secondary schools.

It is possible that some teachers might object to their forms being inspected by one who is an assistant-master at another school. Surely they should feel that one who is engaged in the same work as themselves, whose difficulties resemble

¹ Portion of the Report of the Principal of London University dealing with the Relation of the University to Schools.

Report of the Education Sub-Committee of the Incorporated Association of Assistant-Masters on the Scheme of the London University for the Inspection of Schools and School-leaving Certificate Examinations.

theirs, whose objects, aims, and enthusiasms are directed towards the same goal as their own, is at least as well fitted to inspect their form work as one whose experience is either of the past, or if of the present, then it is no longer subject to the same conditions as regards the difficulties of discipline, obedience, and teaching as their own.

THE TEACHERS' GUILD.

THE Teachers' Guild of Great Britain and Ireland took its origin, in the year 1883, from the strong conviction expressed in a small gathering of headmistresses and others, who had met together for a different object, that some association was required which would enable teachers to enter into corporate union as members of the same profession, with special reference to the making of some provision for old age. Among these prime movers were the late Frances Mary Buss and Miss Selina Hadland, then Headmistress of Milton Mount College, Gravesend. The first members were enrolled in the latter half of that year, and Miss Hadland undertook the difficult task of the earliest organisation with great energy and ability as Hon. Secretary. In a very short while, the original idea expanded, and, at the time of the incorporation of the Guild, on May 15th, 1885, its objects were expressed in the Articles of Association under eleven heads, which have since been officially summarised as follows:—

(1) To form a body which shall be thoroughly representative of all grades of teachers, and shall be able to speak with knowledge and authority on all matters of education.

(2) To obtain for the whole body of teachers the status and authority of a learned profession.

(3) To enable teachers, by union and co-operation, to make a better provision for sickness and old age; and, by the same means, to do all such other lawful things as may conduce to their own welfare and the benefit of the public.

The constitution of the Guild provided for the formation of an original or central body and of local guilds or branches to be affiliated to it. In the year 1884 the first branch at Cheltenham was formed, to be followed shortly by a branch at Brighton. Branches have also been established in several other important centres, as Dublin, Glasgow, Manchester, Sheffield, Norwich, Oxford, Shrewsbury, and Aberystwyth, also in the colonies of Natal and South Australia. The present number of branches is twenty-eight, of which one, in North Wales, has two centres, at Bangor and at Colwyn Bay. Two independent bodies of teachers, the Birmingham Teachers' Association and the Friends' Guild of Teachers, have also entered into definite "alliances" with the Guild. The present numerical strength of the Guild is about 3,820, of which 1,443 represents the Central Guild.

The minimum annual subscription in the Central

Guild is 6s. 6d. (for London members 7s. 6d.); branches fix the amount of their members' subscription, but have to contribute 2s. 6d. per member yearly in contribution-payment to the General Fund.

The official organ of the Guild is *The Teachers' Guild Quarterly*, but reports of its proceedings appear also quarterly in *The Journal of Education*.

Under the revised constitution of 1892, rendered necessary by the multiplication of the branches, the Council of the Guild is composed of twenty general members, elected by the whole Guild in annual general meeting, and of representatives of the Central Guild, and such branches as have a membership of not less than fifty. The total number of Members of Council is at present forty-seven.

Though the constitution makes no provision for a president, the Guild has appointed such an officer annually from the year 1890. Many distinguished persons have filled this office, including Prof. S. S. Laurie; the Rev. T. W. Sharpe; Mr. Arthur Sidgwick; the President of Magdalen College, Oxford; Sir Joshua Fitch; Sir Richard Jebb; Mr. James Stuart; Sir Isambard Owen; Mr. James Bryce; the Master of Trinity, Cambridge; Dr. S. H. Butcher; Mr. Arthur Acland; and the President for 1903-04, Sir Oliver Lodge, whose portrait is given on the next page. The Guild has had only three Chairmen of Council in the twenty years of its existence, viz., the present Bishop of Hereford, till 1890; the late Rev. Dr. Thomas Morse, 1890-92, after four years of vice-chairmanship; and Canon Edward Lyttelton, 1892-1903. At present the chairmanship is vacant, as, after eleven years of office, Canon Lyttelton's other public engagements have compelled him to retire.

The chief work with which the Guild has been identified throughout the period of its existence has been the effort to obtain a satisfactory Register of Teachers, as the basis of a true teaching profession, and the agitation for an intelligent organisation of secondary education, with the consequent co-ordination of primary with secondary education. The task of directing this, the more public part of its work, has been entrusted to the Political Committee, though another equally important committee, the Education and Library Committee, has had to deal with some of its aspects. Eight other standing committees carry on the other activities of the Guild.

As is implied in the official summary of objects, the Guild admits to membership teachers, men and women, in all types of schools in the United Kingdom and in the Empire, and private teachers, and this fact must always be remembered when its policy under any head is examined. It will explain, among other things, how it is that at one time it is engaged in co-operation with the National Union of Teachers and the Educational Institute of Scotland drafting a Bill for the Registration of Teachers, and, at another, it is making joint representations with the College of Preceptors and the Private Schools Association on the subject of the organisation of secondary education.

On the registration question the Guild has, from the first, stood out for (1) a single comprehensive register for *all* school teachers, and (2) a professional qualification of some kind as a necessary condition of registration, and not as an alternative to a purely academic certificate of attainments. It pressed both these points before the Select Committee of the House of Commons on Registration in 1891, and there is no doubt that its efforts have largely helped to secure the establishment of these essential conditions of a real Profession of Teachers. In two main respects the Guild still hopes to improve the Register: (1) by the abolition of Columns A and B, emphasising, as it is

main points at issue, in view of a "possible organisation of secondary education by the State." The answers to the questions put showed a remarkable consensus of opinion on the main issues, and enabled the Council to take action with the confidence that it was supported by members. Ever since that date the aim of the Guild, under this head, has been to decentralise control and to unify authority, and the resolutions of the General Conference at Brighton in 1901, passed by delegates instructed by the Central Guild and branches, have been almost entirely incorporated in the Education Act of 1902. The efficiency of this branch of the work of the Guild has been very largely due to the help rendered by its late Chairman, whose position on the Bryce Commission, on the Consultative Committee of the Board of Education, and on the Headmasters' Conference, enabled him to keep the Council at all points in touch with practical possibilities, while sacrificing little or nothing of its main ideals.

It is impossible within our present limits to give even a sketch of the work done by the Guild in pursuance of its main objects during the past twenty years. It has been continuous and consistent; much attention has been given to such questions as the training of teachers, examinations, leaving certificates, and the right order and relation of school subjects in connection with educational values, and the claims of women to their full share in the control of education have been persistently advanced. A complete set of the Annual Reports of the Guild was among the exhibits selected from the Educational Exhibition at the Imperial Institute for the Education Section of the last Paris Exposition, because it showed clearly what subjects had been to the front in the minds of teachers for some sixteen years, and how they had been regarded by a composite and representative body of teachers.

To pass to the other developments of the Guild, which render it of practical service to the individual teacher. Foremost among these stands the library. This is composed of some 8,000 volumes, and its special value lies in its collection of works on the History, Theory, and Practice of Education, which includes the pedagogic library of the late R. H. Quick. There is also a large number of schoolbooks.

The Guild brings its members together for the expression of its collective opinion on points of national importance in general conferences and in congresses of delegates, and for interchange of views on educational questions in numerous meetings in the Central Guild, and in the branches, taking care that professional questions shall always form the main portion of their annual programmes. Of special value in all such meetings is the mutual influence of the views of primary and secondary, and of public and private school teachers.

The Guild gives legal and professional advice, free of charge, to its members on matters connected with their professional position. The committee which controls this branch of work contains two

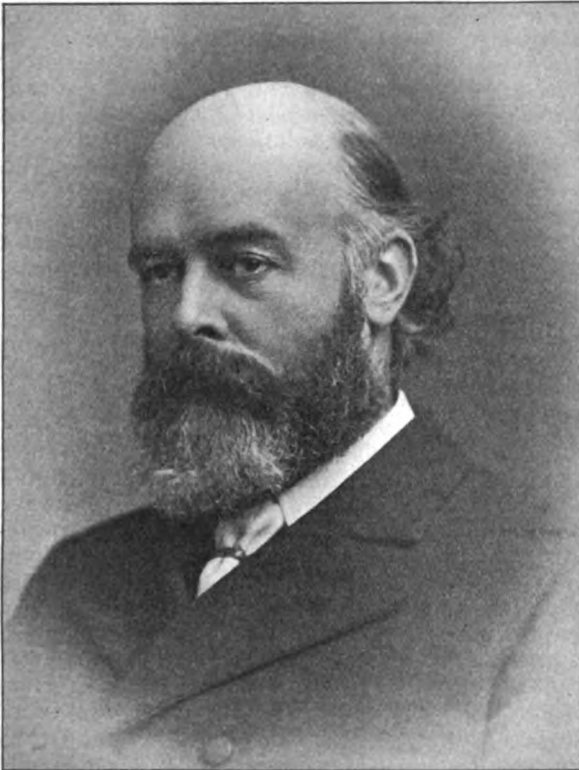


Photo.] SIR OLIVER LODGE, F.R.S.,
Principal of the University of Birmingham, President of the Teachers' Guild. [Elliott and Fry.]

held, undesirably, the distinction between primary and secondary school teachers, and making the passage of the primary school teacher into the secondary school difficult; (2) by enabling efficient existing teachers who have no academic qualifications, of whom there are a large number, especially among women teachers, to be entered on the Register before the more rigorous conditions of registration come into force, in the year 1906. The amendment to the Registration Order, published in July, which admits efficient teachers of not less than ten years' standing to the Register, does much to meet the views of the Guild under this head.

The Guild took up the question of the organisation of secondary education as far back as the year 1888, when all members were consulted as to the

solicitors and two barristers in practice. A pamphlet of legal and professional advice is in active preparation.

! The book of holiday resorts and recommended addresses has reached its twentieth year of issue, and is given annually to all members. Ample guarantees of the quality of houses and householders are supplied by the regulations under which the editions are prepared. A limited number of copies of the book are sold at the price of 1s. to non-members.

Holiday courses for English teachers in France and Spain are organised annually by the Guild, and are largely attended. The centres in 1902 and this year are Tours, Honfleur, and Santander. An endeavour is being made to organise similar courses in England for foreigners in 1904, as there is evidence of a considerable demand for them.

Members are advised on all matters connected with insurance and investment, and receive substantial rebates on the premiums paid on insurances. A pamphlet, "Helps to Self-Help for Teachers by Insurance and Investment through the Teachers' Guild" (price 3d.), has been recently issued. It contains much information on these subjects.

A Benevolent Fund has been started, and now amounts to a little more than £400. Several grants have been made from the fund to members in cases of temporary need or break-down.

The Guild has a Bureau of Information which supplies members, free of charge, with particulars of all kinds that are proved to be required by teachers, in connection with examinations, professional preparation, facilities for study, and so on.

It also takes part in the management of the two professional joint agencies for assistant-masters, and for women teachers.

The educational museum, though small, contains much that is of value to teachers, in the sections of history, geography, and classified school-books. It is a specimen museum, without duplicates for lending, but an attempt is being made to form a loan collection of geography and history portfolios to circulate among schools.

Standing out prominently above all activities of the Guild is the feature which gives it its special character—its catholicity. It is the only association of teachers which to any extent represents the teaching profession as a whole, apart from the bias of any particular section or type of school. This special character of the whole body is repeated in all its component units, and it is the aim of the Council to make each of such units a local force within its own area, watching and impressing with expert opinion such authorities as are locally responsible for education of all kinds. The charge of idealism has been brought against the Guild from time to time. If there is any reproach in such a charge, it is contained in the implication that the Guild is not sufficiently in touch with the vital problems of education. The recognition of the practical usefulness of the Guild by the State is an answer to any such charge, as was shown by the appointment of the Chairman of the Council to a

seat on the Bryce Commission, and of the present Vice-Chairman, Mr. Storr, as one of the six representatives of teachers' associations on the first Teachers' Registration Council. Several members of the Council were also put on the Consultative Committee of the Board of Education. The Guild is to this extent touched with idealism, that it was started at a time when teachers had taken but few steps to form or to formulate definite opinions on educational questions, and was intended, partly, to *create* rather than to *meet* a want. One of its main initial objects was to lead teachers to qualify themselves to become members of a learned profession (hence its constant insistence on training for *all* school teachers), and much of its early work consisted in imbuing its members with the true professional spirit. So soon as that spirit was roused, the Guild became as practical as any of the other associations of teachers which enjoyed the advantage of the pioneer work of the Guild, in its endeavours to shape legislation, and to bring expert opinion to bear on all educational problems. But in all its work it has always striven, and by its very composition has been compelled to strive, to give expression to the abstract professional voice of the teacher *quâ* teacher, apart from his special position in the profession.

THE TRAINING OF TEACHERS FOR ELEMENTARY SCHOOLS.¹

IT is characteristic of the energy of the new Secretary for Primary Education that, amid the stress of administrative and consultative work consequent on the passing of the Education Act of 1902, he has found time to appoint a Committee on the pupil-teacher question, to hold conferences with those concerned in the training of pupil-teachers, and to issue these Regulations. The system was ripe for reform, and, among present problems in English education, no question is more urgent than that of the supply and training of primary teachers. As Mr. Morant writes in the Prefatory Memorandum: "It cannot be denied that a considerable proportion of the many millions of public money now spent annually in our elementary schools fails to produce an adequate return, owing partly to the insufficient training received by many of the teachers, and partly to the excessive employment of juvenile teachers, who must of necessity be imperfectly educated."

THE DEVELOPMENT OF THE CENTRE SYSTEM.

Thirty years ago the boy or girl apprenticed to the managers of an elementary school with a view to become a certificated teacher was taught by the master or mistress the rudimentary knowledge needed for the annual examination. This instruction was given out of school hours—in the early morning, in the midday recess, or after afternoon school. The writer had to rise at 5.30 each morn-

¹ "Regulations for the Instruction and Training of Pupil-Teachers and Students in Training Colleges." (Eyre and Spottiswoode), 1903. 23d.

ing, snatch an early breakfast, catch the 6.10 train, walk a mile to the headmaster's house, and receive instruction till 8. Then there was a second breakfast in school, full charge of a large class from 9 till 4.30, and a two-mile journey home. The evening was consumed in preparation of work for the next morning's instruction and the next day's teaching, in attendance at science and art classes, and what was left in recreation.

As an improvement on this heart-breaking system, central classes were formed, at which all the pupil-teachers from a group of schools were collectively instructed, either before or after school, each master taking the subject most congenial to him. Finally, in the large towns, schools were established for the whole of the pupil teachers in the employ of the school board. These schools, the "pupil-teachers' centres," gradually enlarged the scope of their work as the school boards gradually improved the conditions of the pupil-teachers' service. At present all the most able pupil-teachers matriculate, many pass the intermediate examinations, and a few have graduated directly from the pupil-teachers' centres.

But in the rural schools the system of thirty years ago is still in force, except that by Government regulation not more than twenty hours weekly are spent in teaching. Sporadic efforts have been made to better the lot of the rural pupil-teacher by holding Saturday classes, and in some cases by part-time attendance at secondary schools, but generally speaking nothing has been done. It is in the rural areas, therefore, that the new regulations will effect the most sweeping reforms.

THE PREPARATION FOR PUPIL-TEACHERSHIP.

At present, the pupil-teachers' centre provides a four-years' course of instruction, on a half-time basis, as a rule: the chief change introduced by the new Regulations is that the first two years must be spent in full-time instruction in a secondary or higher elementary school. Where no centre existed, one must be established; and in all, about 10,000 new pupils per annum will need to be provided for. They will come mainly from elementary schools; the girls, almost all over the country, and the boys in the rural districts at least, will be their most intelligent and capable scholars. The chief defect of the pupil-teachers' centres is said to be the gathering together of young people who have come directly from the elementary school and will return to the elementary school, and whose experience is therefore narrow. This defect should now be removed. The chief merit of the pupil-teachers' centres is that they have always remembered that teachers are being instructed, and have made the instruction take the form of demonstrations of method. On the teachers who have charge of the work in the future a considerable responsibility will rest in this respect.

Under the new Regulations, the boy or girl who wishes to become an elementary teacher must at the age of twelve, or not later than four-

teen, enter a secondary or higher elementary school, remaining there until he is sixteen. It is specially desired by the Board of Education that he shall take the ordinary school course, shall take part in the corporate life of the school, and benefit by association with pupils who are to follow callings other than that of teaching. He will, of course, earn the ordinary grants as set out in the South Kensington regulations, and it is intended that his fees shall be paid, and a maintenance bursary provided, if necessary, by the local authority he is afterwards to serve. It is highly desirable that he shall follow the curriculum of a "B" school, since the "A" course would be altogether too scientific; and education authorities should require a stamped agreement with his guardian to prevent abuse of the free education provided.

In the absence of a suitable secondary or higher elementary school, a preparatory class will be formed at a pupil-teachers' centre. Here the entrance age will be fourteen, the class will attend full time, and a grant of 40s. per head per year will be paid. A declaration must be made that the entrant intends to become a pupil teacher, and the authority should have this stamped.

Before leaving the secondary school or preparatory class, the future teacher must pass an examination, either (a) one of those specified in Schedule I A., or (b) the Collective Examination of the Board of Education described in Schedule II., or (c) an examination conducted by the local education authority.

THE PUPIL TEACHERSHIP.

On reaching the age of 16, any boy or girl who has passed one of these examinations may become a pupil teacher and commence his technical training. An indenture signed (1) on behalf of the local authority, (2) by the pupil teacher, and (3) by his guardian, will bind him for two years in the following particulars. He shall serve in school under the head teacher not more than five hours in any one day, nor more than twenty hours in any one week, and he must attend not less than 100 nor more than 200 school meetings per year. He shall receive instruction at a pupil-teachers' centre at least five hours weekly.

A pupil-teachers' centre may be an independent school, or attached to a secondary or higher elementary school. In the larger towns considerable sums have already been spent in founding and equipping centres, which take rank with the other secondary schools. Their work has been, on the whole, successful, and it is unlikely that local authorities will change this arrangement. But in the rural districts and small towns the County Councils will have to look to the grammar and technical schools to undertake this work. To some extent a separate organisation will be necessary, since the pupil teachers will spend but half their time in the centres.

The curriculum must include reading and recitation, voice production (an excellent innovation, in view of the large classes of elementary schools),

physical exercises, music, drawing, natural science, with needlework for girls. The elementary teacher is probably the best plain needlewoman in England, and much importance is attached by the Board of Education to this subject. Where the centre is in organic connection with a secondary school, proper provision must be made for correlating the instruction. Even where there is no direct connection, a conference between the heads of the secondary schools responsible for the first two years' training, and of the centre responsible for the last two, should be held to ensure correlation.

An annual grant of £3 will be paid on behalf of each pupil-teacher who has attended the centre at least 150 times, and been concurrently trained at an elementary school. In addition, any science and art grants earned at the centre during next session will be paid, but after August, 1904, it is intended to pay an amalgamated grant for the whole instruction of the pupil teacher. It is said that the Board of Education will shortly issue a special set of regulations for these half-time centres, based upon those for secondary schools "B."

The final examination for pupil teachers will be the King's Scholarship Examination, or any one of a list of twenty-seven examinations named in Schedule I. B. Any of these examinations qualifies for admission to a training college, but the authorities of these institutions vary in their practice, and most of the residential colleges prefer a high place on the King's Scholarship List. The day-training departments of university colleges prefer a matriculation examination, and some residential colleges select students with the double qualification. It must not be assumed, therefore, that the passing of one of these examinations necessarily carries the right to a King's Scholarship. Application should be made to the college to which admission is desired, and its practice ascertained.

The regulations concerning training colleges contain but one important addition. In future university colleges establishing hostels will receive grants similar to those hitherto granted to residential colleges, of £100 for men and £70 for women.

SUMMARY OF DATES.

January 1st, 1904.—Last admission of pupil teachers under old Regulations, *i.e.*, at 15 years of age (14 in rural districts).

August 1st, 1904.—First admission under New Regulations, *i.e.*, at 16 years of age (15 in rural districts).

(It will be noted that the Board of Education consider the crop of babies born between August 1st, and December 31st, 1888, an exceptional harvest, requiring it to furnish a double supply of teachers.)

August 1st, 1905.—New Regulations universally in force.

It will thus be necessary for education authorities and secondary schools to make immediate

provision for the selection and admission of those boys and girls who are to be apprenticed as pupil-teachers from August 1st, 1905.

Considered generally, the new Regulations are admirable, and if the local authorities interpret them in the fine spirit in which they are conceived, a great change should be wrought in the teaching supply furnished from the small towns and rural areas. On the financial side, there may be some grumbling, and it looks as though the Act of 1902 will have to be amended in the direction of enabling—enforcing if necessary—County Councils to levy something more than a twopenny rate, if these excellent Regulations are to be other than a dead letter in the rural districts.

THE GEOGRAPHY OF CENTRAL EUROPE.¹

MR. MACKINDER has been fortunate in securing the co-operation of the Professor of Geography at Breslau for the Central European volume of his series of the "Regions of the World." Professor Partsch knows well both Central Europe and the literature relating to it, and has written a work which is as readable as it is trustworthy.

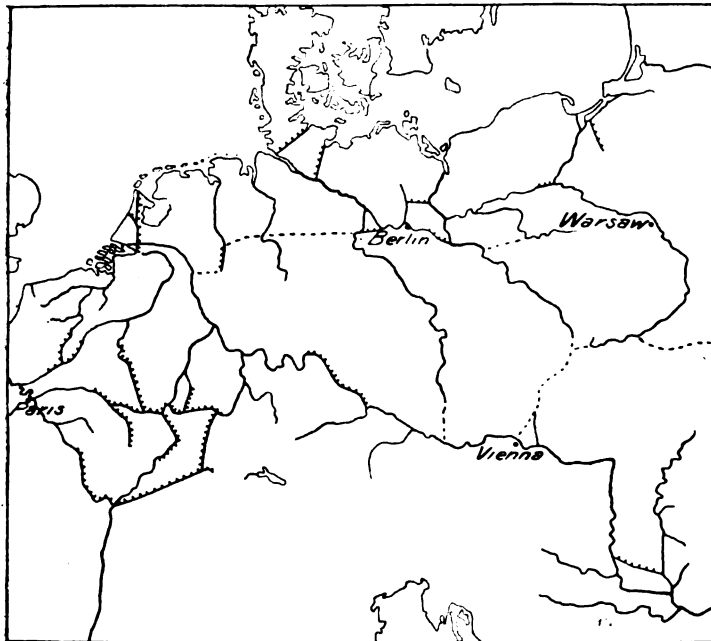
The opening chapters deal with the position and world relations of this central strip of Europe, some 600 miles wide, and extending from the North Sea and Baltic for a thousand miles to a line between the Gulf of Cattaro on the Adriatic to the Gulf of Burgas on the Black Sea; an area five times that of the British Isles. The chapter on physical history is disappointingly short and scrappy, and the least satisfactory in the book. This may be due to the pruning which, the editor explains, was necessary to reduce the German original to the size of the other volumes of the series. If so, we think a mistake has been made, for the general feature lines of Central Europe are most profitably studied in connection with their physical history. In the next five chapters the physical framework of the natural divisions of Central Europe is described in a masterly manner. They contain no mere dissection into mountains, valleys, rivers, and plains carefully labelled and arranged in spacial sequence, but are descriptive of the salient features, which are judiciously selected, and the significance of which is explained. General chapters on climate, peoples, states, and economic conditions follow, and form the necessary introduction to a second survey of the natural divisions of Central Europe, wherein human geography is made the main object of study. General accounts of the chief lines of communication and of the geographical conditions of natural defence complete the work.

In the descriptive chapters dealing with the

¹ "Central Europe." By Joseph Partsch. xiv. + 358 pp. (Heinemann.) 7s. 6d.

political and economic geography of the different regions, the historical factor is emphasised on every page. This adds greatly to the value and the interest of the book, and makes it serviceable to teachers of history, by pointing out geographical explanations which may have escaped them, as well as to geographers who are concerned to trace the influence of man in controlling present distributions of centres of activity and the limits of administrative action.

A most commendable feature is the absence of names on the exquisite orographical maps by Mr. Bartholomew. Only one ignorant of the veriest elements of the reading of maps will cavil at this,



— Navigable Rivers, - - - Canals, ····· Canals Projected
The Waterways of Central Europe.

but it would not have interfered with the value of the maps had names been printed on a sheet of tracing paper the same size as and bound in with each map so as to fit over it.

The black-and-white sketch maps are instructive, but might with advantage have been more numerous. Through the courtesy of the publishers, we reproduce one of these, showing the navigable waterways of Central Europe, actual and projected. It is very clear, and just the sort of sketch map a teacher wants. In this, however, and in some other diagrams, we think it would have been possible to have introduced a few more lines—for, of course, this diagram does not show all navigable inland waterways—and also a few more names without diminishing their utility.

This work should be in every school library, and its contents should be mastered by every teacher who has to deal with either the geography or the history of Central Europe.

READING AND ELOCUTION.

THE excellent Gilchrist travelling scholarships produce from time to time short reports which by their very brevity and first-handedness throw a brilliant light on sections of educational work. The report of Miss Bardsley is no exception, and we shall praise it no further, our object being to deal with the subject from the home point of view.

If we may summarise these thirty pages in a few words, we may say that the schools and colleges visited display to the intelligent traveller a good deal of what may be described as disgraceful, doubtful, and excellent work. It is surely disgraceful that "fifteen pages of a magazine" should be "devoted to the pantomiming and posing of Moore's poem, 'The last Rose of Summer'"; that fifty young women should be told to "think with the palms and then with the tips of the fingers" ("the teacher seemed greatly pleased with the pupils' work, and said the hands were most expressive, but she refrained from saying what they expressed"); that violence should be done to the most delicate flowers of creative thought by the rude, rough hands of the vulgar elocutionist. Among doubtful expedients we may class such questions as "What does the cross cat say?" the answer being "F" (sounded as an explosive); the "original oratory" of children, and the over-study of and the total neglect of reading with expression. Among the excellent hints given us by America we may class the enthusiastic lead set to whole institutions by one good reader; the practice of intercollege debates, and the constant acting of plays in certain quarters; and, above all, the

school for the training of actors. The conclusion of the pamphlet emphasises the need of good teachers, and rightly lays stress on the incalculable evil done by bad teachers.

Now in what way can we apply the lessons learnt by this patient investigator to ourselves? Surely we may be one with those who in America loathe (no milder term will suffice) the ordinary professor of elocution. We know him and her on this side too; we ridicule them in *Punch*; we laugh at them in secret; but we go continually to see them perform in drawing room and concert room, and we allow them to teach children. The negro preacher consigned them all to the infernal regions. "Oh, all dem drunkards! Oh, all dem gamblers!! Oh, all dem elocutionists!!! Hell am yawning for all dem." But we do not even send them to prison. To put it less forcibly, it is only the few who know

1 "Reading and Elocution in the Schools and Colleges of the United States of America." By F. Beatrice Bardsley. 30 pp. (Printed by Hailing, at Cheltenham.)

what good reading, good speaking, good "reciting" is; and these few for very shame hold their tongues. Thus the charlatan and the evil teacher prosper, and a cultivated, quiet, literary rendering on or off the stage of Hamlet's soliloquies, or "The Seven Ages of Man," or the chorus in "Henry V." is not attempted, and if it is attempted it is not praised. Yet the best books on reading keep on dinning into our ears that we cannot as a nation read English well. Hullah, Clifford Harrison, Sir Morell Mackenzie, Plumtre, Canon Fleming, all plead for quiet, refined work, not too full of gesture; realising the poet's thought and trying to do no more; and amongst foreign writers Palleske, Ricquier, and Legouvé have long fought the battle against vulgarity. It is not that we have no guides; but it is that we insist on following, in the interpretation of literature by the human voice, not the poet and the thinker who first learns to love and then interprets his passages, but the badly trained actors of the second-rate stage. Children, too, are all round us, the best instructors in natural work that we can find. And what do we do with them? We set to work to teach them when they should be teaching us.

Surely the easiest, best, and most interesting guide to the appreciation of literature is the human voice; and surely it is the student of his own voice who, already enthusiastic over his author, can best interpret the possibilities of the voice and the author. You shall hear six first-class readers read Shelley's "Skylark"; all will differ; all will delight the audience; and every one of them will be willing to admit the others' excellences. But in the school, Shelley's "Skylark" is to be said in *one* way and in *one* way alone.

If this pamphlet teaches us anything it is this:—

- (1) We want more literature in our teachers—a finer love of the written word.
- (2) We want more freedom in our schools, and a lighter hand upon the child.
- (3) We want to encourage the fearless *raconteur*, the ready speaker.
- (4) We want to show by examples, multiplied all over the kingdom, what can be done in the way of good reading.
- (5) We want reading aloud to be recognised not as an important but as the important subject of teacher-training.

The concluding paragraph in Miss Bardsley's report reads as follows:—

"In schools of every grade the children have greater liberty to express their opinions than in English schools; they receive far more encouragement to give long answers and to discuss questions in class, and consequently they speak more fluently and they always speak out. In fact, I never heard a child 'mumble' in school during the whole three-and-a-half months I was in the United States."

We may wonder whether it would be possible to say this of any college, any ten churches or chapels taken at hazard, any school, secondary or primary, any pupil-teacher centre, or any family party, throughout the length and breadth of England.

PRACTICAL EXERCISES IN GEOGRAPHY.

By E. W. HURST, B.A., F.R.G.S.
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II.

THIS article will be devoted to two series of exercises arranged with the intention of leading a boy to draw, from material provided, inferences as to the extent and character of the influences exerted upon the human race by climate and elevation. Neither of the two series—density of population and the distribution of wheat—is exhaustively treated, but it is hoped that a supply of exercises has been provided sufficient to familiarise the pupil with the methods of investigation pursued, and, at the same time, to demonstrate that geography lends itself to the same methods of study that have made the various branches of natural science so deservedly popular as means of mental discipline.

DENSITY OF POPULATION.

To find the density of population in a district, divide the number of inhabitants by the number of square miles of surface.

That is, $\frac{\text{population}}{\text{area (square miles)}} = \text{density of population.}$

Example:—

Area, 50,000 square miles. Population 3,500,000

$$\therefore \text{Population density} = \frac{3,500,000}{50,000} = 70.$$

Ex. 1.—Fill in the following table. The particulars required will be found on the climate maps and the density of population maps in your atlas. For the last column consult the physical maps of Asia and South America.¹

District.	Population density.	Mean annual rainfall.	July temperature.	January temperature.	Average elevation.
Basin of—					
Ganges					
Hwang-ho					
Yang-tsi-kiang					
Amazon					

Having filled in the table, give as many reasons as you can why the basins of the three rivers in Asia have much greater population densities than the Amazon basin.

Ex. 2.—Find a river-basin in Africa in which the climate features of the Amazon basin are reproduced, and find from your map the population density.

Ex. 3.—Suggest two or three reasons to account for the preference shown by people for living in river valleys.

Ex. 4.—Fill in the following table:—

¹Two moderately priced atlases suitable for such exercises are:—The Classroom Atlas, 8s. (W. & A. K. Johnston); London School Board Atlas, new edition, 1s. 3d. (Phillip & Son)—though neither has a population chart. There is one in Herbertson's "Illustrated School Geography," 5s. (Arnold.)

UNITED STATES OF AMERICA; SOME AREAS AND POPULATIONS.

State.	Area (in sq. miles.)	Population (1900).	Density of Population.	Average elevation.
Idaho	84,800	161,772		
Arkansas ...	53,850	1,311,564		
Oregon	96,030	413,536		
Missouri ...	69,415	3,106,665		
Louisiana ...	48,720	1,381,625		
Arizona ...	113,020	122,931		

What conclusion do you form from the above as to the effect of elevation on the density of population?

Ex. 5.—Fill in columns ii. and iii. of the following table :—

Country.	Kind of Surface.	Population Density.
Greece		
Mexico		
Norway		
Bolivia		
California		
Chile		

Why are mountainous countries, as a rule, thinly populated?

Ex. 6.—Look at the map of Spain and Portugal. The positions of towns are indicated by several kinds of small circles and squares, which vary according to the populations. Make a list of towns with more than 50,000 inhabitants. Notice the distance from the coast in each case, and fill in the following table :—

Towns of more than 50,000 inhabitants.	State whether near to or far from the coast.

From the physical map, explain the facts set down in column ii.

Ex. 7.—From the map describe the density of population of the following districts as "high" or "low," and from the rainfall map describe them as regions of "scanty" or "abundant" rainfall.

Region.	Density of population.	Rainfall.
Sahara Desert		
Gobi Desert		
Interior of Australia		
Arabian Desert		

Hence, explain why people do not live in deserts.

THE EFFECTS OF CLIMATE.

The teacher may easily draw up similar exercises to illustrate the effect on the density of population of mining or manufacturing activities, and of additional climatic controls—climate, indeed, having more to do with the distribution of population than anything else. Particulars of climate, again,

may be furnished in order to show how the distribution of food plants is regulated. Let us take wheat as an example.

TABLE I.—Showing acreage of wheat crops in certain English counties, 1902.

County.	Total acreage under crops and grass.	Acreage of wheat.	Proportion of acreage devoted to wheat, i.e. wheat acreage total acreage.
Bedford	256,607	37,119	
Berks	363,417	34,286	
Cambridge	490,406	89,803	
Chester	536,206	13,614	
Cumberland	581,500	2,327	
Essex	797,969	109,227	
Hertford	330,902	49,501	
Lancaster	821,250	21,636	
Lincoln	1,519,556	167,843	
Monmouth	242,338	5,215	
Norfolk	1,068,521	112,719	
Suffolk	756,791	96,125	
Westmoreland ...	248,549	169	

Ex. 8.—Fill in column iv. by dividing the numbers in column iii. by those in column ii. (Answers correct to two decimal places will suffice.)

Ex. 9.—Make two lists of wheat-growing counties (a) where the wheat acreage is more than 0.1 of the total area cultivated; (b) where it is less than 0.03 of the total.

Ex. 10.—Opposite the name of each county in Ex. 9 write the amount of mean annual rainfall as shown on the rainfall map of England. Hence give one reason why the acreage devoted to wheat varies.

TABLE II.—Showing acreage of wheat crops in United Kingdom, 1902.

Country.	Total acreage under crops and grass.	Acreage of wheat.	Proportion.	Rainfall in inches.
England & Wales	27,490,790	1,679,098		26.26
Scotland	4,897,169	47,258		42.98
Ireland	15,240,135	44,244		37.20

Ex. 11.—Fill in column iv. as in Ex. 8, by dividing the wheat acreage by the total acreage.

Ex. 12.—What relation do you notice between the result and the numbers given in column v.?

Ex. 13.—Look at the July isothermal map of England and Wales. What difference do you notice between the summer temperature of the two groups of counties? (Ex. 9). Which has the higher summer temperature?

Ex. 14.—Make a similar investigation in the case of the winter temperatures.

Hence, draw up a statement to show the relation between wheat cultivation and the rainfall and range of temperature.

We may now proceed to other countries upon which we depend to make up for the deficiency in our home supplies of wheat and flour. Incidentally, it may be as well to let the pupil discover for himself one very important aspect of the fiscal questions which are occupying the Empire's attention just now.

TABLE III.—Showing imports into the United Kingdom of wheat and flour, 1902.

Country from which exported.	Tons of wheat and flour.
India	442,000
Canada	611,000
Australia	211,000
New Zealand	8,000
United States	3,248,000
Argentina	227,000
Russia	331,000
Austria-Hungary	48,000
Other Foreign Countries	270,000

Ex. 15.—Make a diagram to illustrate the relative proportion of wheat and flour received from (a) British possessions, (b) foreign countries, in 1902. This may be done by drawing three parallel lines on the scale of 1 inch = 1,000,000 tons of wheat and flour imported. Let the first line represent the total quantity imported, the second the quantity imported from British possessions, the third the quantity imported from foreign countries.

Ex. 16.—Set down particulars as to climate and elevation of each of the wheat-growing districts named in Table III., from your physical and rainfall maps, and from the one given in Fig. 1. Arrange your results in tabular form, thus:—

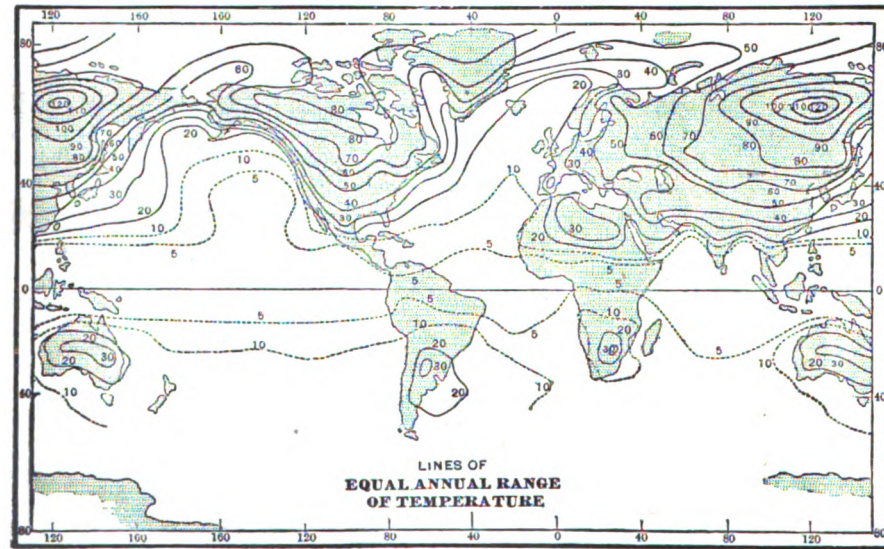


FIG. 1.

Wheat growing district. ¹	Average elevation.	Rainfall.	Range of temperature.
India			
Canada			
Australia			
New Zealand			
United States			
Argentina			
Russia			
Austria-Hungary			

Ex. 17.—From the results now obtained enumerate the conditions necessary for the extensive cultivation of wheat.

¹ The teacher must, in several of these countries, delimit the wheat-growing area more definitely.

As demonstrating the wide limits of wheat cultivation the following exercise will be found useful:—

TABLE IV.—Showing chief wheat-growing countries, with months of harvest.

Country.	Month of Harvest.	Country.	Month of Harvest.
Africa, South	November	Greece.....	June
Algeria	May	Holland	August
Argentina	January	India	February and March
Asia Minor ...	May	Italy	June
Australia	January	Japan	May
„ South	December	Mexico	April
Austria	July	New Zealand	January
Belgium	August	Norway	September
California	June	Persia	April
Canada	September	Portugal	June
Chili	January	Russia, North	October
China	May	„ South	July
Denmark	August	Scotland	September
East Indies ...	February and March	Spain	June
Egypt	April	Sweden	September
England	August	Syria	April
France	July	United States	July
Germany	August		

Ex. 18.—Indicate the regions given in Table IV. on an outline map.

Ex. 19.—Arrange the various regions according to their harvest times.

Ex. 20.—Explain how it happens that the wheat harvest is in January in New Zealand, but in August in England.

Ex. 21.—What connection does there appear to be between the times of wheat harvest and latitude? How do you explain this connection?

EFFICIENCY IN THE PRIVATE SCHOOL.¹

THERE is an idea abroad that, in teaching, the building is everything—that without the most modern form of classroom, with a large central hall, both heated by the most modern appliances, education cannot be carried on. What a mistake. We all know how essential it is that rooms should be properly ventilated and heated, and not over-crowded. But in educational work the essential is the individual. The success or otherwise of a school's work depends not upon the building but upon the individuals who carry on the teaching.

¹ Abridged from a paper by Mr. E. W. Maples, on "The Private School in its relation to the Local Education Authority," read at a Conference of the Private Schools' Association on June 19th.

The first thing for us to do is to open our schools to inspection—let us show that they are in every way fit for the object they pretend to serve. That inspection will, I believe, be of a friendly nature. We may be called upon to make some slight alterations, but I do not believe these will be of a serious nature. It may be that the requirements of the neighbourhood demand some slight change in our curriculum. If this is so, by all means let us fall in with the new demands and requirements. We must give the authorities all the information they may require. I would strongly urge this whatever be the attitude of the authority, for if we fail to do so the authority may turn round and say, "How could we consider you when we were unable to find out what you were really doing?"

Efficiency must be our watchword. Every school in the future must be efficient—some of those glowing prospectuses which offer everything from a commercial to a university education must cease to exist. I would advise all the principals to see that in their prospectuses they do not offer more than they can perform. Let our work, whatever it is, be thorough and efficient.

I come, now, to a very delicate question, the staffing of our schools. There is little doubt but that, as registration comes more and more into vogue, the salaries of such registered teachers will rise—there are too many men and women working in our profession at the present day for a mere pittance. We must in many cases be prepared not to increase in numbers our staff, but to pay a greater salary.

And here may I say one word to the educational authorities themselves. Why has your elementary education in the past thirty years been so great a success? Why, because you have trained your teachers: the men and women have not had to gain their experience at the expense of their pupils, but they have been taught how to teach. In secondary schools how few teachers have received any training! Surely in the training of the teachers lies the first work of these new authorities.

You may build schools; you may provide the best of books and apparatus, but all to no use unless at the same time you provide the individuals competent to make the best use of them. Secondary schools cry out not for new buildings, but for trained teachers.

We must make our work known. Few people are aware as to the number of scholars in our schools. Many of our schools are small; we are scattered over so great an area that even we ourselves are not fully aware of our own strength. I have the best grounds for saying that probably 71 per cent. of the boys and 87 per cent. of the girls attending the secondary schools of this country are educated in private schools.

We must obtain representation on the local and county education authorities. In the past most of us have been so wrapped up in our work, compelled to spend our time out of school in looking after our boarders, that we have as a rule taken little, if any, active part in local and municipal life. This must stop.

Our cry must be, organise and preach. I know it has been the custom amongst many secondary teachers to cry down and sneer at that organisation of elementary teachers, the N.U.T., but see what it has done for them. If those who had gone before in this great work of secondary education had been as wise in their generation as the elementary teachers of a past decade were in theirs, there would have been no need of this conference to-day—we should have contemplated the passing of any Education Act with equanimity, knowing full well that due regard would have been paid to our interests.

I do not say, copy all the methods of that great Union, but I do say, organise and unite as their members have done. Press before your local authorities what are the real needs of education. Compel them to train your teachers and obtain for your

schools freedom from rating if you can. See that in your neighbourhood there are schools willing and ready to take to scholars from the elementary schools. Surely the object of Government is to raise, not lower the status of our profession—to make it a real profession and not a mere means of existence for those who cannot enter any other. If this be so, the destruction of private schools will not attain their end.

In the interests of the children of another generation, it is to be hoped that educational authorities and principals of private schools may help one another, and that as a result there may be built up a system of education in which public and private secondary schools will each take their part.

POSITION AND PROSPECTS OF PRIVATE SCHOOLS.¹

WE are passing through a time of critical change in scholastic matters. We live in a period of educational resettlement; many are burdened with anxious thought for the future, and, while heartily desiring educational improvements, cannot but fear lest those improvements should, directly or indirectly, entail personal loss and suffering to themselves. Do not those who labour under such anxiety deserve our respectful sympathy, and is it not right that whatever is now done to improve our educational arrangements should be done after careful consideration of the work and powers of those who are already labouring in the field?

In a national system of education private schools (*a*) may be supplementary to the public schools, or (*b*) may be experimental in their character, or (*c*) under certain conditions may be made coördinate with the public schools.

(*a*) Private schools may supplement the schools provided by public authority, meeting special educational needs for which the public authority is unable (or does not see its way) to make provision. As an example of this in the sphere of primary education, take the elementary schools carried on by the Christian Brothers in Ireland. In England very great service has been rendered to the country by the preparatory schools for boys. These schools prepare for our higher secondary schools, and their curriculum covers the years from nine or ten to thirteen and a half or fourteen. Nearly all of them are private schools. A further illustration of the value and vitality of private effort in education is furnished by the remarkable development in England during the recent year of a very high grade of boarding-schools for girls. These are supplementing the work of the girls' secondary day-schools, some of which are endowed and public, some company schools. The boarding schools to which I refer are almost wholly private schools. We know how great a service has been rendered to English life by the work of the girls' high schools during the last twenty years. And now, in these first-grade boarding-schools for girls, we see a fresh and remarkable development in girls' education in England—a rekindling of ideals, and a readjustment of educational supply to our changing needs. In the third place, I would cite, as an illustration of the value of private schools as supplementary to public effort in education, the work which is being done in many places by highly efficient private teachers in the provision of teaching for little children of both sexes. Some of the schools may be defined as pre-preparatory schools.

¹ Abridged from an address on "The Value of Private Schools in a National System of Education," delivered by Dr. M. E. Sadler at a conference of the Private Schools Association on June 19th. The address is printed in full in *Secondary Education*, the editor of which, with Dr. Sadler's permission, favoured THE SCHOOL WORLD with an advance proof, from which the extracts here given have been taken.

(b) Secondly, private schools may be, as it were, laboratories of educational experiment. Schools which truly deserve such a title will always, under the circumstances of the case, be comparatively few in number. But, when their work is good and thorough, their influence is far-reaching. They affect, directly and indirectly, the ideals of those who are responsible for the aims and curricula of the public schools. At no time have schools of this character had a greater opportunity of usefulness in this country or in America or even in France and Germany. We greatly need wisely planned and scientifically recorded educational experiments, extending over a sufficient period of years, carried through with good material, efficient teaching, and adequate equipment.

(c) Thirdly, private schools may be, under certain conditions, made coordinate with public schools. By far the most striking example of this method of procedure is that adopted in Denmark and to some extent in the other Scandinavian countries. At the present time educational administrators in England would do well to have regard to what has been accomplished in Denmark, where an effective system of modern secondary education has been established at comparatively small expense by the recognition and aiding of efficient private schools as part of the public supply, the schools thus recognised and aided being under stringent guarantees of efficiency, and the headmaster receiving a recognised salary instead of residual profit.

May I venture on a few words touching some of the practical needs of the present situation? First, should not all private schools strain every nerve to make themselves really efficient? Should they not invite and welcome inspection? Should not all private schoolmasters and mistresses earnestly apply themselves to the study of methods of teaching, and to the investigation of the curricula best fitted to promote the aims of each of the many different types of school which we need? Ought not private schoolmasters and mistresses to make it one of their chief objects to provide themselves with highly-trained assistant teachers? For inefficient private schools, a bad time is coming. For the really efficient private school, able to adjust itself to new conditions, to meet new needs, and to keep its staff, equipment, and premises fully up to date, I believe that (in some grades of education, though not in all) there is going to be a better opening than ever.

ITEMS OF INTEREST.

GENERAL.

ON the vote in the House of Commons on July 9th, for salaries and expenses of the Board of Education and grants in aid, which was eventually agreed to, Sir William Anson said the number of councils called upon to formulate schemes under the Act of last year was 333—62 counties, 69 county boroughs, 139 boroughs, and 63 urban districts. Of these schemes the Board of Education has approved of 238 in England and five in Wales. The secondary inspectorate is not as yet fully organised. More inspectors of literary and linguistic qualifications are wanted, and of such experience and position as will command the confidence of the local authorities and the headmasters of the great schools. Since October last, 1,325 secondary schools had been recognised, while 296 had been refused recognition. Not more than half a million of money is expended annually on secondary education, and Sir William Anson said he feared that in some ways that expenditure was destroying an education which had some elements of good in it, without giving them anything substantial in its

place. They wanted a good liberal education with such a knowledge of science as to enable a man to understand the world in which he lived; and also a good commercial education to enable a youth to compete successfully in commercial struggles, which would give him also a knowledge of languages, literature, and history. In regard to elementary education, the question as to whether they were getting full value for their expenditure of considerably more than £11,000,000 became more urgent. The money was ill-spent, and the children were ill-taught. They had a limited supply of trained teachers, and the cause was mainly due to the insufficient supply of training colleges, and the early pressure and imperfect training of the pupil-teacher.

THE House of Commons proceeded to consider the London Education Bill, as amended by the Standing Committee, on July 14th. The Speaker ruled many of the proposed new clauses out of order. Numerous amendments were proposed and discussed, but most of them were negatived. An amendment to sub-section I., introducing the words "after consultation with the local authority" was accepted, and gives the local authority power to express its opinion as to the grouping of schools, and the number of managers on each board of management. Later, "two-thirds" was substituted for "three-fourths," as the proportion of managers to be nominated by the borough councils, leaving one-third to be appointed by the London County Council. The proportion of women on the managing committees was arranged as "no less than one-third of the whole body of managers." The Board of Education is not to make an order authorising the purchase of a site, unless satisfied that the concurrence of the council of the borough should be dispensed with. A new sub-section was added to clause 2, viz.: "Schools provided by the local education authority for blind, deaf, epileptic, and defective children, and any other schools which, in the opinion of the Board of Education, are not of a local character, shall not be treated for the purposes of this section as public elementary schools." Clause 3 was omitted, and an addition made to schedule I as to the application of endowments. An amendment was also agreed to that the managers of all public elementary schools should not be appointed for a longer period than three years, at the end of which period they should be eligible for re-election. The report stage of the Bill was passed on July 15th.

A SPECIAL chair of the History and Administration of Education at the Victoria University of Manchester has been accepted by Mr. M. E. Sadler, late Director of Special Inquiries and Reports under the Board of Education. Mr. Sadler will reside in Manchester for one term in each academic year, and during his residence will take an active part in the work of the Department of Education, which will be an important feature of the work of the University. It will be remembered that Dr. Findlay has recently been appointed to the chair of Education; among other members of the staff of the Department of Education are Mr. Thiselton Mark, Miss Catherine Dodd, Mr. J. L. Paton (High Master of the Grammar School), and Miss Burstall (Headmistress of the Girls' High School).

THE death of Sir Joshua Fitch deprives the nation of one of its leading authorities on educational questions, and us of a valued contributor. A few weeks ago Sir Joshua arranged to write a short series of articles on great ideals which have influenced the character of our educational development, and it was with sorrowful surprise that we noticed the announcement of his death on July 14th at the age of seventy-nine. To the last he was keenly interested in all matters relating to the theory and practice of education, and ready to take an active part in

the construction of our educational machinery. The article on the Education Act of 1902 and the London Education Bill, in the April number of the *Quarterly Review*, was the last of a long series of contributions to leading magazines and other periodicals in which he formed and guided public opinion. By experience, knowledge and culture Sir Joshua Fitch was exceptionally well qualified to speak with authority on educational questions, and all who are concerned in national welfare will regret that his activities are at an end.

IN spite of the increased interest taken in modern languages during the last few years, it is curious to note the persistency with which errors are made in French sentences printed in many newspapers. In connection with M. Loubet's recent visit the King was reported to have telegraphed the following words: "Les bonnes paroles dans votre dépêche que je viens de recevoir m'ont vivement touchées." This was not a mere misprint of one paper, as it occurred in many, if not all, the London dailies. We cannot believe that His Majesty is a less capable linguist than he was as Prince of Wales. English journalists are by no means behindhand in laughing at their French colleagues for referring to "Sir Chamberlain" or "sportman," but they frequently provide readers on the other side of the Channel with similar amusing mistakes.

REPRESENTATIVES of all the British and most of the Colonial Universities met in London on July 9th to consider the questions of co-ordination of University education throughout the Empire, the development of post-graduate courses in applied science, and the formation of an Imperial council to deal permanently with these and other matters of special interest to Colonial and British University students. The meeting was of an enthusiastic character, and the two following resolutions were carried unanimously: (1) "That in the opinion of this conference it is desirable that such relations should be established between the principal teaching Universities of the Empire as will secure that special or local advantages for study, and in particular for post-graduate study and research, be made as accessible as possible to students from all parts of the King's dominions"; (2) "That a Council, consisting in part of representatives of British and Colonial Universities, be appointed to promote the objects set out in the previous resolution; and that the following persons be appointed a committee to arrange for the constitution of the council: Lord Kelvin, Lord Strathcona, Mr. Bryce, M.P., Mr. Haldane, M.P., Sir William Huggins, Sir Michael Foster, M.P., Sir Oliver Lodge, Sir A. Rücker, the Rev. Dr. Mahaffy, the President of Magdalen College, Oxford, the President of Queen's College, Cambridge, the Hon. W. P. Reeves, and Sir Gilbert Parker, M.P."

At the recent annual Conference of the Association of Headmistresses, held at the Perse School for Girls, Cambridge, Miss Connolly delivered her presidential address, and in it she dealt with the Order in Council for the Registration of Teachers and with the Education Act, 1902. Speaking of the Order in Council, Miss Connolly said certain modifications, affecting present conditions but not touching the future, were still desirable, such as the registration of teachers a year late in training, and of those excellent existing teachers who ought not to be asked to qualify for registration. Several resolutions, including the following, were adopted after discussion. (i.) That the Executive appoint a small committee to consider the relative value of subjects in the Oxford and Cambridge higher certificate and higher local examinations, with a view to the preparation of a memorial to the Board of Education that the higher certificate be accepted as an equivalent for some part of the higher local examinations. (ii.) That this Conference welcomes the London University scheme for a leaving certificate as a step

in the right direction, but regrets that a double standard of leaving certificate has been instituted, as the existence of the lower leaving certificate encourages pupils to leave school while still immature. (iii.) That this Conference approves the decision of the Executive (a) to approach the Senate of the University of London, with a view to their establishing an examination with the ultimate aim of obtaining registration for junior and preparatory teachers in a supplemental register annexed to the register of teachers; (b) petition the Oxford and Cambridge Schools Examination Board to add geography to the list of subjects in Group III., higher certificate examination syllabus. Mrs. Bryant, D.Sc., of the North London Collegiate School, was elected president for the years 1903-5.

THE Marquis of Londonderry, in replying to a recent deputation representing the Private Schools' Association, who urged the claims of that association to direct representation on the Consultative Committee and a seat on the Teachers' Registration Council, said that particular interests were not sought to be represented, the idea of the Board of Education being to collect a body of experts able to deal with education as a whole. On the matter of registration he was inclined to agree with the deputation that some provision should be made under proper conditions for permitting teachers of long experience to register in column B as secondary teachers, and a modification of the Order in Council would be made shortly.

LORD ROSEBERY, in a letter to the Chairman of the London County Council, outlines a scheme for a great Institute of Applied Science in London. Messrs. Wernher, Beit and Co. are willing to provide a large sum of money towards the initial cost of such an institution, and the Royal Commissioners of the 1851 Exhibition are prepared to grant a site of four acres at South Kensington. The institution will represent, when complete, a sum of half a million. There will remain an annual charge for maintenance of £20,000. For this sum Lord Rosebery appeals to the London County Council. The details of the organisation of the proposed institute have not yet been settled, and they will be considered in consultation with the Senate of the University of London and other bodies concerned. It is proposed, Lord Rosebery says in another part of his letter, that the institution, whilst working in close co-operation with the Royal College of Science, the Central Technical College, and other branches of the University, should be organised as a distinct "school" of the University under the management of its own committee. Should the active co-operation of the London County Council be secured, there seems no reason why London should not, in a few years' time, possess an institution rivaling the great college of applied science at Charlottenburg, from which proceed every year some 1,200 young men of twenty-two or twenty-three years of age, equipped with the most perfect training that science can give as experts in chemical technology, electrical engineering, metallurgy, shipbuilding, and other branches of applied science. If our manufacturers attached any regard to scientific education they would make far better use of the men already available. At present, for instance, our chemical manufacturers seem to think they are doing their duty to the country if they pay a chemist £80 a year, and keep him hard at work with routine analyses. It is very doubtful, however, whether the manufacturers of Great Britain are sufficiently alive to the value of science to industry, to provide posts for men trained in such institutions as that proposed. There are already plenty of men with practical knowledge and scientific training awaiting openings for their energies, but they find that their qualifications count for little in the British commercial market.

DR. H. J. SPENSER, rector of the High School, Glasgow, since January, 1901, has been appointed headmaster of University

College School, London, in succession to Mr. Lewis Paton. Mr. H. J. J. Watson, assistant-master at Tonbridge School, has been elected headmaster of Merchant Taylors' School, Great Crosby, Liverpool, in succession to Canon Armour. The Rev. MarCHANT Pearson, second master and chaplain, Bridlington Grammar School, and honorary curate of the Priory Church, has been appointed headmaster of King Alfred's School, Wantage. Mr. Pearson was formerly an assistant science-master at Bradford Grammar School. Mr. C. D. Chambers, of St. John's Training College, Battersea, and Miss Amy Bramwell, of the Maria Grey Training College, have been appointed additional normal master and mistress respectively at the London Day Training College.

The University of London for the first time has conferred honorary degrees. At the recent presentation day His Royal Highness the Prince of Wales received the honorary degree of Doctor of Laws, Her Royal Highness the Princess of Wales that of Doctor of Music, and Lord Kelvin and Lord Lister that of Doctor of Science.

THE Senate of the University of Ottawa, Canada, has conferred the honorary degree of Doctor of Laws on Mr. James Cusack, founder and principal of the Day Training College, Moorfields, London, E.C., in recognition of the services he has rendered to the teaching profession and to the cause of education generally, but more especially to the voluntary schools of this kingdom, during the past twenty-five years.

THIS year's list of birthday honours shows that the claims of education have not been forgotten. A knighthood is conferred upon Alderman H. F. Hibbert, chairman of the Education Committee of the Lancashire County Council, and the late Senior Inspector of the Board of Education, Mr. Thomas King, becomes a C.B. Messrs. E. Harris and A. H. Reid (Board of Education), Mr. G. L. Apperson (Scotch Education Department), Mr. R. Calder, H.M. Inspector of Schools (Scotland), and Mr. P. E. Lemass (Secretary, Board of National Education, Ireland), are created Companions of the new Imperial Service Order.

A GENERAL meeting of the Association of Directors and Secretaries for Secondary Education was held at Oxford on June 26th. The rules of the Association were altered so as to meet the new conditions which have arisen under last year's Education Act. Important discussions took place on the financing and grouping of schools, and on school attendance. On the previous day honorary M.A. degrees were conferred by the University of Oxford on the chairman of the Association, Mr. C. Courtenay Hodgson, and on the honorary secretary, Mr. J. H. Nicholas.

THE Board of Education, having reason to believe that a misunderstanding exists as to the effect of recognition by them of schools in connection with the registration of teachers, wish it to be known that such recognition does not qualify a school to receive student-teachers, and that no school had, up to June 15th, been recognised for that purpose. The Board propose to publish from time to time lists of schools to which they accord this recognition. The Board have issued also "regulations modifying and altering the regulations for the formation and keeping of a register of teachers." Under this new scheme the registration authority may place on column B of the register any person who does not fulfil all the conditions of the registration, but who has had ten years' experience of teaching (other than elementary) and has shown ability to teach.

ONE of the results of the conference of headmasters and headmistresses of secondary schools in Surrey is that the

Surrey Education Committee has guaranteed for three years a grant of £200 a year each to the following schools: County School, Richmond; Grammar School, Guildford; Grammar School, Reigate, on condition that they develop a Commercial Department in connection with the courses of study and examinations of the London Chamber of Commerce. This will no doubt lead other county and borough education committees to give a similar recognition and support to commercial education by providing commercial departments in their secondary schools.

THE formal opening of Clayesmore School, Pangbourne, by Lord Reay, took place on June 27th. The school is the development of a smaller one at Enfield which was a private attempt to educate boys on more practical lines than is common in English schools. The methods adopted at Clayesmore were described in THE SCHOOL WORLD for June, 1900, when the objects the headmaster, Mr. Alex. Devine, has in view were stated at some length. In his speech at the opening ceremony, Lord Reay said he considered Clayesmore School would be of vast importance in the field of English education. Though it had been hitherto a private school, it would be very difficult to give any definition of a real public school into which Clayesmore could not be put. It seemed to realise all the best features of a public school. One of its most important aims was that every individual boy should be carefully looked after. No English boy, if he found his level at school and was well looked after, was incapable of rising above the level of impotence. At Clayesmore the object was to obtain out of every boy the maximum work of which he was capable, and to proceed upon lines which made the development of his faculties possible.

AN excellent attempt is being made to raise a fund to establish free circulating libraries in each of the educational districts in the Transvaal. A circular has been issued by the committee of the Transvaal Education Department Libraries Fund, of Cannon Street House, London, E.C., describing the scheme. An account has been opened with the Standard Bank of South Africa, and the bank has agreed to receive subscriptions. A thousand pounds is required to establish the libraries, and it is expected that an annual income of £250 would be enough to keep the libraries "refreshed with new supplies." Mr. Fabian Ware, of the Education Department, Pretoria, in writing of the scheme, says: "There is no way in which private effort would help us so much at present as in supplying a number of English books (good works of fiction and other interesting literature) suitable for circulation among the Boer children and young men and women. One of the results of the camp schools has been to create a desire for English books among the Boers, and everything should be done to encourage this. Now that our town and farm-school system is spreading all over the country, the Education Department have an organisation by which these books could be easily distributed." The idea is a good one, and we trust it will meet with the success its merits deserve.

MESSRS. BECKER AND CO. send us a description of their Electric Switch Board for use in School Laboratories supplied with continuous current from the town mains, or their own dynamos and secondary cells. The essential feature is that it is impossible for the students to short-circuit the mains, as only one wire is carried round the room. The switching arrangement allows any one student to switch the current on or off for his own experiments, quite independently of the other students. All students must use the same current at the same time, though it can be varied at will by the demonstrator. The board is provided with instruments for reading current and pressure, and a large variation in resistances by the use of lamps and wire frame. It is an excellent thing for boys to learn the precautions

to be taken and the arrangements necessary in using electric currents from high-voltage mains.

THE current (June) number of *The Geographical Teacher* contains several useful articles, *e.g.*, one by Dr. A. Morgan on the scope and methods of geography teaching, and one by Miss Reynolds giving a bibliography of official material available for studying the colonies. Perhaps the most important announcement is that contained in the letter from the Board of Agriculture, referring to the facilities they are prepared to give for the purchase of Ordnance maps—200 copies of the 1-inch map for £1 5s.

AN open competition is announced for a Clerkship on the Geological Survey under the Board of Education. The limits of age are 22 and 35 on the first day of the examination which is to be held in London commencing on August 28th. The subjects for examination are handwriting and orthography, English composition, catalogue and index making, comparison of copies with originals, arithmetic, geology and physical geography, translation from French or German. There is an entrance fee of 12s. 6d. and application forms must be returned to the Secretary, Civil Service Commission, S.W., by August 13th. The salary of the situation is £120—£150—£200.

SCOTTISH.

ONE of the most interesting educational debates of recent years took place in the House of Commons when the Scottish estimates for national education came up for consideration. The Lord Advocate in a prefatory speech marked by great lucidity reviewed the outstanding features in the work of the year. He referred with special satisfaction to the increase in the average attendance of the pupils and in the number of certificated teachers. The report of the Commission on Physical Training received high praise, and the startling nature of some of the statistics in regard to the physical condition of town children opened up, he said, new vistas of the duties and responsibilities of both central and local authorities in regard to such pupils. But possibly no part of an exceedingly interesting speech was received with more general approval than that in which he announced that the Museum in Edinburgh was to be the headquarters of the Department in Scotland and that the Secretary or some of his assistants would be in frequent attendance there. The Government have been well advised to make this concession to the almost universal demand for a closer connection between the Department and the country it is meant to control. It is very questionable if this sop will satisfy Professor Laurie and other ardent nationalists, but they may fairly contend that it justifies their criticisms, and accept it as a better vantage ground for renewing their attacks.

IN the discussion which followed the Lord Advocate's speech, the utmost satisfaction was expressed at the record of progress in almost every direction which he had disclosed. Many members, however, took occasion to protest emphatically against the circulars which issued in ever-increasing volume from the Education Department, and they expressed the hope that their tireless energy in this direction might be diverted to some more useful object. The regulations governing the issue of Leaving Certificates also came in for general disapproval, and it is all but certain that, if the Lord Advocate had not taken the unusual course of "talking out" the debate, the motion condemning the Government for their policy in this connection would have been carried.

UNDER the auspices of the various Educational Associations of Aberdeenshire and Banffshire, a public educational con-

ference was held in the Marischal College, Aberdeen. The meeting was very largely attended, and representatives were present from nearly all the northern counties. The Chairman, Professor Davidson, Aberdeen University, explained that the object of the conference was to focus the opinion of all interested in the cause of education, and thus seek to mould the character of the forthcoming Education Bill for Scotland. After an exceptionally interesting discussion, the following resolutions were passed almost unanimously:—(1) That education in Scotland shall be controlled by one central authority for the whole country, and a single local authority for each educational district. (2) That this central authority shall be a Government Department located in Edinburgh, responsible to Parliament alone, and acting with the advice of representatives from local authorities, universities and the teaching profession. (3) That the area of the local authority be sufficiently large to contain within itself provision for education of all grades—primary, secondary, and technical. (4) That the local authority shall be a Board consisting of members chosen by popular election for educational purposes, to which shall be added representatives of the various educational interests, the elected members to form a majority.

A CONFERENCE on educational questions, in view of contemplated legislation, was held in Glasgow on the 3rd inst., under the auspices of the Scottish School Boards' Association. Dr. Smith, Chairman of Govan School Board, presided, and among others present were Mr. M. Shaw-Stewart, M.P., and Dr. Douglas, M.P. After a long discussion the following resolutions were carried by a large majority:—(1) That in Scotland the local education authority in each district should be elected directly by the ratepayers, and solely for educational purposes. (2) That for the more efficient administration of education the enlargement of school board areas is desirable. (3) That a Consultation Committee, or Board of Education, should be appointed in Scotland for the purpose of considering proposed departmental circulars and changes in the Code.

IRISH.

A COMMITTEE has been formed representing Trinity College, Dublin, which has issued a public appeal for funds to erect buildings and further to endow the teaching of the experimental sciences. It is pointed out that the University of Dublin has to meet demands made upon her resources never contemplated by her past benefactors. Facilities must be provided for research available both to student and teacher, "for in no way is greater vitality imparted to the teaching, and the teacher more truly initiated into the scientific methods, than by the association of teacher and student in original investigation." Within recent years Trinity College has out of her own resources built the Schools of Anatomy, Physiology, and Medicine, the Zoological Museum, and the School of Pathology, and has considerably enlarged and equipped the Chemical Laboratory of Trinity College. Further, a Lectureship in Pathology has been established, and a teacher in practical electrical engineering has been appointed, as well as additional assistants in physics, botany, chemistry, and pathology. The appeal is now made for external aid to build and equip laboratories and lecture rooms for physical science, electrical and mechanical engineering, botany and zoology.

IT is gratifying to state that this appeal has met with an immediate and most generous response from Lord Iveagh, who has offered to contribute the £34,000 necessary for the buildings, if within three years a sufficient sum is contributed to produce the annual outlay of £2,730 deemed necessary by the Committee

for the endowment of the teaching ; or, if within that time the requisite amount is not contributed for all the departments, he will give whatever capital expenditure is necessary for the equipment of any one of the particular departments, as soon as a sufficient annual income for it is assured. The Committee are therefore appealing for £100,000, in order that they may be able to take full advantage of Lord Iveagh's offer.

At last, owing to the kindly and harmonious spirit induced by the Land Bill, the Nationalist members have allowed the money to be voted by the House of Commons for the acquisition of certain land in Dublin, and for the erection and equipment of a new Royal College of Science. The sum to be provided out of the Consolidated Fund is not to exceed £225,000, and it is to be repayable within thirty years. The site has long since been fixed upon in Merrion Road, near the museums.

At the Maynooth College Union this year, much attention was paid to the recent report on University Education. The feeling was favourable to the report, and it was generally accepted that the solution there proposed for relieving the grievances of Roman Catholics in the matter of higher education would afford a satisfactory basis for a settlement of the question. One great difficulty was, however, brought forward, and that is the position of Maynooth College in reference to the scheme. The Archbishop of Tuam, Dr. Healy, one of the signatories of the report, vigorously maintained that Maynooth should have been included in the scheme on equal terms with the Queen's Colleges, and that in no circumstances could the bishops allow Maynooth to be broken up, even for the benefit of a Roman Catholic University College in Dublin. Dr. Sheehan said there were three alternatives before Maynooth in relation to the proposed new college. The first was that there should be University courses in classics and mathematics at Maynooth, and that the majority should stay there, only a few honour students being sent to a house of residence in Dublin, which, however, would be intended chiefly for post-graduates needing a higher grade in theology. This scheme would keep Maynooth autonomous, but would be expensive as duplicating the new institution in Dublin. The second scheme was to transfer the honour students to Dublin, and to keep the pass students at Maynooth. This would be very hurtful to the pass men. The third, and educationally the soundest scheme, was to transfer all the Arts students from Maynooth to Dublin. But this would be very expensive, and would practically ruin Maynooth. Dr. Sheehan was, on the whole, in favour of the first alternative.

THE new Intermediate programme, while containing a few improvements—such as the introduction of one foreign language as compulsory into the mathematical courses, the introduction of music as a subject, the awarding of composition prizes to candidates in the Junior Grade, the publication of the results of the examinations, and the permission granted to students to take the science course of any year a second time—is essentially the same as last year, and imposes a cast iron system on Irish schools. The Teachers' Guild has forwarded to the Intermediate Education Board a series of criticisms upon it. The most important is the suggestion, repeatedly made from all quarters, that a student should be allowed to enter for more than one course. Most students are eligible by the subjects they take for more than one, and, in case of pass pupils especially, it is often very difficult to know which course should be taken. If the Commissioners were sympathetic with Intermediate schools they would see this point at once. The Guild further suggests that a wider latitude should be given to Honours students in experimental science, that a student eligible by age should be allowed to compete a second time for an exhibition in the same grade unless he has

previously won an exhibition of the highest value, that Greek be allowed as an alternative to experimental science in the Preparatory Grade, and that the courses for girls should not be made easier than for boys. They also add some notes on the subjects set in the programme. It should be added here that the papers set at the recent examinations were easier and fairer than last year.

WELSH.

THE interesting experiment of a Summer School of Welsh, at the University College of Wales, bids fair to be a decided success. The Welsh Language Society have secured the services of Professors Anwyl and Morris Jones, and Mr. T. Hudson Williams. It is intended to give three hours instruction in Welsh grammar and literature, and what is, perhaps, quite as significant, instruction will be offered as to the best methods of teaching Welsh to beginners. Carnarvon School Board has given £4 to enable two teachers to attend the course, and efforts are being made to get other local authorities to follow this example.

THE number of distinguished Welshmen who received their early education in the elementary schools is increasing. In the recent Honours Schools at Oxford, a first-class in natural science was obtained by two Welshmen, one who had been taught in an elementary school and a higher grade school at Blaenau Festiniog, in North Wales, and another, to make the balance even, from Carmarthenshire, in South Wales.

MR. R. M. HUGH-JONES recently gave an address to the Colwyn Bay Branch of the Teachers' Guild. He pointed out the value of private schools, even in a country like Wales, with its newly-organised system of county schools. At present only the preparation of boys and girls for the county schools was provided for by the elementary schools by the educational authorities. But surely the close individual attention which many children require cannot be given in the large classes of the elementary schools. There is good reason, therefore, why the more careful attention which is possible in the smaller classes of preparatory schools should not be discouraged. The question arises, how can such schools be brought into relation with County authorities? Surely there is nothing in the new Act to prevent scholarships from the County Council being held in efficient private schools, if the holders prefer them.

THE following resolutions have been unanimously passed at a conference of the Principals of the University Colleges of Wales and the professors of education:—(1) That it is educationally desirable that any proposals formulated by the County Councils for the training of teachers to supply the needs of the schools in their respective districts, should take into account not only the provision for such training already existing in their districts, but also the training institutions throughout the principality. (2) That it should be regarded as a necessary qualification for the entrance into the day training departments of the University Colleges that a candidate should have passed the matriculation examination, or some equivalent examination. (3) That it is desirable that all King's scholars admitted to the day training department of a University College should, in addition to any primary school training they may have had, have received a substantial part of their general education, in some recognised secondary school (including under this term properly constituted pupil teachers' schools).

THE above resolutions refer to the training of elementary teachers. But attention has been given to the training of secondary teachers. At Cardiff, meetings were held on February 7th and June 6th. The Conference decided in favour of a period of continuous practice in which the school to which the student is attached would be responsible; that during the period the control of the student should rest with the school subject to a plan of study agreed upon beforehand between the school and the college; but that during this period the college lecturer should pay occasional visits to the school in order to test the progress of the student at times, to be arranged with the head of the school. The Conference was of opinion that the total fee for the year's course of training should be £30, and that a substantial portion of this should be paid to the school where the period of continuous practice is undertaken. How far this scheme is practicable remains to be seen. It has thus far been discussed by South Wales. But it is a step forward to find a scheme approved by a college and the schoolmasters of the district.

CURRENT HISTORY.

THE Stationers' Company have been celebrating their five hundredth anniversary by entertaining at dinner their patron, the Archbishop of Canterbury. The occasion lent itself to much historical reminiscence. The age of manuscript books, the introduction of printing, and the various limitations on reproduction of books imposed by authority were naturally referred to. We are reminded that the "censorship" of books began practically with printing, and lasted in England till nearly the end of the seventeenth century. It was in the hands of the ecclesiastical authorities, whether these were semi-independent, as they were before the Reformation, or largely under the control of the State, as they were after that event. We remember the stories of the early translations of the Bible, of the ecclesiastical controversies under Elizabeth, when the Established Church held her own by means partly of the "censorship" against Roman and Puritan foes. We recall, too, Milton's "Areopagitica: a Speech for the Liberty of Unlicensed Printing," and the curious, illogical way in which that liberty was gained in 1695. The law of libel and its history during the last two hundred years forms an interesting appendix to the earlier heroics.

OF Preferential Tariffs and of Zollvereins we have recently heard much, and shall constantly hear more for some time to come. The subject is too large for these columns, but we note some side issues. Some months ago we drew attention to the possible formation of a new Imperial Parliament, viz., the meeting of the Colonial Premiers. The new power has made strides more rapidly than we then thought probable. We are told now that preferential tariffs were approved of at the last meeting of this body, and what will happen if the British Isles do not adopt the policy of which the Colonies have approved, or will approve, is hinted at in terms the vagueness of which only increases their threatening nature. The British Empire, consisting, as no other empire has consisted, or does consist, of "self-governing" parts, has evolved a fiscal system (or shall we call it want of system) which, in connection with international treaties, has caused a position which it would tax the wit of any man clearly to explain, and the consequences of which tend to be world-wide. Will the British Isles, if they are in a minority in this "federation," yield to the others? and if so, why?

WE note also that the "preferential tariffs" discussion has made the question of Cabinet unanimity and responsibility quite

keen again. Are Mr. Chamberlain's opinions those of the "Government"? does the Prime Minister agree with them? and to what extent? are questions as much discussed as the merits of the new fiscal policy. This uncertainty illustrates the nature of the British constitution, and the gradual, unconscious way in which it has been shaped. The Cabinet itself and all its characteristics are the result of many forces; it is a growth, not an artificial or conscious creation. It has always been unknown to the law; it detached itself from the Kingship suddenly and accidentally in 1714; it evolved unanimity and a new head during the eighteenth century; it became more dependent on the House of Commons than on the King in 1832. And even so, its progress has not been uniform; we have had "coalition" ministries to balance the "sole" ministry of Walpole. There was a period of some years during which "Catholic Emancipation" was an open question, and now Mr. Balfour tells us that "absolute uniformity of opinions cannot be expected among the members of a Government; it is sufficient if there is common action and common responsibility."

S. PETERSBURG celebrates this year its two-hundredth anniversary, and there are ceremonies connected therewith. But illuminations were forbidden, and the police took measures to prevent people from flocking too thickly into the centre of the city. We have used the word "but" as if there were a contrast between the two sentences we have written. We should certainly speak so if referring to similar celebrations in an English town. But we think we should in the case of Russia and its modern capital have more correctly used the word "and." It would accord more with the policy of Peter the Great and almost all his successors since. The civilisation of the Russians, so far as that process has progressed, and its movement westward both geographically and morally, has been a movement from above, in which the people have had but little share, and have not been expected to appreciate. S. Petersburg was the work of a man beyond his time, and the breach between Tzar and people typified by that advance to the Baltic has never been healed. In Russia it is "everything for the people, nothing by the people," and the Government is not far ahead of its people.

RECENT SCHOOL BOOKS AND APPARATUS.

Modern Languages.

Heine, Die Harzreise, with some of Heine's best-known short poems. Edited by L. R. Gregor. xxx. + 183 pp. (Ginn.) 2s. —Among the numerous editions of the *Harzreise*, Mr. Gregor's will occupy a respectable place. It is not only "well gotten up" (as they say in his country); the editorial work has also been done very carefully. Very full, indeed, are the notes on German life and ways; they afford some insight into the quaint customs of the German student. The introduction briefly states the main facts of Heine's life. The text is conveniently, but not excessively, expurgated; and a few representative poems form a welcome addition. Mr. Gregor rightly attaches considerable importance to the intellectual exercise of translating Heine's prose into good English; and he gives his own renderings of numerous difficult passages. As a rule he is successful, but we must confess that we do not like "that look of hoary precociousness, as well as a complete outfit of 'cops,' nor "my enraptured eyes," nor "Banged up again, Johnny! all the

sawdust has leaked out of me," nor "the whole blessed forenoon," nor "it displeased me dreadfully too."

Little German Folk. By Margaret Schramm. Revised by A. I. Mayhew. 106 pp. (The Norland Press.) 2s.—We approached this book with pleasant anticipations: at a superficial glance it seemed all that could be desired. A well-designed binding, nice paper, a large and clear type, and pictures on every page. Unfortunately we have been disappointed. To see *Theil* and *Sparziergang* on the page of contents showed that the proof reading must have been indifferently done; and, indeed, the book contains a very large number of slips. Substantives have small initials and adjectives big ones; we find *Brot* and *Brod*, *Not* and *Noth*, *zu einen*, *mit einen*, *Schoosse*, *Schäffchen*, *mir* for *nur*, *Kirsche* for *Kirche* (three times), &c. This is inexcusable in a book meant for children. The text is fairly good, though by no means always "written in the everyday speech of little German children," as the title-page promises. The illustrations are good as pictures; but it seems absurd to give the men and women, and often also the children, sixteenth-century costumes.

A. E. C., Kinderfreuden. 80 pp. (Clarendon Press.) 1s. 6d.—A series of scenes of home life, written by a lady fond of her three boys, whose pictures are certainly most attractive. The eldest is supposed to be the speaker, and he tells us about his father (a doctor), his rabbits, storks, parrots, the Zoo, the sea-side, and many other things. He does so brightly and simply; sometimes, however, the language is rather too "grown-up." At the end of the book there is a vocabulary, in which the words appear in the order of the text. It is really very charming; but it is not quite clear what use can be made of it. The construction of sentences is often quite complicated; the vocabulary is large, and, unfortunately, the "local colour" is quite English. If a German boy, living in Germany, had told us about his interests and surroundings in the same bright way, and had done it in language consistently simple, the book would have been more generally useful. We quote a few sentences in support of our contention that the language is often unnatural: "Wir kamen auch viel schneller wie sonst an die Eisenbahnbrücke, so dass wir länger auf derselben bleiben konnten, ohne an das wartende Mittagessen gemahnt zu werden." "So vergessen sie nie ihnen zugefügtes Gutes oder Böses." The proof has not been read with sufficient care.

É. Souvestre, Un Philosophe sous les Toits. Edited by de V. Payen-Payne. 40 pp. (Blackie.) 4d.—This selection has been carefully made and well edited by Mr. Payen-Payne, who also contributes a short note on the author. It is commendably free from misprints, and forms a welcome addition to the rapidly growing series of "Little French Classics."

Körner, Select Poems. Edited by E. P. Ash, M.A. 46 pp. (Blackie.) 6d.—This little volume is exceptionally well edited. The text is carefully printed; the poems selected give a very good idea of the youthful poet's gifts and limitations (especially his excessive admiration of Schiller), and the notes are quite sufficient. The only slip we have noticed is *Antoine* for *Antonie* on p. 3.

The Fairy Tales of Charles Perrault. Edited by L. A. Barbé. viii. + 124 pp. (Blackie.) 1s.—There is no need to say much about these tales, which have delighted children for the last two hundred years. They are neatly printed here, and illustrated with seven pictures of varying merit and by various hands. The notes give all that is required; indeed, they err in giving too much help. The vocabulary seems to be complete.

Heine, Die Harreise. Adapted and edited by W. J. Etheridge. 56 pp. (Blackie.) 6d.—This selection contains about half the original; only two of the poems are retained. The notes are good as far as they go. A map of the country traversed by Heine would have added to the interest.

A Selection of German Idioms and Proverbs. By Alfred Oswald. 127 pp. (Blackie.) 1s. 6d.—This convenient little volume contains three chapters of German idioms (to which there is an index) with English equivalents, an alphabetical list of German proverbs with English renderings, and a similar list of English proverbs. As far as we have tested the book, it is tolerably accurate, and should prove useful.

H. Heine, Selections in Verse. Edited by D. Thiems, Ph.D., D.D. 48 pp. (Blackie.) 6d.—A moderately good "note on Heinrich Heine" precedes a number of lyrics, mostly taken from the *Buch der Lieder*, and disfigured by some annoying misprints; e.g., *Knechtenschar* (p. 14), *Rechten* (p. 16), *Fern* (p. 20), *Dem Schiffer* (p. 24), *Doch ist die* (p. 28), *Giutrote* (p. 32), *Tancer* (p. 38). The notes are of no great value; the renderings are at times positively ludicrous; e.g., *vielterschlungne Zimmer*, "suite of apartments"; *Opferspende*, "offering-gift"; *zartdurchsichtig*, "with a delicate and transparent complexion."

Classics.

Xenophon, Cyropaedia. Book II. With Introduction and Notes founded on those of H. A. Holden, and a complete Vocabulary. By E. S. Shuckburgh. viii. + 102 pp. (Pitt Press Series.)—Dr. Holden's editions are a model of thorough scholarship, and there is no need to do more than mention his name in order to gain confidence for this. But it may be doubted whether the book is suited for beginners in Greek, as Dr. Shuckburgh thinks it is. The vocabulary is large, and the subject-matter "has no story." The editing has been well done. But why is the Pitt Press so niggardly in margins? Their school books are all a little painful to read for that reason.

Aeschylus, Septem Contra Thebas. xxviii. + 75 pp. *Aeschylus, Persae.* xx. + 75 pp. With introduction and notes by A. Sidgwick, M.A. (Clarendon Press.)—Mr. Sidgwick's merits as an editor for schools are too well known to need comment. The present volumes bear out his reputation. We do not think he takes a high level as a textual critic, but for the needs of the upper forms of schools and of undergraduates he is a safe guide. His views are always defensible by good reasons, his illustrations apt and to the point, and (most important of all for examination candidates) he is admirable in stating divergent or alternative views. Those who purchase these books may depend on having a thing which will be useful to them, and will help them to understand their author better perhaps than many a more ambitious commentary.

Ancient History for Beginners. By G. W. Botsford, Ph.D. With maps and numerous illustrations. xvi. + 494 pp. (Macmillan.) 7s. 6d.—There seems to be a great demand in the United States for brief compendiums of ancient history. In this country we do not think they are used or likely to be used; we should prefer to have classical history treated apart, and the whole volume taken up with the rest of the ancient world—surely enough for a volume. Here forty pages suffice for everything but Greece and Rome, although it is true Rome includes Europe down to Charlemagne. Mr. Botsford is fairly well up to date. He knows that unity of language does not imply unity of blood (p. 4), and his information is generally accurate; but he says that the Aryans worshipped the powers of nature, and

that their gods were nearly identical with those of early Greece (36), a daring statement; the temple at Aegina is given as sacred to Athena (p. 119); and the cut of a warrior from Marathon (p. 121) is inserted without comment in such a way as to suggest that its original fought in 490. Mr. Botsford's style is not always pleasing; but the book is, on the whole, satisfactory.

Xenophon, Memorabilia. Edited on the basis of the Breitenbach-Mücke edition by J. R. Smith, Professor of Greek in Ohio State University. xix. + 270 pp. (Ginn.) 6s. 6d. *Xenophon, Memorabilia.* Book I. Edited by B. J. Hayes. 78 pp. (Clive.) University Tutorial Series. 3s. 6d.—The American text-books seem to be best adapted for intelligent persons who begin Greek late; for they combine elementary instruction with comments not suited for young boys. The notes are printed at the foot of the page, which makes them inconvenient for school use; but they are hardly up to university standard, except in case of passmen. Prof. Smith has almost confined his attention to the interpretations, and does not throw new light on the difficult textual questions of the *Memorabilia*. The commentary is most full in the first book. This is a useful, practical edition, taking it as a whole; but Prof. Smith has missed an opportunity. We do want a scholar's *Memorabilia*, in which the questions of wider interest which the book suggests may be fully dealt with. A comparison of Socrates as here depicted, and the Socrates of Plato, would be very interesting, especially if it were carried out into the method and substance of the dialogues given in the text.

Mr. Hayes's volume has the same character as most of the Tutorial Series. It aims at conveying information in the most pithy form, and no more of it than is necessary for "getting up" the book. There is the Life of Xenophon, Life of Socrates, summary of the book, and sketch of early Greek philosophy, all compressed into fifteen pages. We have no criticism to offer on this, except to express some surprise at the patronising way in which Greek religion is treated. Xenophon consulted the Delphic oracle, and therefore "he was not above the superstitions of his age." Would Mr. Hayes say the same of Plato for praising the Eleusinian Mysteries? The notes are elementary. For its purpose the book is well suited.

Mr. C. S. Jerram publishes a key to his excellent *Latini Reddenda*, under the title of "Reddenda Reddita." (Longmans. 3s. 6d. net. 37 pp.)

Edited Books.

Selections from Shakespeare's Henry V. 32 pp. School Classics. (Blackie.) 2s.—We have referred to this series favourably before. This addition to it is very well done, and the selections represent certainly the best passages of the play. The notes are numerous, but judiciously compressed; if the edition were not strictly for juveniles many of them could have been also suppressed. Altogether very meritorious.

Scott's Legend of Montrose. By W. K. Leask. 239 pp. (Blackie.) 1s. 6d.—This edition is commendable, though presenting no unique features except some illustrations among the notes, and no great evidence of exceptional editorial labours. The notes certainly have been well done and are interesting; so too is a short list of "common" Scottish words used in the text. Many of these are quite uncommon to the English reader even when passably well instructed.

Shakespeare's Othello and the Crash of Character. By Dr. William Miller. 108 pp. (Natesan & Co., Madras.) 2s.—

No. 56, Vol. 5.]

Dr. Miller always has a great deal to say, and he says it in right good earnest, adorns it with sufficient graces of style to make it pass muster among much more pretentious efforts, and always succeeds in being interesting if not profound. This volume is the distilled essence of a great deal of other critical work which has passed through Dr. Miller's rather original mind. A portrait of the author of this series of "Shakespeare Shockers" adds to the interest of it; and it is like his previous booklets, largely devoted to the necessities of Indian youth.

The Bishop's English. By G. W. Moon. 164 pp. (Swan Sonnenschein.) 3s. 6d.—The author appears to think that the niceties of grammarianship are the main things in life. Consequently he has fallen foul of Bishop Thornton, of Blackburn, for advising the use of the Revised Version of the Bible. But this is only a preliminary onslaught. The revisers themselves are declared to have produced an "ungrammatical, immoral and blasphemous version." This contention Mr. Moon expounds upon many pages, with copious examples. The Revised Version is practically a dead book, and it was scarcely worth while to devote so much attention to its deficiencies.

Scott's Lord of the Isles. By H. B. Cotterill. 228 pp. (Macmillan.) 2s. 6d.—Another volume of this excellent and scholarly series. Its greatest interest lies in the notes, which have been done with great care. A vocabulary supplies the philological element in a separate form, and although this portion of Mr. Cotterill's labours seems, at times, like a work of supererogation, because so many of the words he deals with are fairly well known and accepted, even in the poetic sense in which Scott employs them, it will be found useful to students. The introduction strikes us as being the poorest part of an otherwise excellent performance. The editor has gone too much upon the easy plan of extracting other people's statements and opinions in his discussion of Scott's poetry, and the biographical portion is unwontedly scanty; but even that contains an extract from Lockhart. The historical sketch of the period, dealing with the Scottish War of Independence, is, however, distinctly well written. Altogether this is a volume to be recommended; but if Mr. Cotterill edits any more of Scott's poems let us have his own estimate of Scott rather than slabs of musty prose disinterred from the mouldy magazines of the pre-Victorian epoch.

History.

How our Grandfathers Lived. By A. B. Hart and A. B. Chapman. xiv. + 371 pp. (The Macmillan Co.) 3s. 6d.—This book consists of extracts from letters, books, &c., of the years 1780-1820, illustrating the social life of Americans in various parts of the United States, and, to a certain extent, in England. A few necessary explanations of words are given in the margin, and there are pictorial illustrations. It makes a very interesting reader, and would be welcome in school libraries both for girls and boys.

A History of England for Catholic Schools. By E. Wyatt-Davies. xv. + 539 pp. (Longmans.) 3s. 6d.—Mr. Wyatt-Davies here gives us a readable and very correct history on the usual lines, except that ecclesiastical matters are treated from the point of view commonly called Roman Catholic. We think he has fulfilled his purpose excellently. With the exception of one or two points, which are, after all, matters of controversy, there is nothing with which we feel at all inclined to differ. His treatment of Elizabeth and of Cromwell in especial is very fair, and we can commend the book not only to those for whom it is

intended, but to others who may like to know how certain events appear to those who have not hitherto been represented in historical text-books for schools.

A General History of Commerce. By W. C. Webster. ix. + 526 pp. (Ginn.) 6s. 6d.—This is not a book to be read. It is rather an encyclopædia in small of the outward facts of commercial history. The amount of information is enormous, but much of it is surely quite indigestible. There are ten illustrations of vessels and nineteen maps. Thirty-four pages suffice for the Greek and Roman periods, seventy for the "middle ages," and we are half-way through the book before we reach the "fall of Napoleon." The method is to proceed by countries in each period: thus in Part IV., which deals with "The Age of Steam," four chapters are given to England and France, and one each to central Europe, the "remainder of Europe," and the United States. The consequence is that commerce is judged in too particularist a way, and prosperity is measured not from a world point of view, but according to the relation between exports and imports. The English reader will find, on reading between the lines, that though the author, who is "lecturer in Economic History in New York University," condemns the "mercantilist theory" and talks freely about the "ignorance" of previous generations, he yet seems to think "protection" a good institution, at least in many circumstances, and that an excess of exports over imports is the chief, if not the only index of success.

Geography.

A New Geography of the World. vii. + 216 pp. (Oliver and Boyd.) 1s.—Contains many maps and diagrams, and will be found as useful as most other geographies of the world containing as few pages.

The Practical Teaching of Geography in Schools and Colleges. By A. Morgan. 18 pp. (Philip.) 6d.—A pamphlet reprinted from *The Geographical Teacher*. It contains numerous suggestions useful to the teacher of geography, many of them dealing with out-of-door work capable of being undertaken by the older pupils in schools, e.g. map-making by means of the plane-table, the study of contours, observation of latitude &c.

Guide to Switzerland. cvi. + 235 pp. With 31 maps and 6 plans. (Macmillan).—Visitors to Switzerland will find this Guide a very useful companion. The information is well-arranged and the maps are exceptionally fine. There are no less than thirty-one maps and six plans, and these alone will give the tourist satisfaction in possessing the book. The introductory matter includes an article on Switzerland by Mr. Joseph King, hints to travellers, pedestrians and climbers, sections on glaciers, avalanches, baths and springs, vocabulary, and a list of hotels, those most frequented by American and English travellers being distinguished by dark type. Routes are described in six groups, namely, north-western Switzerland, Lucerne and district, the Bernese Oberland, western Switzerland, the Engadine, and the Italian Lakes. Some of the details might be corrected or supplemented by anyone intimately acquainted with Switzerland; but the book is intended to meet the requirements of the average traveller, and it does this in an adequate and serviceable manner.

Grammar and Composition.

Précis Writing. By H. Latter, M.A. 304 pp. (Blackie.) 3s. 6d.—A useful collection of extracts from official correspondence, giving material for fifteen précis papers, the first of which is annotated and presented in complete form.

Standard Shilling Dictionary. 444 pp. (Blackie).—Very good value for the money. The dictionary proper contains no illustrations, but there is a useful illustrated appendix dealing with mechanical powers. Other appendices that will be serviceable in schools are included, e.g., principal monies, &c., of the world, phrases, contractions.

English Composition. By Amy Kimpster. 301 pp. (The Norland Press.) 3s. 6d.—Teachers, of lower forms especially, will find much to interest them in this manual. Great stress is laid on the incidental teaching of "composition"—that is, the training in clearness and accuracy of expression. The book contains a well-planned scheme, graduated for pupils from 3 to 14, and model lessons, &c., based on this scheme, are given. The last part of the book, containing about 180 pages, consists of exercises in word and sentence building: these are very useful, and are carefully graduated in six stages. They may be obtained separately, price 2d. each.

Applied English Grammar. By E. H. Lewis, Ph.D. xiv. + 363 pp. (New York: The Macmillan Co.) 3s. 6d.—The first seventy odd pages of this book consist of numerous exercises on "correct usage"; some of these will be unnecessary in English middle-class schools, but the general principle is sound. Next, we have about an equal number of pages dealing with the structure of sentences. A valuable feature of this part is the number of pictures (14) to be used as exercises in sentence-building and in essay writing. The rest of the book is devoted to more formal grammar and punctuation. The complete course is intended for two years, and it is, on the whole, well planned; we can recommend the book to teachers who are at liberty to wander from the beaten tracks.

Science and Technology.

Elements of Physics. By A. T. Fisher, assisted by M. J. Patterson. 180 pp. (Heath.) 2s. 6d.—This book consists of nine chapters, which explain, in a simple manner, the leading facts concerning matter, motion and force, work and energy, fluids, heat, light, magnetism, electro-dynamics, and sound. Numerous illustrations are included, and one hundred and nineteen experiments are described. A set of easy questions is added at the end of each chapter. The treatment of numerous subjects in so small a space is necessarily superficial, and attempts are made, especially in the section on electricity, to explain phenomena which ought only to be discussed in more advanced text-books.

Elementary Physics, Practical and Theoretical. Second Year's Course. By John G. Kerr and John N. Brown. 169 pp. (Blackie.) 2s.—Though we think it is better to include a minimum of theory only in a laboratory book, and to reserve formal explanations of mathematical physics for the lecture room, we have pleasure in recommending the exercises in this little volume as the work of experienced teachers. The experiments deal with dynamics, heat, and light, and are numerous enough to fill the time available in most schools in a year for laboratory work in physics. It seems a pity, however, that a student should have to wait until his third year in the physical laboratory to do simple work in electricity, magnetism, and sound. Like the First Year's Course, the work is well printed and excellently illustrated.

A Brief Course in Qualitative Chemical Analysis. By John B. Garvin. 238 pp. (Heath.) 3s. 6d.—A few years ago "test-tubing" was the branch of experimental science usually taught in secondary schools in this country, but now we are apt to congratulate ourselves upon the adoption of a more educational method which postpones test-tubing to a later period of

the student's training. The author of this text-book is an apostle of the old method, and maintains that the solution of the numerous problems arising from qualitative analysis "affords the keenest delight and satisfaction," and "provides the soundest kind of training in experimentation, observation, and inductive reasoning." The volume contains the more common reactions for the metals and acids, also a detailed account of the systematic examination of substances of unknown composition. Throughout the greater portion of the book, alternate pages are left blank, evidently for students' notes. An appendix gives information on preparation of reagents, solubilities, &c. No analytical tables are given, but the student is aided to formulate his own scheme of separation after studying the reactions of the members of any group. The dry tests are not mentioned in the reactions of the metals, but are tabulated in the section on systematic examination. With the aid of this volume qualitative analysis would be intelligently taught.

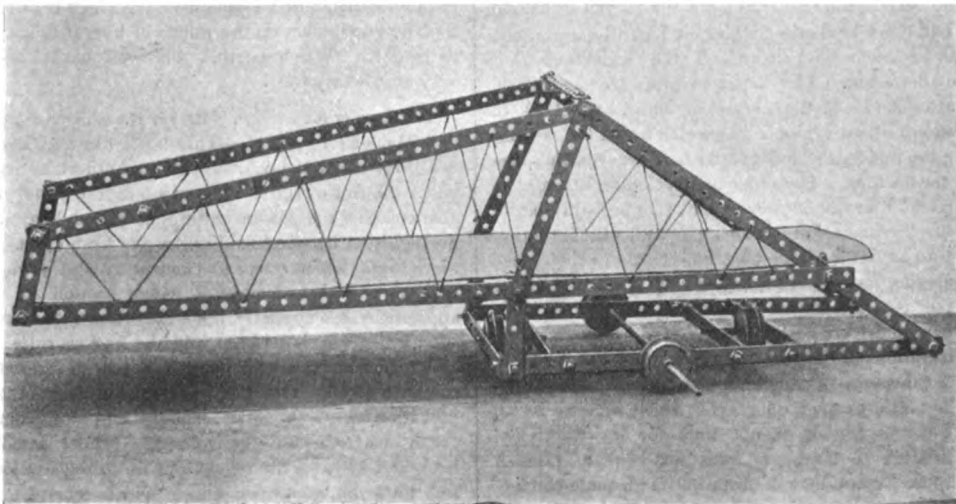
(1) *Mechanics made Easy*. An adaptable mechanical toy, 7s. 6d. (2) *Box of Accessories*, 5s. (Philip & Tacey).—For boys who are interested in machinery and engineering—and what boys are not?—no better present could be given than these two boxes of metal work for making models. The first box includes a number of strips pierced with holes half-an-inch apart, angle pieces, brass wheels, grooved steel-rods, nuts and screws, &c.; the second one contains pinion, gear, and centric wheels, pulley wheels, and a few additional grooved rods and other accessories. It is astonishing what can be made with these things: cranes, bridges, elevators, railway lines, signals, machinery, shafting, &c., can be constructed so effectively that the liveliest satisfaction is derived from the handiwork. One of the models which can be built up with the strips, screws, and wheels is shown in

be better employed than in constructing the various models to which the parts lend themselves. The occupation gives scope for ingenuity, demands the exercise of care, and combines pleasure with instruction in a way which is not excelled by any other means with which we are acquainted.

Mathematics.

Logarithms, Metric Measures, and Special Subjects in Advanced Algebra. By G. A. Wentworth. 142 pp. (Ginn.)—It is not quite clear why this little book should be issued in its present form; it consists, with the exception of seventeen pages on metric measures, of chapters on logarithms (with a table of five-figure logarithms), compound interest, continued fractions, permutations and combinations, and general equations. The treatment of these subjects does not differ from that usually followed. The chapter on equations is illustrated by graphs and contains a clear statement of Horner's method of solution.

The Junior Arithmetic. By R. H. Choate. viii. + 370 pp. (Clive).—In adapting the "Tutorial Arithmetic" to the needs of junior forms the author, who collaborated with Mr. Workman in the preparation of that book, has retained the order of the chapters and the method of treatment, omitting the more difficult portions of the larger work. Large numbers of additional examples are given; for school use the examples seem almost too numerous. It is impossible to turn over the pages of any book on arithmetic designed for schools without being impressed with the enormous waste of energy involved in the English system of weights and measures. Can nothing be done to save both teachers and pupils from the senseless drudgery that system entails?



Swing-bridge; flooring made of cardboard.

the accompanying illustration, and many more elaborate machines can be made. The value of the work lies in the exercise of the creative and constructive faculties involved in it. Moreover, when a boy finds that he can construct a strong working model from simple parts, he is given confidence in the strength of materials rightly arranged, and is encouraged to undertake works which he would have considered to be quite beyond his powers. We have no hesitation in saying that the two boxes should form part of the leisure-hour equipment of every school. Boys who find no delight in reading could not

Inductive Plane Geometry. (Revised Edition.) By G. Irving Hopkins. vi. + 208 pp. (Heath).—The author states that in an experience of twenty years he has found that fully three-fourths of his pupils can demonstrate unaided, or at most with a suggestion or two, the majority of theorems, the demonstrations of which are given in most text-books for the pupils to read and memorise. In this book, therefore, after stating the theorems, he offers aid in the way of suggestions only where the pupil needs it. Within limits the method is good, and in a course of demonstrative

geometry, preceded by a rational system of geometrical drawing, the proofs might be much shorter than they are usually made; but in this book the method of allowing the pupil to find the demonstrations for himself seems carried to excess. One result of the method is that the leading theorems do not receive their proper emphasis; the tendency in all books on geometry is to give too many theorems, and this tendency is very noticeable in the present case. The author has evidently spent much labour in producing this work, and while it contains much excellent material, and has many suggestions for the teacher, yet it seems too condensed for the average pupil. On pp. 191-208 is a collection of examination papers set to entrants at several American colleges; these will be of interest to English teachers.

Principles of Arithmetic. By H. O. R. Siefert. v. + 163 pp. (Heath).—This book is stated to be the substance of a series of discourses given from time to time to the teachers of the four upper grades of the Milwaukee Public Schools, and is said to contain the minimum of what the teachers in those grades ought to know and the maximum of what the pupils ought to be taught of the principles of common and decimal fractions, percentage, ratio and proportion, involution and evolution, and mensuration. There is probably not much in the book that is new, but there is certainly a good deal that teachers do not, as a matter of fact, put into practice. Young teachers would greatly profit by a study of the methods here illustrated. Stress is laid, and justly laid, on the value of proportion, though there may be a difference of opinion as to the best method of presenting it. The style is simple and lively. The author indicates in many cases the derivation of words; perhaps he will consider whether "paralleloped" (p. 149) is correct orthography.

Essentials of Algebra for Secondary Schools. By Webster Wells. viii. + 367 pp. (Heath).—The range of this book is that usually understood by "Algebra up to the Binomial Theorem;" but there is also a chapter on logarithms and one on undetermined coefficients in which the convergency of series is briefly discussed. The earlier chapters are particularly good; the introduction at the outset of simple problems to illustrate the use of literal symbols is excellent, and the method of establishing the rule for the multiplication of negative numbers is simple and satisfactory. The order of developing the subject is to a great extent a matter of opinion, but it is probably better to take up quadratic equations in connection with factors than to postpone them to so late a position as they occupy in this book. Partial fractions too, instead of coming in at p. 324, might have been considered as a method of simplifying a fraction. The introduction of a short chapter on limits is to be commended, but the demonstrations of theorems in which limits are or ought to be used—e.g., theorem of undetermined coefficients—are not very thorough. The chapter on graphs which appears as an appendix is too meagre. Is it not time for the traditional chapter on variation to disappear from text-books? Does it serve any purpose except that of fostering inadequate conceptions of variability? In any case, variation should be treated in connection with the graphical representation. The book, taken as a whole, compares favourably with current text-books; the style is throughout simple and clear.

Miscellaneous.

Reading made Easy. Part II. By A. Snell. 79 pp. (Philip). 8d.—This is a well-printed, clean, and attractive little book. The pieces are well within the small child's power and many simple and original pieces of verse are included.

The Royal Alphabet School: a method of learning to read, &c. Part I. By S. Croft. 24 pp. (Murray). 6d.—This is a bold attempt to familiarise little children with all the sounds

attached to the letter A. But the booklet does a good deal more, and *incidentally* gives the learner easy lessons in Pitman's shorthand. Many teachers will welcome the introduction of shorthand at an early age, and there is no doubt that shorthand could be taught easily if taken at this stage of school life.

The True Theory of Voice Production. New edition. By J. P. Sandlands. 32 pp. (Sonnenschein). 6d.—Mr. Sandlands, a clergyman living at Thrapstone, is well known as a curer of voice ailments, and in this small book he sets out his "theory." We must confess that, of all the books on voice production that we have ever read, this is the hardest to understand. It seems that Mr. Sandlands can cure, but from a couple of perusals of this pamphlet it seems equally clear to us that he does not know how he effects his cure. His remedy for voice ailments is very simple, "Come to me."

The Songs of a Child. By "Darling" (Lady Florence Dixie). 579 pp. (Leadenhall Press.) 3s. 6d.—The authoress of these pages is known as a versatile and gifted woman, and she shows in them no little metrical facility for a girl between the ages of ten and seventeen years. One must not look for depth of thought, or even of genuine poetic promise in this volume, but the trick of rhyme is there; and in the later productions evidence of considerable budding mental power is displayed.

Wild Oats. A Sermon in Rhyme. By M. G. Hime. 41 pp. (Churchill.) 1s. net.—The theology of this composition is quite unexceptionable, and so is the verse—as verse. That is to say, the scansion is correct; which may not be without influence in a versified appeal to the religious instincts. Dr. Waits succeeded in compounding much the same sort of mixture, though he, at his worst, was rather less prosy than Dr. Hime at his best. Regarded as literature, this "Sermon" is a trifle; but its reasoning is sound and its appeal forcible. It is another instance of sanctified common-sense, which is calculated to have a really good effect on the minds of boys if they can be induced to read it. We hope that this well-meant effort will bear very satisfactory fruit.

The Law of Education. By W. R. Willson. 732 pp. (Sweet and Maxwell.) £1 1s.—This book has been compiled for the use of members of Local Education Authorities and Committees under the Act of 1902. It is an attempt to bring within manageable compass the powers and duties of such bodies. It carefully distinguishes between Authorities and Committees, and between the powers which relate to elementary and to higher education respectively, and devotes a whole section to finance. The appendices are specially full—the Education Acts from 1870-1902 are given *in extenso*, and the various rules, orders, forms and regulations, issued by the Board of Education are also similarly given. Pages 442-451 contain lists of the various local education areas—counties, county and non-county boroughs, urban districts—and the voluntary school associations. The book also includes the regulations as to registration of teachers, and rules for secondary schools which receive grants from the Board of Education. The work appears to us to be compendious and well arranged; and its information is well digested and up to date; it ought to serve well the purpose for which it has been compiled.

School Room Travel. Compiled by W. E. Long. 116 pp. Gratis. *Educational Stereographs.* 8s. 6d. per dozen. *Aluminum and Walnut Stereoscope.* 4s. (Underwood and Underwood).—The attractive book published by Messrs. Underwood under the title of *School Room Travel* should do much to encourage the introduction of the stereoscope into schools. It is not merely a descriptive catalogue, but contains a large amount of useful information relating to physical, political and commercial geography, ancient and modern history, nature,

study and other subjects. The introductory section on physiology is very well done and consists of notes on typical objects and scenes selected from many parts of the world. The notes constitute, in fact, a summary or syllabus in which no important characteristics are overlooked, and references are given to stereoscopic pictures illustrating all of them. The stereographs which have been submitted to us are of a most instructive character; and the relief and perspective are so striking that, next to actual travel, there could not be a better means of giving pupils permanent impressions than is afforded by these pictures. Some of the pictures make excellent subjects for developing powers of expression, and any pupil with a spark of imagination could be encouraged to construct a story about scenes brought before his eyes in such a vivid fashion. There can be no doubt whatever that stereographs are far superior to ordinary flat pictures in educational value, and we strongly recommend teachers to take advantage of the inspiring means of instruction now provided by the enterprise of Messrs. Underwood. The stereoscope is specially designed for school use, and is not likely to get out of order even with the rough handling to which it would sometimes be subjected by boys.

The Place of Industries in Elementary Education. By Katharine Elizabeth Dopp. i. + 208 pp. (P. S. King & Co., London and Chicago.)—The short preface to this remarkable book disarms the critic by its statement that for many years the author worked upon the lines suggested; and, if we may quarrel with one thing only, we must say that one meagre reference to actual experience seems to be a very hard treatment of the reader. Briefly, the book breaks new ground in England: though it is only one more plea for common-sense in education and intelligent interest in work. The whole volume, with the exception of a few scattered sentences, tries to answer the question, "How can we use the intelligence and experience of primitive man in our modern teaching?" Primitive man by slow stages invented an arrow, and discovered the use of elasticity. Then some genius invented the bow and put the arrow on the string. Now we should, says the author, introduce children to the complexities of modern industrial life by letting them, under guidance, follow, sympathise with, succeed with, and fail with, primitive man in his long course of development. The reasons for nomadic life, for co-operation, for subdivision of labour; the slow development of the sailing ship from the unpointed log; the thousand-and-one nature problems; all these are to be set before the child, not as solved, but as solvable questions. There is not a dull page in the book and every chapter is suggestive. We seem to see, also, in the pages, almost as deep a dissatisfaction with modern education as in the denunciation of Mr. H. G. Wells.

A Memoir of Anne Femina Clough. By B. A. Clough. (Edward Arnold.) 6s.—There is no change in the text of this new edition of Miss Clough's life; it has been brought out more cheaply, in response to the wish of old pupils and admirers, that the work may be within the reach of everyone. This is indeed desirable, for a whole generation has passed away since the foundation of Newnham College and the developments of the early 'seventies. Our young people may well learn from a book like this the history of the movement, which is carefully explained here, not only as concerns Cambridge, but as showing itself in the North of England Council, the beginnings of University Extension, the establishment of the Cambridge Higher Local Examination, and other schemes. But this biography gives more than history; it paints from diaries a vivid sketch of what life was to girls and women of the comfortable classes about 1850, in its account of the pathetic struggle Miss Clough made to find scope for her exceptional character and energies—a life of scraps and futilities, studies undirected,

vain efforts, till she was past forty years of age, and at last, about 1864, found her true field. What must life have been for women of lower powers, less natural vigour? The book paints, too, that character itself, in touch after touch, minute, even trivial, recording the little human failings and peculiarities, as well as the underlying greatness and simplicity. Yet somehow it fails to give, to those who did not know Miss Clough personally, the secret of her force, her influence, her sway; the style is dull, and lacking in poetry, feeling, beauty. The Cambridge coldness freezes it; it is clear and accurate, but dead. So far, indeed, none of the books on this movement are adequate; the *vates sacer* of the story of women's education in the Victorian era has still to come.

Frauenbildung. (Leipzig and Berlin: Teubner.) One mark (1s.) each number.—This monthly magazine, now in its second year of existence, is devoted to the interests of all grades of girls' education—from the University courses down to the elementary schools. It is well worth the attention of English readers, as it deals with many subjects, and these in a thorough fashion, which are seldom discussed in our educational journals. Most of the articles are by experienced teachers, though now and again it is clear that the non-scholastic writer is allowed a few words; and it is pleasant to find that German parents are interested in educational problems, and anxious to unite with the teachers in anything that makes for the welfare of their daughters. Among the many good articles a few call for special attention, being of interest not only to German teachers, but to English ones alike. "The Domestic Education of Girls who have left the Elementary Schools" is a strong plea on behalf of giving all girls a knowledge of the various branches of domestic work, and this may be obtained by a short and inexpensive course of training. Herr Klumpp, in *Was uns not tut*, utters a sensible and timely protest against cramming girls with names and dates in history, geography, literature, &c. He also animadverts against the absurd practice of setting young girls in examinations essays which require mature judgment and an amount of knowledge impossible for young persons. "Co-education" occupies a considerable amount of attention, an interesting account being given of the present feeling in America—the original home of the movement—on the subject. It would appear as if in Germany, as in England, opinion is divided. A list of books on educational subjects given each month adds to the value of the magazine, while English readers will be interested to hear that English educational matters are not neglected. The keynote throughout is one of progress; *Frauenbildung* should have a long life and prosperity before it.

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.

Programme of the Education Section of the British Association.

ON the eve of the departure of schoolmasters and schoolmistresses for their well-earned vacations, will you kindly permit me to use your columns to remind them that the meetings of Section L (Educational Science) of the British Association will take place on September 10th, 11th, 14th and 15th, at Southport, under the presidency of Sir William Abney, K.C.B., F.R.S.?

It is hoped that the success of the past two meetings will be more than equalled on this occasion, and that there will be a large muster of those actually concerned in the practical work of education.

The Organising Committee has decided to continue the procedure adopted at previous meetings, namely, to confine the discussions to a few broad subjects.

It is proposed to devote two days (September 10th and 11th) to an organised discussion of school curricula, based on a series of short papers contributed in advance, so that there may be time to print and distribute them. Separate questions will be dealt with in separate numbered paragraphs, in order that it may be possible to discuss together the corresponding paragraphs in several introductory papers.

The Organising Committee suggest that the discussion should follow lines laid down broadly in the following scheme:—

Character of curriculum (general) suitable for (a) primary (preparatory) schools, (b) secondary schools, with reference to such questions as:—

(1) What subjects, if any, all children should at first study in common.

(2) Whether the training should not in all cases necessarily include (a) literary instruction, (b) practical instruction (science, drawing, manual and physical training, &c.).

(3) How far up the schools both these should be carried.

(4) At what stage and to what extent divergence from the general preparatory courses should take place, and what should be (broadly) the curriculum of each type of school, the types to be considered being schools preparing for commercial professions, domestic professions, engineering and applied science professions, literary professions.

(5) To consider what should be the treatment in the above several types of school of the two branches of instruction, (a) literary, (b) practical—*i.e.*, what should be the subjects included under these two heads in various types of schools, and how (broadly) they should be dealt with.

Introductory papers have been promised by Miss Burstall and Dr. M. E. Sadler, Mr. J. L. Paton, Mr. W. L. Fletcher (Liverpool Institute), Prof. John Adams, Mr. T. E. Page, and others.

A joint meeting with the Geographical Section will be held to discuss the "Teaching of Geography." The discussion will be opened by Mr. H. J. Mackinder, Reader in Geography, University of Oxford, and he will be followed by several gentlemen who have devoted special attention to this important branch of school work.

In addition to the above subjects, there will also be discussions on the reports of committees on:—

(a) "The conditions of health essential to the carrying on of the work of instruction in schools."

(b) "The teaching of Natural Science in elementary schools."

(c) "The influence exercised by universities and examining bodies on secondary-school curricula, and also of the schools on university requirements."

(d) "The teaching of botany in schools."

The Organising Committee is desirous that teachers should take an active part in the work of the section. Important results have already followed the work of the past two meetings, and much practical result is hoped for from the Southport meeting.

W. MAYHOWE HELLER,
Recorder, Section L.

Heuristic Methods of Science Teaching.

IN the July issue of THE SCHOOL WORLD, Prof. Armstrong pays me the compliment of an extended notice of my little book, "A First Course of Chemistry (Heuristic)." In view of the attention now being given to the methods of science teaching in schools, some reply to his criticisms may not be devoid of interest.

The keynote of Prof. Armstrong's complaining appears to be that the word "heuristic" is misapplied by myself and others. I leave the latter to speak for themselves, but a dictionary (1903) gives me the meaning of the word as I understand it, viz., "the method in education by which the pupil is set to find out things for himself." I consider that Prof. Armstrong's method as indicated by his remarks, and my own method as worked out in my book, both come within the limits of the above definition. My treatment of the method, however, differs from his in the following respects:—(i.) the learner has the problems suggested to him in logical sequence; (ii.) he is not permitted to work out the answers to these in any haphazard manner due to his inexperience; (iii.) he is led as far as possible to form sound deductions from his observations and experiments.

Wherein lies the insult to the young beginner's common sense in drawing his attention to an observable *fact*? As a geologist I demur to Prof. Armstrong's statements about localities; but putting this aside, what does it matter whether the chalk is hard or soft, if only the student is led to exercise his judgment properly respecting the specimen in his hand? Prof. Armstrong proceeds: "The only true policy is to give a lump of chalk to the student, to let him see chalk and handle it; then let him write about it in a plain, crisp, straightforward way. In fact, give *him* an opportunity of displaying some intelligence." That is exactly the aim of the array of questions in Exercise 1. I cordially agree with Prof. Armstrong that "all *talk* about the properties of chalk is out of place at the beginning;" that is why I start the student's work by asking him questions.

I consider that the oft-repeated enquiry of a child, "what is it made of?" does directly lead the enquirer to the threshold of chemical knowledge; and that, therefore, the term "chemical facts" cannot be meaningless to him. And judging from my experience of pupils who have passed through my hands—a not inconsiderable number in twenty-three years—I have no hesitation in saying that an absurdly small proportion have known such facts as that limestone is burnt to lime, or that lime is used in making mortar. How can pupils be started in their work "from this common knowledge" when they do not possess that information? They would have to be told first of all in Prof. Armstrong's own words, "Limestone all the world over is burnt to lime, which is used in making mortar." If this would not be "didacticism pure and simple," one is at a loss to know what is.

I admit that the term "blast-furnace" is open to objection, but I do not know of a better. No pupil of mine, however, has needed excessive mental effort either to discover it or use it. And as regards the use of the pieces of paper, it would probably surprise Prof. Armstrong to know how often a boy of his own accord has thus kept temporary memoranda of weight, &c., to be incorporated later in a well-arranged record. Of course such directions are only a means to an end, and do not apply to older students. A young learner usually requires much training in orderliness; and I find that he cannot keep a presentably neat record-book if he makes it the receptacle of "jottings" and "rough work." He keeps the bit of paper in his note-book, and has no need to cry "Eureka" over a thing which he has not lost!

Prof. Armstrong further objects to the introduction of electricity in the decomposition of water. His objection interests me, as I remember having some unnecessary qualms on this very point. I asked the advice of a mutual friend of Prof. Armstrong and myself—no less an authority than the late Dr. J. H. Gladstone—and his decisive reply was: "Certainly—by all means I should introduce it," and added, "you wouldn't prevent a boy using the Bunsen burner, would you, until he understood the subject of combustion?"

But, after all, these details only touch the fringe of the main question. Prof. Armstrong and myself, I take it, are in com-

plete accord in that we both wish the children to work out their own inquisitiveness with the single object of advancing their future mental and moral welfare. Our aims are identical; the question at issue between us is the *how*.

Strongly as I am in favour of the later methods of science teaching, there are points in the older method which I for one should be sorry to lose. Didacticism need not necessarily be cram; it has so often been so in times past that it has now got a bad name, and forthwith the "heures" would hang it. But is such action reasonable? The nature-loving child who accompanies you on a country or sea-shore ramble, or on a visit to the Natural History Museum, expects you to "tell it things"—and woe betide you if you cannot do so, or if you draw on your imagination for facts. What about the science lectures which many a child loves—*e.g.*, those given at the Royal Institution? Did anyone ever accompany an intelligent child on any of the above occasions, and not wish that he could tell more in reply to the insistent little questioner? Yet all this didacticism, and, as such, is hateful to the "heurete." Is it all to go? And if it is not to go, why in the name of common sense should it be completely banished from school life?

Yet another point. Proposals respecting practical work appear to me of little use if they are impracticable. The mortar in the playground is a case in point, understanding what I do of boy and girl nature. But even granting for the sake of argument that the heuristic method, as enunciated by Prof. Armstrong, is to be adopted in all its fulness, how is the school time to be obtained to follow it out? Modern languages, mathematics, writing, spelling, geography, history, drawing—and Latin—all call for their due share of attention. Do the "heures" really grasp the fact—I ask them to pardon my apparent didacticism—that headmasters are at their wits' end to know how to find time for the multiplicity of subjects in which the parental community demands that its children shall be educated? Which subjects are to make room for the science work if the latter be not mapped out, and the path of the young discoverer made perfectly plain wherein he is to walk? How much additional time would be required for a child to "discover" its way towards the application of electricity to the decomposition of water? We may have our ideals, but we have to adapt ourselves to our environment in educational as in other matters.

"The proof of the pudding is in the eating." One of my former pupils who has done well at a technical college of high repute told me not long ago that what attracted him to science was that while I helped him (didacticism) I always made him reason out a thing from his own knowledge (heuristicism). Which seems to teach me that a middle course is here, as elsewhere, the safest.

J. H. LEONARD.

I AM glad that Mr. Leonard has taken notice of my criticisms and that he recognises that they were made in no carping spirit; as he says, our aims are identical. Only good can come of any discussion which will tend to bring about an understanding among teachers on questions of method; it is very desirable that we should discuss such questions freely.

But I deplore his defence of the practice of taking notes on pieces of paper. Let us hope that when the next edition of his book is issued this most objectionable practice will no longer be advocated by him. There is no evidence of sound and successful training equal to that afforded by a note-book neatly and systematically kept, containing a frank statement, in concise terms, *written while the work is in progress, at the bench*. The keeping of such books involves moral, mental and literary training of the greatest possible value to the student—and to the teacher!

The argument underlying Mr. Leonard's letter only confirms the opinion I formed on reading his book. A meaning given to

a word in a dictionary may be understood in very different ways by different persons: I can only say that Mr. Leonard's conception of the way in which the pupil should be set to find out things for himself is not mine; I do not see how freedom of will or judgment can come in if every step to be taken be marked out in advance; the path of the discoverer wherein he is to walk is never made perfectly plain until the walk be done—and not often then. And I must decline to accept Mr. Leonard's rendering as in any sense a justifiable statement of the policy of which I am an advocate. Books on heuristic teaching are necessarily but a travesty of the method: they have no place in the laboratory. I trust Mr. Leonard will come to recognise this and abolish his sub-title.

In my article only the abuse of the term "heuristic" was dealt with, not the question of didactic *versus* heuristic teaching; nor can this now be discussed. Needless to say, both methods have their place. But it is beating the air to raise this question when that under discussion is: "What constitutes heuristic teaching?" Understanding on this point is of fundamental and vital importance; unfortunately, few see how vital. If dull Pistol could say, "the world's mine oyster, which I with sword will open," surely we present-day teachers may recognise our opportunity and see that it is our duty to provide the swords with which the infinite variety of problems the world affords may be attacked—our duty to train eyes to see that there are problems, on all sides. It is not for us to open and serve up the oysters: we can only strive to teach the art of oyster opening; that the art is not to be learnt by eating oysters, we all know full well. The term "heuristic" is abused, misunderstood, by teachers because so few have served at the oyster stall. I can only counsel apprenticeship to the trade: skill is not to be acquired by reading, writing or talking even; no "master of method" yet elected can give it; practice alone maketh perfect.

HENRY E. ARMSTRONG.

English Papers in the Scottish Leaving Certificate Examination.

THE Scottish Leaving Certificate Examinations—the annual "inquest of the nation" for secondary pupils—have come and gone. From very modest beginnings in 1885, these examinations have gradually extended their bounds till now they practically dominate the whole field of secondary education in Scotland. As the character of the examinations must always to a large extent determine the nature and scope of the teaching, it is well that the annual tests should receive the most careful scrutiny, so that they may make for thoroughly sound and liberal education.

As in other years, very many of the papers set this year might well serve as models of what such examination tests should be. Unfortunately the English paper of the Lower Grade is as bad an example in the opposite direction as could well be found. The passages for dictation and paraphrase were needlessly long. One does not require to eat a whole cheese in order to find out its quality, and the capacity of a pupil can be gauged as readily from ten as from twenty lines of paraphrase or dictation. In the passage for dictation appeared such unnerving phrases as "fastidiousness of hypercriticism," "exacerbation of party," "negotiating the fragrant dust or the tranquillising quid," "scintillation of genius," "insipidity of accident and syntax." Such words and phrases are surely altogether outside the vocabulary of the average or even the clever pupil of fourteen or fifteen years of age. The literature questions to an even greater degree than last year encourage text-book cramming in its most unashamed form.

Here is the question in full:—

"Give an account of the following works, and of their authors:—'Faerie Queene,' 'Essay on Man,' 'Minstrelsy of the Scottish Borders,' 'The Seasons,' 'The Vicar of Wakefield.'"

The Department very rightly insist that a knowledge of liter-

ature is only of value when it has been acquired at first hand. They should see to it, therefore, that their own examiners do not directly encourage the very opposite.

The English paper of the Honours grade has been since the institution of the examinations a wholly ideal paper. Every year the questions set suggest to the teachers topics for treatment of the highest value. Whoever is responsible for them has literary knowledge and taste of the highest kind. Would that he would infect his colleague of the Lower Grade!

Bellahouston Academy,
Glasgow.

D. MACGILLIVRAY.

Army Examinations.

I WAS very astonished to read the letter of "Twenty Years an Army Class-master" in your July issue. It is true that the Army examinations are again to be altered, but it is not true to say that the regulations will be issued without consultation with experts. Surely "Twenty Years an Army Class-master" has seen the Report and minutes of evidence of the War Office Committee on the education and training of officers, which was issued in May, 1902. On this Committee were, among others, Sir Michael Foster, Dr. Warre, and Mr. Walker; and among the witnesses were Mr. Baker, Mr. Compton, Captain James, Dr. Macguire, Mr. Philpotts, Mr. Pollock, Mr. Roberts, and Mr. Somerville. Surely these may be styled experts in education! And it is on their evidence that the new regulations were drawn up. The latter are all in favour of a simplification of the examination, and a discountenance of cram. The only point in the Report that is open to grave criticism is the discouragement given to modern languages. After the startling display of ignorance given by our officers during the International Expedition to Peking, one would have thought that the War Office would have seen the necessity of encouraging language study.

DE V. PAYEN-PAYNE.

Geology as a Branch of Nature-study.

FORTUNATELY the attempts made by some enthusiasts to define and delimit nature-study, to say what subjects exactly it shall include and what natural phenomena it must disregard, have not as yet met with much success. The idea that nature-study should be regarded rather as a means to develop an open-eyed and intelligent interest in Nature in all her aspects seems, however, to gain general acceptance. Personally I am glad of this, for my work lies in an obscure corner of England, where no one of intelligence can, it seems to me, live a single week without wishing to understand the broad principles governing the arrangement of the rocks building up the crust of the earth.

Our school is within a quarter of a mile of the sea, and the cliffs there, as in many other parts of North Cornwall, provide material enough for the object lessons of many terms. Within the space of a short walk are to be found examples of such geological structures as horizontal, inclined, and contorted strata; synclinals and anticlinals; faulting and metamorphism; to say nothing of the various stages in the formation of pebbles by the action of tidal waters; the well-known phenomena of the weathering of hard and soft rocks; and the formation of sand dunes.

The exigencies of our school curriculum make it impossible to find time enough for the inclusion of geology as a formal subject in the school time-table, though we are able to give a certain number of periods to what we call now by the name of nature-study. At first, it seemed to me that the advocates of nature-study wished the name to be confined to the study of plants and animals and to have inanimate Nature ignored, and I was by no means sympathetically disposed towards what seemed most likely shortly to become merely a new school-subject. The

official report of the exhibition held in London last year, containing as it does an excellent address by Prof. Grenville Cole on the subject of "Geology as a branch of Nature-study," has reassured me, and I have not hesitated to allow geological subjects to take their turn with plant and animal studies during the hours assigned to nature-study. I hope other teachers will follow my example.

H. PETHERICK.

Memorial to the Late Mr. T. G. Rooper.

A DESIRE has been expressed in many quarters that steps should be taken to perpetuate the memory of the late Mr. T. G. Rooper, M.A., H.M.I., who passed away on May 20th, 1903, occasioning a regretful loss to a large circle of friends, and deplored by all whose privilege it was to be associated with him in various branches of educational work. All who knew him are aware of the value of his inspiring influence, his far-sighted enthusiasm, and his noble character.

Mr. Rooper held the office of H.M. Inspector of Schools in the Isle of Wight, Southampton, and the vicinity during the last seven years, and previously spent fifteen years as H.M. Inspector in the Bradford district. His splendid work in the cause of education is widely known throughout England, and his influence extended to other countries. His powers and his means were always generously placed at the disposal of the many movements with which he was identified.

An influential Committee has been formed to give effect to the feelings referred to by establishing some permanent memorial in honour of Mr. Rooper, so that there may be carried down to future generations the record of a name and a life which will always be held in peculiar affection and esteem. In order that the memorial may be associated with the work to which he devoted almost the whole of his life, the Committee suggest that it should take the form of a scholarship, to be called the "Thomas Godolphin Rooper Scholarship," tenable at a place of higher education by students who have at some time been scholars of a public elementary school, but that all conditions should be finally decided at a meeting of subscribers. To raise a memorial worthy of the occasion, a sum of from £1,500 to £2,000 should be obtained—sufficient to found a scholarship of the annual value of not less than £50. The Committee beg to call your attention to this memorial scheme, and to appeal to the sympathy and support of your readers.

The contributions of your readers are earnestly requested. Cheques may be sent to Mr. A. Key, 31, Belmont Road, Southampton. Further information concerning the memorial will be gladly supplied by

F. J. C. HEARNSHAW,
J. F. HUDSON.

Hartley University College,
Southampton.

The School World.

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SIXPENCE.

COPY BOOKS AND PENMANSHIP IN THE SCHOOLS.

By J. W. JARVIS.

St. Mark's Training College, Chelsea.

Advice a century ago.—The Modern Upright Style and its present modification.—The Civil Service Hand.—A new and beautiful Handwriting.—Some Copy-books with specialties.—Blank paper.

“THE Accomplished Tutor,” or complete system of liberal education, published in 1806, gives the following instructions to young gentlemen and ladies “for the attainment of the art of writing:”—“It is necessary that the learner be provided with the implements requisite for writing: a good pen, and good free ink, without which it is impossible to write a fair copy; a round or flat ruler (the round one is used for dispatch, and the flat one for sureness); a leaden plummet or black-lead pencil to rule the lines, without which the learner will never write straight; and some pounce or gum sandrack-powder to rub the paper with, if it be too thin to bear the ink, and when bold hands are to be written, as large text, German text, or the like; also when a word or sentence is scratched out with the penknife, in which case the place must first be rubbed smooth with the haft of the knife, or a piece of clean paper, and then rubbed with the pounce to enable it to bear the ink. A quarto-sized copy-book is the most proper, as each page will contain a copy of ten or a dozen lines, which will be sufficient to write at one time.” Then follow instructions about ruling lines parallel to each other, and after a page of warning about the tops and tails, and the very hygienic one of not allowing the abdomen to press more than very gently against the desk, the learner is told that it is requisite that he should know how to make and mend his pen before he proceeds to copy in round-hand text twenty-six apothegms each of which begins with a new capital letter, Xerxes weeping at mortality, and Zeal being sometimes proper, concluding a most suggestive series. The chapter ends by a receipt for making black ink, to which, if the green peelings of walnuts be added, a stronger and more beautiful colour is given. Chapter II. is

a remarkable one on secret writing, and small wonder the agony column flourished, for the instructions are worthy of the inner ring of a diplomatic service.

But we have changed all that. The modern boy has never heard of pounce,¹ never uses a round ruler if he can get a flat one, dare not scratch out in his copy-book, and could not make a quill pen to save his life. All things are done for him, and the art of penmanship is passing away before the art of typewriting

The problem before the master now is the choice of style in which his pupil shall write. The old-fashioned hand was distinct and clear, but weak in the up-strokes. It was occasionally disfigured by flourishes, and was a somewhat difficult thing to acquire, and few copy-books in this method can now be obtained. The slope to the right has grown more vertical, until we have the “Upright” copy-books. The publishers claim for this new style of penmanship that it produces a maximum of legibility, and that it makes the ordinary forward scrawl and the ungraceful backhand equally impossible.

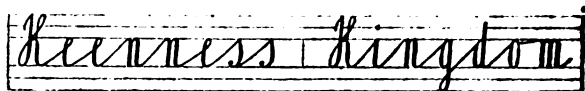


FIG. 1.—McDougall's “Upright” Copy-books.

To Mr. John Jackson must be credited the establishment of vertical writing as a system in 1886, and since then he has had many imitators. It is certainly an aid to the practice of writing shorthand, and it is claimed that it is allied to the position taken in drawing.

Obta the great port and arsenal of Austria

FIG. 2.—Jackson's New Style Vertical Writing (reduced in size).

This is probably claiming too much, for the difficulty of preventing the ungraceful backward slope is almost insuperable, and the same publishers have issued a series of semi-vertical copies.

¹ Pounce, a fine powder, such as pulverised cuttle-fish bone, used to prevent ink from spreading on paper, now superseded by blotting paper.

In these there is a slight slope to the right in order to obviate the tendency to backhand writing.

Use discretion at all times.

FIG. 3.—McDougall's "Upright" Series (reduced in size).

Messrs. Macmillan have issued a series of copy-books in which, while maintaining the upright stroke, they avoid the pointed curve which is seen in Figure 1. The writing is bold, legible, and graceful, and extraordinarily easy to acquire. It is free from flourishes and tails of any description, but its long letters are shorter, and unless the pen is held correctly, there is a tendency towards the backward stroke.

The Day Book contains entries of all goods sold on credit during the day.

FIG. 4.—Macmillan's "Official" Copy-books (reduced in size).

To avoid this a semi-vertical slope, also called Civil Service Hand, from the style of writing which obtains in the English Civil Service, has been introduced. It is very legible, and when spaced properly is probably the clearest form of handwriting to be obtained. It receives medical sanction because the relation of the forearm, wrist, and fingers are such that a slight forward slope is natural, and so this system is conducive to greater ease and speed of production. Mr. Vere Foster was the great exponent of this style, the essential principle of which is that from the beginning of their training pupils are taught to write words *continuously*. From end to end the pen is not lifted, and the characters are formed and the junctions effected so as to render the writing natural and easy. Greater distance is observed between letters than between the parts of a letter, and so one letter is never confused with another, and a severe simplicity is aimed at in order to secure a maximum of legibility. It is very easily learnt, and does not rapidly degenerate, but it shows none of the characteristics of the writer, it reveals nothing of that individuality which makes the receipt of a pen-written letter such a charm, and as a work of art it is monotonous.

Allow not nature

FIG. 5.—Vere Foster's Bold Writing Series. No. 17. (Blackie.)

Mr. J. Logan, in "Blackie's Civil Service Copy-book," has a modification in favour of clearness of style. The strokes are finer, the loops more open, and the flatness of the connections at the top and the bottom are avoided. Like all this series, the capital letters are not things of beauty, and some are distinctly forms of debased curves (Fig. 6).

Messrs. Chambers, in their "Government Hand Copy-book" have introduced the older forms of the capitals. These are better in design, and the exercise of writing is an æsthetic occupation.

A clear style

A clear style

FIG. 6.—Blackie's Civil Service Copy-book.

Teachers should not sacrifice too much to the utilitarian principle, nor feel that there is not ample time in the schoolboy's life to acquire at least a graceful way of doing things.

The practical difficulty in the adoption of a universal Civil Service Hand is the attitude of the merchants, who do not like a change of style in their ledgers. City book-keepers nearly all write alike, with finely-pointed long pens, and it is a source of pride with them that page after page of their books is written in precisely the same formal hand. This slopes rather more than the Civil Service, and the spacing, that is the distance between the letters, is not such a prominent feature. Many publishers successfully combine the two, as is shown in the copy below.

The lowing herd

FIG. 7.—Cassell's Modern School Copy-book.

This is practically the style which holds at present, which our pupils are taught in the junior forms of our schools. Apart from its clearness, its advantage is that it does not prevent the boy developing his own style when a man, and it gives to that style a roundness and a freedom which does not belong to the untaught hand.

Before leaving the general question of handwriting, reference must be made to a very delightful book entitled "A new Handwriting for Teachers," by Mrs. M. M. Bridges, and published by the University Press, Oxford, 3s. 6d. In form and general character it is like the Italianised Gothic of the sixteenth century. The authoress

*All the ways of life are pleasant;
in the market place are goodly*

FIG. 8.—Specimen of Mrs. Bridges' Writing.

complains that the common ugliness of the old copy-book writing comes from the mean type our pupils have seen, and urges that more good models

for slow writing should be provided. It is not an attempt to resuscitate an ancient art, but to provide modern scripts which are based on beautiful models, in the hope that children will realise how lovely a thing handwriting can be. It belongs to the craft of the engraver and artist, and it is refreshing and hopeful to find an appeal for leisure and beauty in these days of haste and utility.

In this alphabet a few of the letters have two or three variant forms; in some cases these are merely alternatives and can be used according to taste, others are for distinct use as initials or finals.

From this attempt to restore or to introduce sixteenth-century forms we teachers can at least safely learn two things, viz., that handwriting may be in itself beautiful, and that we may show our pupils various ways of making the same capital and small letters without increasing their burden of knowledge.

One of the best series of copy-books issued is the "Public School Writing Book." No expense has been spared in producing the headlines, which are not only beautiful specimens of the art of the engraver, but they are models of correct writing. The paper is good and the passage from formal to current hand is cleverly devised.

"Discount, an allow

FIG. 9.—Allman's "Public School Writing-book."

Messrs. Blackwood, in their "Universal Writing-books," have attempted to solve the problem of securing uniformity of style by printing a series of books with dotted oblique lines which slope in the direction taken by the letters. Pupils are asked to go with the grain, *i.e.*, to follow these dotted

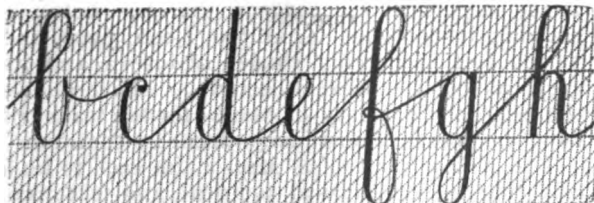


Fig. 10.—Blackwood's "Universal Writing-books."

lines entirely, and a good style of handwriting will result. It represents a form of hand-training very much in vogue forty years ago, when the master wrote several lines faintly with blacklead and made the pupils pass their pens over them. The rulings

suit all words, and so there are no headlines to be copied. Just as the railway train must keep on the rails to perform its journey, so the pen must keep on the lines in order that a finished copy may result. For beginners this is an admirable system, and Mr. J. T. Pearce, of the Technical College, Leith, may be congratulated on his device.

Inspection of the annexed diagram shows how to use the "Universal Writing-books" effectively during any lesson which involves writing. It is not necessary to keep exactly on the lines; in order to obtain uniformly good writing, pupils require only to be taught to "go with the grain" as indicated above.

For those teachers who favour simultaneous work in class, Messrs. Nelson have prepared copy-books in which the copy is detached from the page by cutting it after the book is printed. A pupil who is absent when page one is written can, by turning the copy over, write the proper headline on the first page. The plan is very suitable where there is much exposition on the blackboard during the lesson, and as the book is particularly well stitched there is little or no danger of the headlines being torn off.

The same publishers, in their No. 8, "Royal Star Copy-books," have adopted in the latter part of the book the very bold policy of omitting the lines and leaving a blank page with a headline at the top. At first sight this would fill a pupil with despair, and teachers who do not care to try experiments will avoid them, but, unfortunately, in the world of work much writing, including all correspondence, is done on blank paper, and so pupils should be regularly practised in this. As letter-writing is very carefully taught in these schools, the older boys do not use lined foolscap, and this strange result follows: the boys acquire a running hand in a free and legible style before they leave, so without making a special point of teaching handwriting the pupils turn out very good penmen, able to space and to set out the work on a blank page to the best advantage.

(To be continued.)

THE fourteenth report, that for 1901-3, of the National Association for the Promotion of Technical and Secondary Education is now available, and contains an excellent summary of the present state of secondary and higher education in the different parts of the United Kingdom. The report is divided into seven sections, of which the first is of an introductory character, the second is concerned with the Education Act, 1902, the third contains a brief account of the Conference on Higher Education held last March, the fourth deals with a variety of important subjects including the allocation of the Local Taxation Fund, the fifth provides information regarding Scottish education, the sixth summarises recent educational developments in Ireland, and the seventh is made up of miscellaneous subjects, among which may be mentioned the chief facts as to the registration of teachers. The same association has also published, separately, a full account of the proceedings at the Conference on Higher Education.

AVAILABLE SCHOOL WALL-MAPS.

By E. R. WETHEY, M.A., F.R.G.S.
Bradford Grammar School.

THE purpose of this article is to examine the state of the wall-map market from the point of view of the teacher of geography. We shall therefore indulge in no fine writing on the theory and use of wall maps in general; we shall hurl no fulminations against men who never use wall maps in geography lessons; we shall simply pry into what we consider the relative merits of the publications now on the market, in the hope that our comments, invidious perhaps sometimes but honest always, may be of assistance to intending investors in this branch of geographical apparatus. And here we must enter a disclaimer: we have no pecuniary interest in any of the maps we appraise. Much of what we may say will perforce appear as "advertisement" literature. We cannot help that. We have nothing to gain one way or another. Our remarks are based upon an absolutely impartial enquiry into merits—"merits," that is to say, according to our own unaided judgment—and our thanks are due to the kind way in which the various publishers to whom we have applied for catalogues, specimens, &c., have responded to our blandishments.

Presuming then, in the first place, that the main object of the wall map is to act as a means to an end and instruct its students in the right use of the school, or other, atlas, and, in the second, that all the maps mentioned or alluded to in this article possess the obvious but necessary qualities of trustworthiness, reasonable accuracy, and fair up-to-dateness, or *down-to-dateness*—as they express it with greater directness in America—the questions teachers should ask themselves before choosing a new wall-map are: (1) Is it adapted to fulfil this "main object?" and (2) How does it present these "necessary qualities" to the eyes of the class? In plain English, maps to be acceptable must be *large* enough to "visualise" their main features, *bright* enough to attract the attention of, and *clear* enough to prevent confusion amongst the occupants of the hindermost benches of the class-room. Moreover, they must be *cheap* enough to suit the pocket of the schoolmaster. Working, then, upon these lines, let us see how the market stands.

Physical geography is the base of all good geography teaching. Where are the best physical geography maps to be obtained here in the British Isles? For we may say at once that we have no intention of discussing the output of the famous German or Austrian firms, except where Britishers have become their publishing agents. Three series or sets stand out prominent:—

Philips' Sydow-Habenicht Series,¹ *Stanford's Orographical Maps*,² and *Nelson's Royal Wall Maps*.³

For ourselves we should vote for the first-named, but let that pass. All three sets portray their physical geography on the orthodox lines of international colouring—greens for lowlands, browns for highlands, and varying shades of blue for ocean depths. But the Philips' set stands out best, though he would be an inveterate grumbler who would find much fault on this ground with the other two. An objection might be made to the exaggeration of highlands and of rivers in all maps of this type. We take it that such objection would be ill-founded. A good "teaching" "wall"-map must be diagrammatic; boldness rather than fineness of execution should be its chief feature. Whoever uses the Sydow-Habenicht set may be certain, at all events, that his most stupid listener will know where the chief highland regions are to be found and where the great rivers flow.

For the rest, this series shows few names, paints boundary lines in red, and dots towns (graded according to size) in the same colour. Recent editions have introduced improvements, to wit, a few limit-lines of certain typical flora, and insets of the British Isles or parts of the British Isles, on maps of the continents. We venture to think that this last improvement is one which should be grafted on all maps. In choosing a map ourselves, it is almost the first thing we look for. A map of North America without an inset to show the insignificant size of the United Kingdom is, diagrammatically, incomplete.

It should be noted that Philip has several other series well worth attention and much cheaper than the Sydows. The new "*Comparative*" series,¹ based on the maps of the excellent school atlas of "*Comparative*" Geography, and the smaller *Relievo Test Maps*² are examples to the point. The map of Africa in the first-named series can be thoroughly recommended. In addition to the physical features of the continent it includes all Southern Europe and much of Western Asia, and shows as insets a bright political map of Africa, a diagrammatic section from the Congo mouth across to Zanzibar, and by way of comparison a map of England on the same scale as the general map.

The *Stanford Maps* are of course good, and equally of course absolutely trustworthy. For teaching purposes, however, we do not consider them quite up to the first of the three we have selected. The latest departure, *Mackinder's Europe*,³ notwithstanding its contour lines at 500, 1,000, 5,000, and 15,000 feet in varying shades of brown, and its grey, almost transparent lettering, which allows the insertion of plenty of names for the teacher's benefit, appears almost insignificant by contrast.

The *Nelson Royal Wall Maps* claim each to be a combination of a physical, political, and test map. The names are delightfully unobtrusive, the physical features are quite bold enough, and each map is divided into squares of English miles. We

¹ Philips' Sydow-Habenicht series, 78 in. × 68 in., £1 3s.

² Stanford's Orographical Maps, 50 in. × 58 in., £1 1s.

³ Nelson's Royal Wall Maps, 60 in. × 50 in., 15s.

¹ Philips' Comparative series, 74 in. × 50 in., 16s.

² Philips' Relievo Test Maps, 36 in. × 25 in., 5s.

³ Stanford's "Orographical Map of Europe." Edited by Mackinder, 60 in. × 54 in., £1.

specially commend the map of the *British Isles in relation to the Continent*.

Mention of these *Nelson Maps* leads directly to the subject of "Test Maps" pure and simple. Whether they be used as "tests" or not, we consider that they embody the best principles of class teaching. Anyone who teaches much geography, and who knows his subject well enough to discard the aid of the wall-map names, comes to regard all names on the wall map as nuisances, for just when he wants to find out how much of his work is bearing fruit in the class he cannot use his map! Most publishers advertise "test maps" as such, though we should include in this category all maps whose names are illegible to students at a short distance. In addition to *Nelson's*, Philip intends to issue test maps of the *Comparative* series, *Bacon's* has some excellent work in this line, and *Moffatt's*² (now, we believe, in the possession of E. J. Arnold and Son, Leeds) are of strikingly bold appearance.

So much for the great physical wall-maps. Though they are distinctly preferable, in our opinion, even for teaching political geography—given good atlases in the hands of the class—all teachers like to have ready to hand a choice of some good political maps. The difficulty is to keep them up to date. A ten-year-old physical map is usually as useful as the day it was bought; a two-year-old political map is often more than useless; it is actually harmful. Bearing this in mind, the following may be relied upon in this present year:—*Phillips' Large Series*,³ *Bacon's Excelsior Series*,⁴ *Gill's Cartographic Series*,⁵ and *W. and A. K. Johnston's Imperial Series*.⁶ The *Phillips' set* are all very clear, bright and unobtrusive in the matter of names. Those published by *Bacon* are as good as any "politicals": rivers blue, hills brown, names black, town spots red—they are familiar objects on schoolroom walls, as they deserve to be. They are intensely diagrammatic, though for ourselves we prefer the *Test Series*, uniform with the *Excelsior*, and defective only in the fact that the physical features are a trifle too subdued. For the juniors we like the set known as the *Bold Features*,⁷ which have the great recommendation of inordinate cheapness. Special mention should be made of this firm's new *British Empire*,⁸ which has several distinctive and notable features: it is drawn on the indispensable Mercator's projection, but, as correctives to this form of error in dimensions, comparative areas are drawn in diagram at the foot of the map; Sandford Fleming's 24-hour zone notation (for a standard uniform time) is shown on the upper margin; Australia is depicted twice over so as to show how it can be approached from East or West; the coaling stations are marked, and dis-

tinction is drawn between British and foreign; the chief commercial routes are given; the colouring adopted is naturally red for British possessions, a light red for British spheres of influence, and a neutral tint for the rest of the world. It is right, of course, that so patriotic a map should display a Union Jack and Royal Arms prominently in its forefront, but it is, to say the least, odd that the "Jack" should be utterly and totally wrong in its drawing! *Gill's Cartographic Maps* are unique in one respect—the bold white lettering of coastal names on the deep blue of the coastal waters. The only objection is that there are too many names, though the publishers consider there is no grievance on this head. The series began some four or five years ago; it is printed in seven colours, and boasts that it is "produced entirely in the British Isles." The latest addition—a fine map—is that of the *British Isles in relation to Continental Commerce and Trade Routes*. To the critical eye the maps are crude and highly inartistic; but they are diagrammatic enough in all conscience, and so ought to work out their own salvation. *W. and A. K. Johnston's Imperial Series* is a good example of bold map-making. The publishers issue a handbook of explanatory matter with each map—a commendable idea. The maps themselves we are inclined to think a little overcrowded. The same firm issues a large number of other series of varying qualities—all more or less good—but space prevents our entering into details anent them, and a publisher's catalogue can usually be obtained gratis!

So far we have devoted our attention almost entirely to the large wall-maps, say of some 5 ft. or 6 ft. by 4 ft. or 5 ft. In many private schools the very size of these maps is against their utility. There are, however, in the market several smaller types of map to meet their wants. Here is a choice: the chooser will not go far wrong with any of them:—*Nelson's Wall Atlas*,¹ *Bacon's Wall Atlas*,² the well-known *Ruddiman Johnston Series*,³ and the new *MacDougall Set*.⁴ The wall atlases, as their name implies, are a series of eight to twelve maps bound together on one roller. Their technical advantage is their handiness; they can be slung over a blackboard and turned over to the desired map like pictures in a portfolio. Both *Nelson's* and *Bacon's* are beautifully clear and distinct. Those of *Ruddiman Johnston* have proved their worth by the safest of criteria, time. We have only seen one of the *MacDougalls*, *India*, a photo relief map in maroon, and very good we thought it. To teachers who have to teach geography in rooms too small for the larger wall maps we recommend a device we have seen practised with great success. Cut out the maps of any good atlas, say *Longman's* (edited by *Chisholm*), frame them cheaply and hang them in continuous

¹ *Bacon's Excelsior Test Maps*, about 54 in. x 60 in., 13s. to 15s.

² *Moffatt's Test Maps*, 58 in. x 50 in., 9s.

³ *Phillips' large series of Political Maps*, 68 in. x 54 in., 14s. (Supplementary series of about 80 in. x 60 in., at about £1 1s.)

⁴ *Bacon's Excelsior series*, about 54 in. x 60 in., 13s. to 15s.

⁵ *Gill's Cartographic series*, 80 in. x 60 in., 16s.

⁶ *W. and A. K. Johnston's Imperial series*, 72 in. x 63 in., 21s.

⁷ *Bacon's Bold Feature series*, 50 in. x 40 in., 6s.

⁸ *Bacon's British Empire*, by *Parkin and Bartholomew*, 72 in. x 48 in., 15s.

¹ *Nelson's Royal Wall Atlases*, 30 in. x 40 in., 8 to 12 maps, 12s. 6d. to 17s. 6d.

² *Bacon's Wall Atlases*, 30 in. x 40 in. Different prices according to number of maps. About 3s. 6d. a sheet.

³ *Ruddiman Johnston's World series of Class Room Maps*, 34 in. x 24 in., 2s. 6d.

⁴ *MacDougall's Educational Co.'s Photo Relief Maps*, 33 in. x 26 in.

line and systematic order round the room. They are bright and attractive; they give an air of distinction—not to say refinement—to their habitation, and they are handy for all purposes of exposition.

As to map-mounting and map-showing, all sorts of apparatus are on the market, varying in degrees from the expensive, but effective, map "cases" of Stanford, W. and A. K. Johnston, &c., through spring rollers at 15s. a foot, ratchet rollers, portfolios, book volumes, cabinets, screens, single-string winders, revolving stands, elevators, *et hoc genus omne*, down to the ordinary roller of the ordinary teacher with his length of picture cord and a couple of screws. For these and sundry we must refer the reader once more to the catalogues.

But before we close we must say something on what one may term wall-map substitutes, or better, perhaps, wall-map complements. We mean *Relief Models* and *Blackboard Maps*. The best models we have seen are those published by *Arnold of Leeds*,¹ and known as the *A. L. series*. For teaching youngsters the rudiments of geography any one of them is invaluable. There is a large choice (some thirty all told), and—this again for the juniors—the publishers claim that they are unbreakable. The relief work is very good though much exaggerated. In *Europe*, for example, the horizontal scale works out at 66 miles to 1 inch, and the vertical at 2½ miles to 1 inch. There are but few names, and for the colouring—the sea is sea-green, the rivers white (cut into the plastic material) and very plain, the towns red dots and the railways red lines. In some, Nature becomes realistic; in one the *Red Tarn* on Helvellyn can be filled with water, and all the operations of a spring observed; in another, *Vesuvius*—at a slight extra charge—can be made to produce eruptions of startling severity at will! Excellent samples are the models of *Yorkshire*, the *Altesch Glacier*, *Africa*, *Lancashire*, *Victoria*, and *North Wales*.

Of blackboard maps we call special attention to *Philips' Map-building Sheets*² and *W. and A. K. Johnston's Slate-cloth Maps*.³ The map-building sheets are on "blackboard paper," with red outlines only. We have used coloured chalks on these with great satisfaction to the young folk and much amusement to ourselves. The slate-cloth maps are printed in black; by the aid of this device the teacher can electrify his geographical charges with the ease and rapidity with which he can sketch out this or that portion, or, indeed, all the map, say, of Europe. And there we will leave him for the present. At some other time, when he is older and richer, we may point out that no class-room is complete without one or two Reference maps, such as Stanford⁴ and W. and A. K. Johnston's⁵

Library series and Philips' *County maps*.¹ One thing there is which he ought to do: piece together and paste up the Ordnance map² of his district—not so much for teaching purposes as for the sake of the finest reference map in the British Isles.

FIRE PREVENTION IN SCHOOL BUILDINGS.

By FELIX CLAY, B.A.

II.—NEW BUILDINGS.

HAVING briefly considered in last month's issue the apparatus that should be found in every school in order to provide against the risk of fire, in the case of old or existing buildings, it is intended in the present article to give notes upon some points to be borne in mind when considering the scheme of a new building. They may conveniently be taken under six heads:—(1) Site or position, (2) Plan, (3) Construction, (4) Equipment, (5) Management, (6) Periodical inspection.

SITE.—Under this head comes the consideration of the position of the school with regard to neighbouring buildings. It is of course so desirable, for reasons of light and air, that a school should stand well away from other buildings, that there ought not to be any danger of fire from adjacent houses. But in cases where any danger is to be apprehended from an adjacent building fireproof shutters may be with advantage supplied to the windows on that side. If these are windows where wired glass could be conveniently used, this will be found an effective barrier in case of fire.

PLAN.—The building should be so schemed that no part of it can be cut off from a staircase in case of fire, that is to say, the staircases should be at each end of the building, in addition to any that may be required in the middle, as in the case of a large school, so that wherever an outbreak occurs none of the occupants can find themselves with the fire between themselves and the staircase.

Direct and easy access should of course be arranged to the stairs and exits, taking care that there should be plenty of room at the foot of the stairs; if these discharge at right angles into a corridor unless of considerable width, or close to the door of a class-room, there is a likelihood of dangerous crushing in case of panic. The staircases should continue right up the building, and are safer if constructed in the form known as "boxed," that is, with a wall up the centre; this is, however, sometimes objected to on the ground

¹ Arnold and Son's A.L. Relief Models. Edited by Alonzo Gardiner. From 21 in. x 27 in. to 51 in. x 42 in. From 18s. 6d. to 42s.

² Philips' Map-building sheets, 42 in. x 32 in. Single maps at 1s. 6d.; sets from 6s. to 12s.

³ W. & A. K. Johnston's Slate Cloth Maps, 50 in. x 42 in., 14s.

⁴ Stanford's Library Maps, 60 in. to 70 in. x 50 in. to 60 in., 25s. to 55s.

⁵ W. & A. K. Johnston's Library Maps, 52 in. to 72 in. x 43 in. to 56 in., 21s. to 63s.

¹ Philips' Large Scale County Maps, 40 in. to 70 in. x 30 in. to 50 in., 7s. 6d. to £1 1s.

² Ordnance Survey Maps, three scales (25 in., 6 in., 1 in. to 1 mile). Agents in all large towns. 6 in. map, 2s. 6d. per sheet.

of appearance, and also that it renders supervision more difficult. In America it is common to find an emergency staircase leading from the upper floors directly in to the playground; this is not required or used in ordinary circumstances. A square staircase leading right up the building and lit by a skylight or lantern at the top is a great danger in case of fire; it acts as a gigantic flue to supply the air.

An important consideration to be borne in mind during the planning of a building is that of providing against the rapid spread of a fire when once started. In a school which has to be arranged with the view of allowing for the rapid and easy movement of large numbers, the difficulty of cutting off the different parts is of course considerable, and it would be hardly possible to provide fire-proof screens and curtains for confining a fire as far as possible to the immediate neighbourhood of the outbreak; a brick wall, however, is one of the most effective barriers against the spread of fire, and, as far as can be managed, internal partitions should be of brick and continued right up the building from the basement to the roof. The ease with which upper walls can be carried on iron girders, and so not necessarily placed over a wall below, tends very much to give fires a chance of spreading.

CONSTRUCTION.—Recent experience in regard to fires taking place in so-called fire-proof buildings points to the fact that such buildings have in case of fire an element of danger that has to be added to that belonging to a building of the ordinary construction, for, though built to a large extent of materials that are themselves practically incombustible, and in this way of course tending to make an outbreak of fire less likely, yet behave very treacherously when once a fire has got a footing. The stone staircases crack and break off, the iron expands and twists, pushing out the walls, the concrete floors collapse, and falling on to the floors below not only do great damage but render the work of the firemen more difficult and dangerous.

The materials to be selected are those that are as little as possible subject to expansion and contraction under rapid changes of temperature, such as timber, bricks and mortar, and good plaster. At the recent Fire Prevention Congress, held in London in July, great stress was laid upon the value of sound timber construction, especially in the case of floors. A well-made floor with the ends of the joists well bedded in the walls, flooring boards not less than one inch thick well tongued together, the spaces between the joists filled with pugging, and the underside coated with plaster one inch thick on wire laths, will resist the action of fire either from above or below for a very considerable time, only giving way when burnt right through. Although the use of timber in the floors may to some extent increase the smoke, this does not amount to anything of great importance, since everything else in the room, the hangings, &c., must be well alight before the floor begins to burn.

Stud partitions covered with lath and plaster and hollow in the middle are extremely dangerous,

acting as a ready channel for the fire from one point to another; nor is there any necessity for their use now that so many different kinds of solid and fireproof partitions are to be obtained.

Staircases of stone, although generally recommended as a fireproof construction, should not be used unless they can be placed in a well apart from the main building. As pointed out above, stone stairs are very untrustworthy when exposed to heat; being for part of their length built into the wall, the expansion is bound to be unequal, and they are apt to snap off at the point of junction when exposed to heat. A staircase made of hard wood, such as oak or teak, with its underside coated with plaster, will remain in position and serviceable long after it has been impossible for any human being to go up or down it, and even if it does catch alight the first jet of water will make it passable again; heat sufficient to set alight such a staircase would either break off stone steps or render them impassable. In a large preparatory school built not long ago the staircases in the boarding house were made of oak after consultation with the fire-brigade authorities as the safest method of construction. A safe and satisfactory form of stair can be constructed out of concrete, with solid two-inch treads of teak or oak.

When using timber in buildings as a form of fireproof construction it must of course be only in substantial form well protected, and care taken to avoid any exposed edges.

The arrangement of the fireplaces and flues is of course a matter of extreme importance, particularly in the case of wooden floors; care should be taken to see that the wooden centring is removed from the small arches that carry the hearth stones. A better plan is to carry these on concrete, carried the full depth of the floor with the plaster applied directly to the underside of the concrete. Flues, unless surrounded with a full nine inches of brickwork, should have fireclay linings. A danger in the case of buildings warmed by means of air brought in over hot pipes may be mentioned here. It often happens that on a mild day in winter all the registers are closed, in which case the temperature inside round the pipes rises dangerously high; some of the registers should be made so that they cannot be closed, in order to ensure a movement of air.

EQUIPMENT.—In providing the apparatus for a building it is of importance that it should be selected and made to suit the particular building, water supply, &c.; competent advice from a fire engineer should be obtained while the scheme of the building is still under consideration; much additional expense and loss of efficiency is caused by leaving, as is often the case, the question of fire protection until the building is nearing completion. The usual appliances consist of fire mains supplied with their water either from a water company's main or from a tank in the roof, having hydrants or firecocks on each floor with the necessary hose and nozzles attached to each hydrant.

The water supply is of course of the first import-

ance, and until this has been satisfactorily arranged for, it is of little use providing the other apparatus. It is not possible to enter upon the question here, but it may be pointed out that the water to be of any real use must be under considerable pressure. A tank in the roof will give but a small head of water to the hydrants on the upper floors, and unless the jet is thrown with force, it is not of much effect as a fire extinguishing agency. In order to meet this difficulty, Messrs. Merryweather have brought out an ingenious piece of apparatus called a "pressure augmentor," which occupies but little room and is easily worked by hand or driven by an electric motor or other power. By means of this a very powerful jet of water can be obtained where the pressure in the mains is too small to be of any real use. In a large building there should be one or more large supply-pipes or mains running right up the building with an ample supply of plain hose on each floor so arranged that any point of the building can be easily reached.

In addition to this supply of hydrants for a severe outbreak, there should be on each floor a small hand fire-pump, as described in the article of last month, for use in case of a small fire discovered in an early stage, and so to avoid the damage of a large stream of water.

The fire mains are best made of cast iron and the internal diameter should not be less than three inches; they should be properly coated with composition to prevent rust. The choice of the hydrant requires care, as it must be so made as not to be liable to freeze or to stick; the thread of the screw should not be too fine, or it will be very liable to damage from a chance blow. With regard to hose, the only form that is at all durable is leather; this has the drawback for use inside a building that it is not quite waterproof, but any form of canvas hose treated with indiarubber to make it impervious is very short lived, the rubber deteriorating very rapidly; plain canvas hose is less waterproof than leather and liable to mildew and rot.

MANAGEMENT.—Under the head of management would come the various forms of drill and practice in the use of the apparatus supplied. The proper method of using the hydrants and hose requires instruction and practice, and the staff of the building ought to be taught their use. Many of our larger schools have a fire-engine and a fire brigade composed of boys in the school, the members of which might well be instructed in the use of the fixed apparatus as well as in the use of the engine. The question of fire fighting lies outside the scope of these articles, which only aim at giving some suggestions as to the precautions to be taken and the apparatus to be kept, so that if an outbreak should occur the means for dealing with it effectually and promptly may be at hand, and to ensure at least, if the building itself cannot be saved, that at all events there shall be no loss of life.

Finally, the greatest danger to which all fire apparatus is exposed is that of disuse and its

consequent deterioration. The only way to guard effectually against this is to insist upon a periodical inspection and trial of apparatus. The manufacturers of fire apparatus have recognised this fully, and make arrangements to test and inspect the apparatus they supply at stated intervals, and also to carry out drills and give instruction to the members of the staff of the building.

SCHOOL-ROOM TRAVEL.

By Prof. GRENVILLE A. J. COLE.
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THE title of this article is taken from that of a "Descriptive Catalogue of Stereographs designed for use in classes and libraries of public and private schools," compiled by Mr. W. E. Long, and issued by Messrs. Underwood and Underwood, of New York and London. The stereographs, which are of excellent quality and variety, are to be used in conjunction with a cheap stereoscope in schools. It is highly desirable that each child should be supplied with one of these instruments, which need cost only four shillings, and becomes part of the permanent apparatus of the school. The photographs are sold at 8s. 6d. per dozen; and here, again, it would be well to purchase multiple copies of subjects used in general instruction.

Thus, as the catalogue itself explains, several copies of a landscape showing a typical valley or a typical mountain can be given out to the class, and the teacher can indicate the salient features. This avoids the darkening of the room, and the formal lecturing, that occur in the case of lantern-slides; while there is no doubt that the impression produced by the stereograph is one of amazing vividness. When asked to prepare this article, I confess that I had no conception of the pleasure that lay in store for me, or of the grasp obtainable of the scale and the component parts of a landscape when regarded stereoscopically instead of in the flat.

Messrs. Underwood, and the authors chosen by them, deal with the pictures from a traveller's point of view. Despite pages 7 to 37 of the catalogue, where something more systematic is suggested, geographical teaching is not kept much in sight. Yet it is the teacher of elementary classes, and not the person who likes to take his evangelical or literary hobbies with him into the high places of the earth, who will be the serious gainer by the present enterprise. Both in choice of subject and method of description, we are reminded too forcibly of the "organised tour" and the "summer conference," which have done so much to fill their participants with a sense of repletion, if not of satisfaction.

Probably English teachers can select what will suit their special courses, for series of pictures can

be broken into and recompounded in any order. Here and there, a complete set will be advisable, where it forms a detailed study of a limited district. Such a set is provided in the Yosemite series now before me. The whole twenty-four stereographs are arranged to illustrate a definite tour throughout the valley; and we can conceive the effect produced on British classes by a similar introduction, say, to the Snowdon *massif*, with its cirques and ridges, or to the Western Isles of Scotland, as one steams in and out along the sounds. Special emphasis is very properly laid on the maps accompanying the local series. Each view is there represented by two red lines, radiating from the point where the observer is supposed to be standing. He thus knows exactly what lies within the picture; and the combination of map and landscape is in itself an admirable lesson. While the teacher should make a copy of the main features of the map on the blackboard, so as to direct the class while the views are circulating, it would be desirable that one of the detailed maps should be available for each pair of pupils, so that the roads, rivers, and changes of slope, may be observed upon it, and identified, with culminating pleasure, in the landscape.

This is, in fact, one of the many joys of practical geography, of travel by road in a new country. We note the map mile by mile, and delight in the unfolding of the features already promised by it. To the geographer, the "cyclists' route map" is an abomination, for it omits all but the immediate surroundings of the road. Messrs. Underwood's detailed system should inspire the pupil with a far finer perception of what goes to form a landscape.

Anyone who examines the Yosemite series of stereographs systematically will feel that he has acquired new conceptions. I should prefer to overlook the description of the district in the Catalogue (p. 35) as a "sample of Nature's eccentricity"; and the statement on p. 7 of the Guide-book, by Mr. C. Q. Turner, that "the origin of this great Sierra range was fire"; and a few loosely popular or sensational expressions which have no function in geography. The phrase (p. 23 of the Guide), "all is guess and scientific speculation," shows that the writer does not claim to be a man of science. He dwells, indeed, on superficial details, without becoming truly synthetic, or connecting these details with the steady carving out of the district on the western flank of a great continent. Yet the map and the pictures supplement one another so excellently that any sound teacher can draw up a lesson for himself with the aid of ordinary works of reference. Let him accept the topographical guidance of Mr. Turner at the outset, and then utilise his appreciation of the country for the special ends of his own pupils.

The Yosemite series opens with perhaps the finest view of all, where a sharp foreground of rocks is obtained on Inspiration Point, and the eye is led into the valley through successive levels of the forest. Then, above the wooded floor, rise the cliffs of the wide cañon, a great waterfall pouring

over one of them on the right; far up beyond are the peaks that stand about the valley on the east. It is certain that no ordinary lantern-projection could give the same effect of successive distances. A more audacious and equally beautiful picture is that from the crags of Glacier Point (No. 14), the interval between the happily poised figure on the rocks and the far cliff on which the eye next rests being two-and-a-quarter miles. The high country, of which the Yosemite valley is an incident, is well seen stretching northward beyond the great leap of the river.

It is in these vast aerial distances that the stereograph is at its best. The views of Rome look tame in comparison; and yet here and there some small detail in a particular picture is brought out as if to challenge our assertion. Take, for instance, the flooded vegetation in No. 7 of the Yosemite series; or the water in the Devil's Punch Bowl of the Yellowstone, which literally boils before our eyes. In another view, the roofless houses of St. Pierre stand out below us with a terrible reality, while the gloom of Mont Pelée still darkens all the air. If I quarrel with so suggestive a system of instruction, it is only in the matter of choice of subject and exposition.

The book styled "Italy through the Stereoscope," by D. J. Ellison, D.D., contains 602 pages, and is, I imagine, a fair sample. Is the teacher to read these wordy descriptions, these drawn-out anecdotes, to a class? Is it history, or geography, or just "travel," the gossip of the conducted tour, that is to be imbibed by such a method? What a child wants to know is that lava is hot, not that Dr. Ellison had to "keep on a hop in order to stand on it." The ridiculous story about the exorbitant charges of photograph "venders," with its shrewd reference to the advantages of stereoscopic views, occupies three-and-a-half pages of small type. What with classical narratives that are better learnt from the "Student's Rome," and the hackneyed descriptions of works of art, which the teacher cannot transmit unless he feels personally moved by them, there is no geography of any kind in the volume. Merely "travel," the thinnest kind of travel, where the tourist is always ready to gaze on new things, and to conjure up correct emotions from the writers of a previous age. Where is the real Italy in this book—Italy which all but bridges the Mediterranean; Italy, the youngest child of Europe, still heaving in the throes of birth? Where is the vision of her empire, stretching east and west, wherever the sea could bear her armies, but checked at last in the vain attempt to draw a cordon through the German plains? Where is the struggle for supremacy between Genoa and Venice, or a mention of that larger Italy which once kept Dalmatia from the Turk? Messrs. Underwood have not yet made their true appeal to the geographers.

Perhaps a simple way of doing so for British classes would be to illustrate some composite treatise, such as Mr. Mackinder's handsome series, or Dr. Mill's "International Geography."

Here we have the work of men who know the countries about which they write. The teacher can select such subjects as he requires, and frame his lessons from large books of reference to suit the aptitude of his class. Any personal experiences of his own will of course appeal most keenly to his pupils; but they will probably be spared the phrases "majestically grand," "Nature multiplies her charms," "wonderful witness to Aztec enlightenment," "prowess of American arms," and similar expressions which abound in transatlantic newspapers, and find their way into the present catalogue of views.

I have no claim to be regarded as a teacher of geography; but long travel on the roads and by-ways has made the comprehensive survey of a country a thing dear to my own mind. To know what lies beyond the horizon, to see landscape fitting into landscape in one harmonious whole, is to provide every scrap of history with its background, and the arts and manners of a people with a setting that may prove an explanation. To realise the aspect of a country—and here is the opportunity of the stereographer—adds a surprising warmth and colour to the "Latest Intelligence" of the daily press, and may go far towards educating a future politician.

To take a near example, what should we wish to know, in a broad survey, about France? Should we not seek illustrations of the fundamental structure of the country? On these bones the living flesh of history has been moulded. Let us view Azincourt and Crécy-en-Ponthieu lying in an open landscape so like our own home-counties that we feel the pertinence of the Anglo-Norman claims. Let us see Paris growing from its island, and needing a strong northern race to hold it as the heart of France. I think I should show the gates of Moret-sur-Loing, one for Paris and one for Burgundy, and then seek the stronghold of Semur upon the plateau, and the sources of the Seine and Marne. Here we reach the rim of the great northern basin, the counterpart of our own Cotteswold Hills; and we realise the struggle between France and Burgundy in this wide undefended country, a region without structural lines. Safely down below lies Dijon, in the valley of the Saône, with its monuments of an almost regal rule; and eastward rise the Juras, a land of scarps and deep ravines, where the strange race that held the valley for a thousand years was finally broken, and forced back into solidarity with France. The story of all these comings and goings, these thunderings at the gates of Paris, where Swiss hirelings met the men of antique Brittany, is wrapt up in matters of geography. And out of it all rises the purest voice in Christendom, that of the Maid whose dream was unity, who swept the English from Orleans, much as she would drive sheep from the gateway of her upland farm.

When we have passed Orleans, we reach the rim of northern France again at Bourges, whose merchants looked, indeed, southward and traded as far as the Levant. And here we meet the central plateau, a high mass of granite and ancient

rocks, cleft by the Loire and the Allier, which manage to get out northwards, and bounded on the east by the mightier waterway which still forms the main route to the Mediterranean. On the west we have Limoges, depending on the granite for its industry; in the centre a line of volcanoes, marvellously fresh at the north end, and dissected on the south, where the earlier masses have been carved out into somewhat forbidding crests and valleys. These form the upland pastures of Auvergne, cut off from the modern life of the lowlands, a country of cattle and cheeses, the scattered *burrons* being often the only features on a mountain-side. We have to cross the Cevennes to get out of this region, which is still primitive and *sauvage* in the French sense; and then we plunge suddenly into the Mediterranean south. Here is quite a country by itself, tinged with the dust blown fiercely from the valley of the Rhône, where every town has its temples, baths, or amphitheatre, recalling the long years of Roman rule. This warm and accessible region must have seemed to the colonists an extension of the plain of Italy. Dry Cretaceous marls and limestones rise from it on the east and west; and in the centre the Rhône brings down the powder of the central plateau and the Alps, and spreads the great delta seawards, blotting out the ports of the Crusades. Here one can pick out picture after picture rich in human interest, but wrapped together in one geographical province, the common ground of France and Italy; Avignon built about its rock, Arles and Orange on the Roman highway, Aigues-Mortes lost amid the sea-banks and lagoons, and, by contrast, finally, the forest of masts in the open and prosperous harbour of Marseilles.

I cannot do more than mention the Alpine heights of Dauphiné and Savoie, where the curve of the Mont Blanc chain brings down the noblest frontier in Europe between modern France and Italy; or the superb fan-delta of Gascony, where the whole country is controlled by the rivers streaming from the Pyrenees, and the towns sit isolated, high upon the banks, each one crowned with its yellow fortress or *bastide*. Enough has been said to indicate the sort of picture that would convey to a class the essential qualities of France. If we exhibit a cathedral, let it be because the plain-dwellers were great builders of cathedrals, by which their cities are marked out ten or fifteen miles away. The delicacy of workmanship, and Ruskin's commentary, are beyond the scope of the general class whom we seek to interest in the earth. If we exhibit Paris, let it be l'Île de la Cité, the Corps Législatif, expressing modern nationality, and the Place de la Bastille, expressing the vital insurrection. The Vendôme column, moreover, carries us across all Europe, and should be compared with the statue of Vercingetorix on the hill of Alise-Sainte-Reine, where the untutored and generous Gaul withstood the Napoleon of his day. These empire-builders and empire-withstanders count for much in political geography; but the tomb of Napoleon, or the ruins of the Tuileries, may be left for ordinary travellers. In

conclusion, school is not a place where the every-day tourist should be manufactured wholesale. If we open the door—and we cannot do better—to Messrs. Underwood's method of pictorial geography, let us see that the essentials are set before us, and that our vision is stimulated along certain lines, rather than jaded with variety. The pupil will then know that a host of details will attract him when he is fortunate enough to travel for himself, but that these details will fit into their places on the foundation laid out in his school days.

ON THE CORRELATION OF STUDIES.

By A. SONNENSCHREIN.

IT is as difficult to over-estimate the value of the correlation of studies as it is easy to misunderstand and misapply it. The kinship which subsists between some branches of study is so natural and obvious that even indifferent teachers have observed and more or less utilised it. Who, for instance, fails to perceive that pure mathematics gain in vividness of apprehension if their theorems and conclusions are applied to practical work? If an arithmetical progression is brought to bear on the phenomena of gravitation, then the student sees that the problems connected with an A.P., so far from being a baseless fabric of the brain, represent natural forces universally active. The series

1, 3,	5	7	9 &c.
I. II.	III.	IV.	V.
$1=1 \times 1. \quad 1+3=2^2, \quad 1+3+5=3^2, \quad 1+3+5+7=4^2, \quad 1+3+5+7+9=5^2,$			

and so on, reveal to the young student an unexpected property of numbers, which cause him to wonder and to think, and if he can be induced to discover the demonstration for himself he will derive more than a merely intellectual benefit from the effort. Similar and still greater advantage is secured by connecting trigonometry with surveying and astronomy.

Again, history and geography aid and illustrate each other. It has been said that geography is the body and history the soul of a country, but this is an overstatement of the case, for the study of geography is quivering with an independent life of its own. Nevertheless, there is a valuable truth in this dictum, for many historic events are intelligible only if their theatre is known and understood.

The survival of Keltic speech in Wales and in Scotland, the successful resistance of Styrian and Tyrolese peasants to the Napoleonic power, the formation and continuance of small communities in the Alps, and *per contra* the creation and growth of the vast despotic domain of Russia in the great plain of Eastern Europe, all find their explanation in the geographical features of their respective countries.

Again, Britain's industrial and commercial pre-eminence is due to the fact that by their intelligence and energy her inhabitants have known how to utilise her mineral wealth, her insular position, which makes her accessible to friends and inaccessible to foes, and London's central place in the land-hemisphere. Dr. A. Kirchhoff, the eminent Professor of Geography at the University of Halle a/S, has lately published a little work entitled "Mensch and Erde," which shows, in a masterly manner, the action and reaction on each other of a country and its inhabitants by what he calls "telluric selection," and he would be a poor teacher of geography who would neglect to draw profit from its lessons.

So, too, the study of the mother-tongue and of foreign languages mutually aid and support each other, if the teacher is skilful enough to exhibit similarities and contrasts with telling force, for, as in the case of anatomy and many other studies, it is only by comparison with other kindred pursuits that the subject of study can be best understood. Goethe says, with his usual acumen: "Wer fremde Sprachen nicht kennt, weiss nichts von seiner eigenen."

But if correlation of studies is of such high value in secondary schools, it is still more so, nay, it is all but indispensable, in elementary education. Lessons in speaking, *i.e.*, in clear and distinct utterance and in due accentuation of every syllable, in word-building and spelling, in reading and writing, are all intimately connected with each other, and by their mutual support the little learner is enabled to overcome difficulties which appear at first sight to be unsurmountable at so tender an age.

It has lately been the good fortune of the present writer to witness a reading lesson given in a board-school in the south of London. The mistress, painstaking and conscientious, built up on the black-board all the new words of the lesson with such skill and accuracy that she riveted the attention of her large class of seventy (!) children, who watched with eager interest the growth of the words and their transmutations by the successive changes of single elements. This reading-lesson was followed by a writing lesson, which reproduced the new words learnt, and fixed them in the mind by means of the analytical and associative, and not merely repetitive or carrying memory.

So much for the natural and obvious correlation of studies; but there are teachers and men entrusted with authority who endeavour to create arbitrary relationships, which are not only valueless but distinctly harmful. Some, for instance, use the shape of the letters of the alphabet for lessons on form. This is in every way reprehensible, for, at that early stage, children should be led to deal with things and not with their symbols; nor are the shapes of many of the letters sufficiently simple for the children to describe them from memory as they ought to do; and finally, a knowledge of the names of the letters, before their functions are known, is a positive hindrance to the early reading-lessons. Lessons on form should be

given on the sphere, the cube, the oval, the cylinder, the oblong, the cone, the pyramid, the prism, the disc, the circle, &c., &c., thus systematising and giving precision to the child's earliest notions on space.

Some men in authority urge that Nature-studies and early reading-lessons should be made to support each other. They suggest that the examination and oral description of some natural object, say a bird or a flower, should be followed by a reading-lesson on the same subject. This advice, though very alluring and plausible, is impossible of execution, because the classification and graduation of the difficulties of the two branches of study cannot be made to run on parallel lines. How, for example, can a robin be described with its *two* legs and *eyes*, its *feathers* and *beak*, its red *breast* and *throat*, without abandoning all classification and combination of the elements of English reading and spelling? This method would necessitate the adoption of the baleful "Look and Say" method of teaching reading. What the advocates of this plan really seem to desire is that, when the children once are able to read with fair fluency, they should, before reading a description of some natural object, themselves look at and orally describe it, and then compare their own observation with the account of the object given in the book; a most desirable practice.

Numerous other instances of spurious correlation of studies can be adduced, and will naturally suggest themselves to the reader. It now only remains to point out the tests for recognition of a real connection between different branches of study. These are: first, the studies must mutually support each other. It will then be found that subjects are often related to each other, not in pairs but in groups, and they should, after the several initiatory steps had been taken independently, be made to advance simultaneously as much as possible. Secondly, if subjects, though apparently helpful to each other, present difficulties which cannot be surmounted simultaneously, then advancing *pari passu* should not be attempted.

THE EDUCATIONAL INSTITUTE OF SCOTLAND.

"**A**T a general meeting of the teachers of Scotland of various Christian denominations, held within the High School of Edinburgh on Saturday, September 18th, 1847, it was agreed that for the accomplishment of certain specified objects an Association, composed of the teachers of Scotland, to be called the 'Educational Institute of Scotland,' should be then formed."

So runs the official account of the inception of the Educational Institute, and a "preliminary statement" informs us that the objects of the Association were "to increase the efficiency of the teachers, to improve their condition, and to raise

the standard of education in general." No bad aim, we may well agree, in these latter days. It has taken the country a long time to arrive at the truth—if it has yet really done so—that the well-being of the teacher is inextricably bound up with "the raising of the standard of education in general."

The Institute is thus nearing the completion of its fifty-sixth year of useful existence. This, we suppose, makes it the oldest professional teachers' association of national dimensions now to be found in any part of the world. Of this claim Scotland may reasonably be proud, and other associations of greater size and more powerful resources may well agree to yield to the Institute the palm in the matter of antiquity. It is not a claim that sisters are usually anxious to dispute.

Formally constituted in 1847, the Institute soon embraced within its fold a membership of eighteen hundred. Teachers of all grades joined—university professors, principals of high schools (called *rectors* north of the Borders) and parochial teachers. A comparison of the list of members then with that for the present year shows that the democratisation of education during the past thirty years is reflected in the predominant character of the class of teachers who form the Institute. The Institute was really founded by secondary-school teachers with a smaller number of ordinary parish-school teachers. While there are still university professors and numerous secondary-school teachers among the members, still by far the greater proportion is now drawn from the primary-school system. This mixture is quite in keeping with the traditions of Scottish education. It must be remembered that there was no hard and fast line separating primary from secondary education. A parish school did, or did not, do secondary work just as the teacher was, or was not, able for it. Even in these days of delimitation the attempts of those in authority to define and separate the respective spheres of primary and secondary education and to segregate pupils and schools into corresponding groups have so far had but little support from Scottish public opinion.

An important step forward in the history of the Institute was taken in 1851, when a Royal Charter of Incorporation was granted by the Privy Council. It is both interesting and instructive to read that the prime movers in this matter were "William Hunter, LL.D., Rector of the Ayr Academy and present President of the Educational Institute of Scotland; Fletcher Read Low, LL.D., of the High School, Glasgow, and Daniel Macintosh, of the Meadowside Academy, Dundee, two of the present Vice-Presidents of the Institute, and George Ferguson, A.M., Professor of Humanity, King's College, Aberdeen, the present Secretary of the Institute." Among other privileges granted under the charter was one that is becoming more and more valuable as the years pass—the power of granting degrees. The Fellowship of the Institute (F.E.I.S.) is eagerly sought after by teachers in Scotland, and every year sees a greater number of applicants from other countries who,

although of high professional standing at home, have considerable difficulty in satisfying the requirements of the Board of Examiners, the statutory body presided over by Dr. Hugh Dickie, Rector of Kilmarnock Academy. Tradition has it that the granting of the fellowship was not always so strictly guarded as now; but such laxity, if it ever existed, is now happily a matter of ancient history.

It may conveniently be noted here that under the charter certain powers of examining and certifying as to the attainments and professional skill of teachers and as to the scholarship of others were conferred on the Institute. The examination and certification of teachers soon fell into abeyance, and became practically a dead letter when the Committee of Council on Education formally undertook that duty, and began to issue "parchment certificates." This may be looked upon as a distinct professional misfortune to teachers, inasmuch as it took away from them the privilege so carefully guarded and so much prized by other professional bodies—viz., the right to determine who shall and who shall not be admitted to the register of qualified practitioners, whether it be law or medicine.

But the other examining powers of the Institute still remain and are to-day in active use. The examinations conducted quarterly by the Institute in Edinburgh, Glasgow, London and Dublin, are held by the respective authorities—the British Medical Council, the Royal Veterinary Council, the Pharmaceutical Society and the Dental Association—as satisfying the requirements for their preliminary examinations. The registrar for these examinations is Mr. S. M. Murray, 40, Princes Street, Edinburgh (the headquarters of the Institute). It is gratifying to observe that, in keeping with the traditions of the country, the Institute manages to make quite a tidy income from its preliminary examinations.

Leaving history and coming down to actual present-day facts, it will be interesting to give some account of the constitution of the Institute and its method of working. As befitting a society of fifty-six years' standing, the constitution of the Institute is a somewhat complicated affair not to be rashly attacked, and certainly not quite easily understood. Safeguards are so numerous and so carefully balanced, to secure that no undue hurry shall ever mar its action, or that no hasty hand shall pull down what was built up with so much loving care and on the whole with so much commendable foresight, that there are not wanting certain people of somewhat fervent and go-ahead temperament who affirm that the safeguards are in reality strangling the life of the Institute. They hint that a dynamite cartridge, judiciously placed in the works, would be a most useful contribution to progress. But all that these iconoclasts have hitherto managed to do is to produce some fine schemes—on paper. Up till now, they have not done much effective reformation. Few apparently can withstand that final argument, viz., the flaunting of the charter in their

faces. On this point your contributor can speak feelingly, as he has dared greatly and done little.

The executive of the Institute consists of a President (Mr. A. T. Watson), Vice-President (Mr. George Fenton), Ex-president (Mr. George Rae), Secretary (Mr. John Laurence), Treasurer (Mr. S. M. Murray), Secretary to the Board of Examiners (Dr. Dickie), and a General Committee of Management, at present numbering fifty-three—in all, fifty-nine individuals. Such an unwieldy body can meet but seldom (four times a year), and is not fitted for the speedy transaction of business. Consequently, there is wholesale delegation of administrative powers to numerous



MR. A. T. WATSON, M.A.

Rector of Dumbarton Academy and President of the Educational Institute of Scotland.

committees, of which the chief is the *special committee* which in recent years has done much executive work—"usurped," some say. But whatever the shortcomings of the General Committee of Management as an administrative body, it has one advantage which, in the estimation of some, outweighs all its disadvantages. From the fact that it is popularly elected and that it draws its membership from every part of Scotland, from Caithness to Wigtownshire, it is truly a representative body, and by this means it is able to focus educational opinion in a way a smaller and otherwise more efficient committee could not do.

While executive powers are thus vested in the General Committee of Management and its numerous delegated committees, in theory and in

actual fact all powers are centred in the Annual General Meeting, which is held on the "Saturday immediately following the third Friday of September"—a most effective Shibboleth, that date, with its numerous *r*'s, to distinguish between the true-born Scot and his southron neighbour. This gathering of the clans takes place according to rules and in keeping with unbroken tradition in the precincts of the Royal High School of Edinburgh. The delegates from the local associations assemble to the number of about a thousand for the transaction of business, but thousands more make this annual pilgrimage to the Mecca of Scottish education, drawn there by educational zeal, by custom, by the hope of meeting old friends, and by the expectation of being able to fill certain black bags with the numerous specimen publications scattered broadcast by generous publishers. There are certain libellers on the country brother who affirm that by judicious gathering of the said specimens sufficient materials are collected to run a small school for the ensuing winter. At any rate, the black bag is much in evidence, and book catalogues—the badge of all our tribe—overflow into Princes Street, where the lady teachers may easily be identified in the promenading crowds by the tell-tale bundle carried in their hands.

An important part of the proceedings of the annual meeting is the delivery of the Presidential Address. Custom has prescribed that the greater part of the morning *sederunt* (*anglicè*, session) shall be given up to the swan-song of the out-going president. But here, again, the innovator is anxious to make a change. He says that, as all the business of a year has to be crowded into one short bustling day, the President's Address should either be delivered on the evening of the previous Friday, or should be held as read. Some one may in ignorance suggest that the annual meeting should begin an hour sooner in the morning, only to be told that the charter says specifically and definitely that business must begin at eleven o'clock. The ignorant one may well think that what is needed regarding the charter is another Cromwell to say, "Take away that hauble."

But, as a matter of fact, the business part of the annual meeting does not reflect credit on the Institute. There is too much to do to permit of proper deliberation of the items on the agenda, and sometimes important points have to be scamped in the necessity of the time. Then Scottish teachers are not so practised in the rules of debate as to permit them to follow orderly procedure. It is no uncommon incident to see two or three delegates attempting to address the Chair simultaneously, and most of the speakers would think it an infringement of their natural rights were they not to have as many opportunities of speaking to a "motion" as they pleased. Still the business is done somehow in a sufficiently satisfactory manner to permit the work of the next year to be carried on, and that, after all, is the great thing.

But the Institute has another public function. About the time of the New Year holidays the

Annual Educational Congress is held at one or other of the prominent centres of population. This "movable feast" is arranged largely by the local association of the chosen place aided by the officials from headquarters. Glasgow was the scene of the last Congress, Dumfries of the previous one. As the name implies, this is purely an educational congress. In reality, it is a public meeting which anyone may attend, and in the proceedings of which anyone may take part. In addition to the President and other teachers who may be said to represent the professional element, prominent outsiders are invited to use the congress platform to enunciate their views on educational topics. Thus at Dumfries, Mr. Haldane, K.C., M.P., gave an address on "University Extension and Reform," which has had permanent effect in moulding public opinion in Scotland on this subject. This year Dr. Michael Sadler and Mr. Thomas Shaw, K.C., M.P., appeared on the platform of the Glasgow Congress. The freedom of the meeting was admirably exemplified in the case of Mr. Shaw's address, in which he took occasion to argue for the continuance of the existing School Board system on practically its present footing, and the Congress unanimously resolved there and then directly the contrary to the distinguished special pleader.

This separation of function between the business Annual Meeting in September and the Educational Congress in January has much to commend it and might well be imitated by other associations. Two useful purposes it serves may be noted here. It serves to identify in the public mind the close connection between the Educational Institute and the progress of education, by making the Congress of this body the occasion on which important contributions to the discussion of prominent educational topics are made. It serves to keep teachers in touch with the opinions of the outside world, and takes them away from viewing every question through narrow professional spectacles.

The fifty-seventh Annual General Meeting of the Institute is at hand. The officials will be able to report on the continued prosperity of all branches of the Institute work. The financial report will be gratifying as showing evidence of vigorous life, and the results of the educational propaganda carried on in the country will also give satisfaction. The Benevolent Fund is flourishing. It is worth noting, by the way, that this is maintained exclusively by a special annual contribution from each member of the Institute of one shilling. Certain domestic questions are ahead of the Institute, and these will come up for discussion, the most important being the arrangements for the future made necessary by the lamented death of Dr. Mackay, late Treasurer of the Institute, and for many years its most prominent personality.

We give a portrait of Mr. A. T. Watson, rector of Dumbarton Academy, the President for the current year. Elected by a unanimous vote in 1902, Mr. Watson has proved himself a splendid chairman of the General Committee of Manage-

ment, and in his numerous public appearances has done honour to his high office. The great traditions of the past have been safe in his hands. How great they are is sometimes not properly appreciated, but a glance at the roll of past presidents is of itself a convincing proof of the great part the Institute has played in the history of Scottish education. The oldest surviving ex-president is Principal Donaldson, the distinguished head of St. Andrews University. The President for 1892, Prof. John Young, of Glasgow University, died during the past year. One ex-president more we may mention, although he is very much alive indeed. Professor John Adams, of London University, President of the Institute in 1896, is a man whom the Scottish teachers delighted to honour, for reasons which educational London is now finding out for itself. It is therefore, we repeat, high praise indeed to say that Mr. Watson has fulfilled splendidly the great tradition of the chair.

But no body can live on mere traditions of the past, however glorious. The present work must be carried on, and the future must be kept in view. Important developments are before us in Scottish education. Changes are in contemplation which cannot fail profoundly to affect both the educational future of Scotland and the personal position of the teacher. The Institute must be up and stirring, ready to take that share in shaping the necessary legislation which its undoubted influence warrants us in expecting. Wisely guided and effectively applied, that influence could do much. It has been alleged, possibly with some truth, that the Institute has in the past been somewhat slow to move. There lies before it an excellent opportunity of proving that its honourable antiquity does not cause the blood to run sluggishly in its veins, but that its lengthened experience serves only to guide aright and not to delay the necessary action.

SCIENTIFIC INSTRUCTION IN GEOGRAPHY.

TWO suggestive syllabuses of instruction in geography for elementary and secondary schools respectively have just been issued by the Royal Geographical Society. The elementary syllabus, drawn up by the late Mr. T. G. Rooper, was completed by Mr. G. G. Chisholm, and that for higher schools is due to Mr. H. J. Mackinder. Both syllabuses have been discussed by a special committee appointed by the Council of the Society at the request of the London School Board and the Oxford and Cambridge School Examinations Board, and they should be of real value in indicating what competent authorities consider to be the functions and scope of geographical teaching. The fundamental idea of the courses proposed is personal observation of local conditions, and the

relationship of the material for study thus provided to cause and consequence in the geography of the world as a whole.

All who are interested in the improvement of geographical teaching will find themselves in general agreement with the views of the committee of the Royal Geographical Society. Whether the syllabuses will have any influence upon the work of schools is, however, another matter. So long as any master is considered competent to teach geography, and so long as examiners set questions which can be answered by learning topographical tags, the subject must remain in its present unsatisfactory position. We are all agreed that improvement is desirable, but little advance will be made until a practical teacher produces a course of work which can be carried out under the ordinary conditions of school work by men who have not been specially trained to teach geography, and in the one or two periods a week devoted to the subject. It must be recognised that field work in school hours is impracticable in most cases, and that the only workable course which can be accepted under existing conditions must be of the nature of a compromise.

Three or four years ago the Cambridge Local Examinations Syndicate issued an admirable course of instruction in physical geography for junior and senior candidates, with notes on practical work, but less than two thousand pupils were presented for examination in the subject last year, while more than ten thousand took geography of the ordinary type. It should be evident from this that teaching follows the line of least resistance, and that little improvement is effected by a syllabus when the work prescribed cannot be insisted upon, or requires special knowledge and equipment to be performed successfully.

What is wanted at the present time is a course of general geography for schools which will cultivate the mental activities of the pupils and can be carried out almost entirely in the class-room. A good atlas, and a work of reference such as "Whitaker's Almanac," or the "Statesman's Year Book," provide material for study, and practical exercises based upon them, or upon results of observations made in leisure hours, should be worked by students in their note-books. When someone shows how this can be done, a real commencement will have been made in the application of scientific methods to the study of geography in schools.

The ideals set forth in the syllabuses of the Royal Geographical Society ought to inspire better methods of instruction. Indeed, if suitable teachers could be found and sufficient time placed at their disposal to develop the courses in the manner advocated, it would not be long before the fact was demonstrated clearly that geographical work of the right kind is one of the best instruments available for the proper development of the pupil's intellectual faculties. In the absence of specially trained teachers and in view of the already crowded curriculum of both our primary and secondary schools, however, it is a

counsel of perfection to advocate field work in school hours. All educational improvements take a long time to become general, and, though much in the new syllabuses may be familiar to the better teachers of geography, the underlying conceptions of the need for more practical work are by no means generally accepted. We trust this publication of the Royal Geographical Society will be widely distributed and carefully studied by headmasters and headmistresses as well as by teachers of geography.

ATHLETICS AND OUT-DOOR SPORTS FOR WOMEN.¹

THIS interesting and useful publication comes to us from the United States, Miss Eaton Hill being the Director of Physical Training in Wellesley College.

The students at Wellesley have splendid opportunities for exercise in the use of their five hundred acres of grounds and their very large and beautiful lake, but it is evident that the American woman, as a rule, before she becomes a student in such a college as Wellesley, has very little opportunity of learning the value of play, many of the directions given in this book being so elementary that they appear to us to be unnecessary.

At first sight it is disappointing to find so little mention made of organised games, those treated of being only hockey and basket ball, but the evident cause of this is that the book is primarily intended as a guide for the training of the individual up to the highest perfection possible of health of body and mind, the training of character being, in this connection, a minor issue. Upon this assumption we can give almost unqualified praise to the book. The directions are clear and are copiously illustrated, so that anyone by careful study can give herself a very satisfactory physical training. As might be expected from the circumstances, the articles on rowing, swimming, skating, riding, and basket ball, are particularly well done. Exception must be taken to the statement that hockey is the "king of games," as it encourages one-sided and stooping positions, which are in strong contrast with the nobler positions necessary for either basket ball or lacrosse.

Swedish gymnasts would also take exception to the commencing position advocated in the chapter on home exercises, and also in some cases to the form of execution. Also in the gymnasium work the principles of systematic physical development do not appear to be fully understood. Hence there is danger of over-exertion, especially as the students are urged to go on "until they are tired," it being essential for true development that over-fatigue of any particular muscle should be avoided. In spite of these small drawbacks, we may con-

gratulate Miss Hill upon having produced a book so careful in its instructions and so high in its aims as the one before us. Women have in these days of luxurious self-indulgence to learn, not only for their own sakes but for the sake of succeeding generations, the absolute duty of moderation—something of the old Greek ideal of self-restraint in all things for the good of the community; so only is "physical beauty to be found in abounding health, grace of motion and dignity of bearing."

It may save trouble if we point out a printer's error, namely, that Figures 226 and 227 are apparently reversed.

MORAL PHILOSOPHY OF THE GREEKS.¹

THIS book is not quite what its title suggests. One would expect to find in it a calm and dispassionate examination, divided into two parts—for there was little connexion between philosophy and religion in ancient Greece. What we do find is difficult to describe. If it were less ably written we might call it a religious pamphlet on a large scale. There is a good deal of feeling in it, and the mode of address to the reader savours at times of the pulpit or platform. Yet its tone is so high, its aim so generous, and its actual value so considerable, that we should hesitate to brand it with any title which might hinder a reader from approaching it. If we value it for reasons not quite the same as prompted the unknown author to write, we do nevertheless value it. Yet it is our duty to point out its faults, which we shall do gently, since the author has now gone where he cannot defend himself, to those islands of the blest whose description in Pindar has excited his admiration.

And first, to get the fault-finding over. The introductory section, describing the land and the people, the early antiquities of the Greek tribes, and tracing the influences which moulded their history, is much too long, and contains so many errors that it must be used with discretion. The author relies too often on authorities which are either unsound or out of date, and much of it—his suggestions as to the early Greek worship, for instance—would have to be re-written in the light of recent discoveries. He gives too much weight to accepted etymologies, and too little to anthropology; he interprets early custom by symbolism, late and often fanciful, as when he suggests that the oak of Zeus was a symbol of beneficence. The relation of nature worship to Greek religion is not adequately grasped. It is unfortunate that this part, the least satisfactory in the book, comes at the beginning. When the author approaches his serious task, he almost ignores the fruitful specu-

¹ "Athletics and Out door Sports for Women." Edited by Lucille E. Hill. 339 pp. (Macmillan.) 6s. net.

¹ "The Makers of Hellas: a critical Enquiry into the Philosophy and Religion of Ancient Greece." By E. E. G. With an introduction, note, and conclusion by Frank Byron Jevons, M.A., Litt.D., Principal of Hatfield Hall, University of Durham. xxix. + 711 pp. (Charles Griffin.) 10s. 6d.

lations of the earlier philosophy, and assumes, without ground, the predominance of Zeus in the Greek pantheon at an early date. Modern research is putting quite a new aspect on the relations of the gods, and ancestor-worship in particular (the existence of which is denied in this book) is becoming an important problem.

What then, it will be asked, is the value of the book at all? It lies in the analysis of the works of several great writers, from Homer to the dramatists, Plato, and Aristotle, from the religious point of view; or rather, more properly, from the point of view of moral ideas, with which (*pace* our author) Greek religion had little to do. He brings out clearly how large a part in the poet's mind was played by the νόμοι ἀγραφοί, the unwritten laws of right and wrong, which are most strikingly treated perhaps in the *Antigone* of Sophocles. His analysis of moral ideals, and the views taken of virtue and vice, bring out the characteristic points of the writers, and their differences, in clear relief. By the way, it also elucidates the characters of dramatic poetry. Thus, although literary criticism was probably far from the mind of the author, few readers but will be enlightened in this respect by the careful examination of the *Antigone* or the *Oedipus*. It follows also that the aims and merits of the several writers are made clear. We think the author's estimate of Euripides is particularly good, as standing between the extremes of Dr. Verrall's "Rationalist," and the "literary bungler" of other critics. The author seems to us to have a strong dramatic power, which not only discloses to him the secrets of plot and character, but enables him to present his poets and philosophers to us as living men.

One word may be added on Prof. Jevons' additions, which were made necessary by the untimely death of the author, who left his MS. incomplete, for the editor to publish without revealing his name. Prof. Jevons points out well the strong and weak points of the book, and gives a lucid summary of the contributions of Greece to the history of religion. He does not overlook, as the author is apt to do, the popular side of Greek religion, and he points out that here too, as well as among the great thinkers, there was a sincere faith quickening a ritual often childish or unreasonable.

We are glad to conclude by saying that the book is both interesting and stimulating, and, for those who are capable of using it with discretion, full of instruction.

You cannot get a child to learn merely from prudential considerations: a child is much more idealistic than a grown-up person, and readily responds to an ideal impulse. You cannot attract him by the hope of making money in the future. He wants to learn what the world really is, to make his surroundings intelligible. Upon your capacity for putting to the child the appeal to learn on a basis which attracts his attention, his response will inevitably depend.—Bishop Creighton.

A NEW SCIENTIFIC THEORY.¹

By EDWIN EDSEK, A. R. C. Sc.
Fellow of the Physical Society.

IN 1885 Prof. Osborne Reynolds drew attention to a remarkable property of granular media which had previously evaded scientific recognition, although it was familiar enough, in one of its aspects, to dealers in grain. Speaking generally, we may state that a granular medium possesses the property of expanding, or becoming less dense, when subjected to compression: to this property Prof. Reynolds gave the name of *dilatancy*.

To explain this property, let us refer to Fig. 1, which represents 64 cannon balls piled in the closest possible order. Any one of the balls near the middle of the pile will be in contact with its twelve neighbours, the space between the balls being the smallest possible. Consequently, if any alteration from this arrangement is made in piling the balls, the spaces between them will be enlarged, and the overall dimensions of the pile will increase. Fig. 2 represents the same 64 balls piled in the most open order possible. To form an idea of the

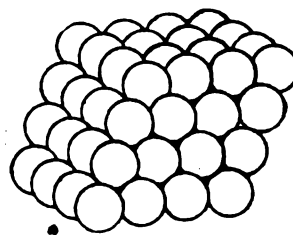


Fig. 1.

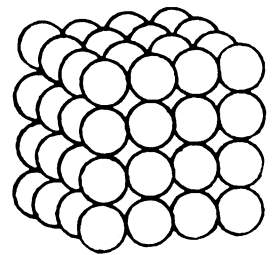


Fig. 2.

difference produced in the density of the pile, let us take the density of a single sphere as equal to unity, then the density of the pile in Fig. 2 will be equal to $\pi/6$, while that of the pile in Fig. 1 will be equal to $\pi/3\sqrt{2}$, or $\sqrt{2}$ times as great as that in Fig. 2.

This property was well recognised by grain dealers in times when corn was sold by measure, instead of by weight as at present. It was then customary to pile up the measure with corn, and finally give the surface a blow with a wooden pin, termed a *strake* or *strickle*. This left the measure apparently filled up to the brim; if, however, it were shaken, it would be found that the measure was only about nine-tenths full.

Let us now suppose that an india-rubber bag is filled with shot, the interstices of the latter being occupied by water, from which air has been removed by previous boiling. Let a glass tube be fixed in the mouth of the bag, so that the water stands some few inches up it. On shaking the bag, the shot will arrange themselves in the closest possible order, the interstices then having the smallest

¹ "On an Inversion of Ideas as to the Structure of the Universe." (The Rede Lecture, June 10th, 1902.) By Osborne Reynolds, M. A., F. R. S., &c. 44 pp. (Cambridge University Press.)

possible volume, and, therefore, the smallest possible volume of water being within the bag. From what has been said previously, it is easily seen that if we now compress the bag we cannot avoid displacing the shot, and thus increasing the spaces between them, so that water will be *sucked into* the bag, instead of being expelled, as might at first sight have been expected.

A sack containing grain can be deformed into any shape we please, so long as its mouth remains open. While the grain possesses a free surface, its properties are not unlike those of a liquid: many a ship has been capsized through shifting of a loose cargo of grain. Directly, however, the mouth of the bag is closed tightly on the grain, the sack and its contents acquire properties nearly akin to those of a solid: no deformation can be produced without rupturing the sack.

The following experiment comes about as near to magic as any commonly met with, although its explanation will be obvious to those who have followed the above argument. A child's india-rubber balloon is filled with a mixture of sand and water, which has previously been boiled to expel air. When the sand is shaken down there should be a slight excess of water above it. The mouth of the balloon is then closed, all air being excluded, when the balloon may cautiously be flattened out into a shape similar to that of a tea-cake. So long as the pressure of the hands remains on the flat upper surface of the balloon, the contents will remain quite fluid, since the sand has a free surface beneath the water. On relaxing the pressure of the hands, the elastic balloon contracts, and displaces the sand grains from their previous close packing, thus sucking water into their interstices. But directly the excess of water has been sucked into the interior, the sand no longer possesses a free surface and its apparent fluidity vanishes. Any further displacement of the sand grains could only be effected by a pressure great enough to produce one or more vacuous spaces, *i.e.*, greater than 15lbs. per sq. in. The balloon and its contents is now quite rigid, and when stood on edge it can sustain a weight of two hundredweight without any appreciable deformation being produced.

Enough has perhaps been said to explain why the sand on the sea shore, which has been left wet by the receding tide, is firm to walk on, while the dry sand allows the foot to sink into it quite readily.

The foregoing will give some idea of the property of dilatancy, discovered and explained by Prof. Reynolds. This is, however, by no means the end of the story. Prof. Reynolds has worked out a theory of the structure of the universe, in terms of the dilatancy of a granular medium. The ether is assumed to consist of excessively small, hard spherical particles, the diameter of each being about *one seven hundred thousand millionth part of the wave-length of light*. In free space these particles are packed practically as closely as possible. In places, however, some particles have been displaced so that a spherical surface of misfit exists between the interior particles and those surrounding. Each

such surface constitutes an atom, which is thus, so to speak, a crack in the ether. When an atom moves, the ether does not move with it; in advance of the atom, the ether particles pass into the interior of the atom, across the surface of misfit, and others leave the interior in the rear. Similarly if a row of six billiard balls are placed in a straight line on a table, and a seventh ball, travelling in the straight line which the others occupy, strikes one end of the line, that ball comes to rest, while another starts off from the opposite end of the line of balls. There are still six stationary balls, but the line has shifted through a distance equal to the diameter of a ball.

It is impossible, at present, to go much further into detail over this most interesting theory: in the first place, on account of the space an adequate treatment would occupy; and, in the second place, because the full results obtained by Prof. Reynolds are not now before us. Suffice it, then, to say that Prof. Reynolds claims to have obtained an explanation of universal gravitation, cohesion, chemical affinity, electricity and magnetism, all in terms of the granular ether of his invention. If Prof. Reynolds' theory can stand the criticism it is sure to evoke from mathematical physicists, it will unquestionably constitute the greatest advance in science which has been made since the time of Newton.

ENTRANCE REQUIREMENTS AT PUBLIC SCHOOLS.¹

MR. LLOYD has compiled a book which will be absolutely necessary to the headmaster of every preparatory school in the country. It contains from one to five complete sets of papers, set at scholarship examinations of the chief schools of England, and the questions serve clearly to define the knowledge expected from pupils hoping to enter a public school. Unfortunately the editor has considerably impaired the utility of this otherwise excellent book by not including any papers later than 1901. His preface is dated May, 1903; therefore, by waiting another two months, he might have included most of the 1903 papers, as the examinations usually occur in July; and his book would yet have been ready by the beginning of the Michaelmas term. This omission is all the more to be regretted as it is to be hoped that we are on the eve of a great change in the compulsory subjects of these examinations. Charterhouse is, for example, for the first time this year, giving two scholarships independent of Greek.

Now, to take a general view of the knowledge expected, as these papers show, from boys of about fourteen: the two most pronounced defects that strike an unprejudiced inquirer are the enormous

¹ "Entrance Scholarship Questions for the chief Public Schools and H.M.S. Britannia," by E. J. Lloyd, Headmaster of Harrow House School, Bognor. 568 pp. (Sonnenschein.) 5s. net.

credit given to Greek and Latin, and the most perfect ignorance of the mother tongue which is allowed. Little boys are expected to be able to turn Macaulay and other writers into Latin and Greek prose, and fragments of English poets into Latin elegiacs and Greek hexameters; but, in the few cases where any questions at all on English work are asked them, the examination takes the form of a general paper, which includes Scripture, English and European history, geography, literature, and often one or more sciences. It is well known that this paper has little influence on the result of the examination except when two boys are almost equal. What is the consequence of this? It has very often been pointed out before that masters in preparatory schools give no time at all to English subjects. No doubt the talented boy manages to pick up some English grammar through the medium of Latin and Greek, just as he would through Hebrew or Sanskrit. But what of the average boy? All his life he is in doubt as to whether he should say "who" or "whom," and "between you and I" or "between you and me." An honourable exception must, however, be made in the case of Haileybury, which for its modern-side scholarships has an efficient English paper. Eton considers the character of Pericles or Cicero a proper question for a general paper; and asks for an explanation of the term "dicotyledon." Another school asks for the definition of "isotherm," and a list of British colonies in their order of date of acquisition.

All the mathematical papers in this book are set along the old lines, although at Winchester the recommendations of the Mathematical Association have already been followed. It would be a great help to preparatory schoolmasters if they knew the lines on which the papers were to be set, as at present they are in danger of trying to teach both and succeeding in neither.

If we might be so bold as to map out an ideal set of papers for an entrance scholarship, we should suggest that English, elementary mathematics, Latin grammar and unseen translation should be compulsory, and either Greek, a modern language, or a science might be offered as an additional subject. The English paper might be along the lines of that set at the new London University Matriculation, omitting the paraphrasing and *précis* writing. Stiff continuous Latin prose possibly, and Latin verse certainly, should only be expected from those seeking classical scholarships. The marks for these subjects even then should not exceed half the total number offered for competition.

Some of the French papers in the book have absurdly tricky sentences to be translated into French; instead of this we would have an easy continuous tale or anecdote, or, perhaps preferably, a tale or anecdote to be read out in English for the candidates to write down the substance in French. At Uppingham, we happen to know, it is not customary to set any French papers for the ordinary entrance examination, although candidates are asked what German books they have used, and what science they have done.

The book is clearly printed, and is remarkably free from misprints; but we have noted "cover" for "over" on p. 351, and "courtesan," for "courtisan" on p. 99. We presume the phrase "*tout est perdu sauf l'honneur*" instead of "fors," was so printed in the original paper (p. 76). The answers and hints to all the mathematical questions greatly enhance the value of the book.

THE INDUSTRIAL PLANTS OF FORMOSA.¹

SOME interesting information has recently been published regarding the industrial plants of the island of Formosa, the resources of which, in Japanese hands, are likely for the first time to be fully turned to account. The commodity naturally associated with Formosa is camphor, for though some camphor is obtained from China and Japan, it is from Formosa that the bulk of the world's supply is drawn. The mountains of the interior are clothed with an almost impenetrable jungle, among which the camphor laurel grows freely, frequently attaining a girth of twenty-five, and occasionally even of forty feet. The task of obtaining camphor, however, annually involves a vast sacrifice of human life. The tree must be felled, and thus the camphor trade has led to the destruction of wide areas of forest, the abode of fierce aboriginal tribes, who view with alarm the contraction of their forest homes, and who are ever lurking in the jungle, waiting a chance to attack the solitary camphor gatherer and carry away his head as a trophy. Even ivory, perhaps, is scarcely bought at a greater cost of human life, and this circumstance contributes greatly to enhance the price of the drug. After the tree is felled and cut up the camphor is obtained by distilling, by means of stoves set up in the forest, and so simple is the process that a single man is able to look after one stove and to make journeys backwards and forwards to the tree on which he is at work for fresh supplies of chips. Trees of ordinary size, about twenty feet in circumference, would supply a stove for two years, but many trees are considerably smaller. An exceptionally large tree might keep a stove busy for several years and yield camphor worth several hundreds of pounds.

Next to camphor, at the present time, ranks tea, of a high grade and expensive quality, which, though little known in this country, is highly esteemed in America. The amount annually exported at present is about 20,000,000 lbs., or about one-tenth of the quantity annually imported into this country from India and Ceylon. Four crops are obtained annually, the picking being done by Chinese girls and children. Several thousand Chinese families leave their homes in

¹ "The Island of Formosa, Past and Present." By James W. Davidson. vi. + 646 + xxviii. + 46 pp. (Macmillan.) 25s. net.

China every spring to work in the tea establishments of North Formosa. Dressed in her best and most gaily coloured garments, with a *coiffure* elaborately arranged, and decorated with magnolia and other fragrant blossoms, the tea picker is a picturesque figure. Of other cultured plants sugar is the most important, and the industry will undoubtedly develop very rapidly. Local conditions are so favourable that cane, which requires eighteen months to ripen in Hawaii, reaches maturity in Formosa in twelve months, while the Chinese population supplies abundance of cheap labour, and Japan, where sugar cannot be grown, provides a market. The present output is between 90,000,000 and 100,000,000 lbs.

Among the other economic plants of Formosa fibre plants are exceedingly important. Chief among them, China grass, often incorrectly called "ramie," is a plant of the nettle family. Its value is so great that it is not only grown for the market, but even by the savages, who make it into a coarse cloth, roughly woven but extremely durable, and not without a beauty of its own. China grass is one of the finest and strongest of vegetable fibres, and though no satisfactory mechanical method of preparation has yet been devised, it is increasingly in demand. It is perhaps more used in France than in any other European country.

"French hotels and railway companies are reported to have abolished ordinary linen in favour of the new product, owing to the latter's splendid wearing and washing qualities. The Minister of War has adopted it for the cordage of balloons, ammunition bags, &c., and the army and navy use it for the dressing of wounds. It is in use as linen in some twenty city departments at Paris, and the Bank of France has adopted it exclusively in the manufacture of notes."

Jute ranks next in importance to China grass, and other fibre plants are the fan palm, from the sheath of which are made large ropes for junks, sun hats, mats and other articles; the sisal hemp, the pineapple, which yields excellent fibre as well as luscious fruit, the paper mulberry and many others. There is also a rush, believed to be peculiar to Formosa, used to plait mats, which are only equalled by those of the famous Panama straw, and, like these, can be folded without injury. In central Formosa the industry which is carried on by children and young girls is a very busy one. Hats are now being made, and may not improbably soon rival those of Panama.

The paper plants include the so-called rice-paper plant, or pith-plant, the pith of which, finely pared, is largely used as paper by the Chinese, and the paper mulberry, the bark of which supplies a paper which is used in the manufacture of paper umbrellas, Chinese lanterns and rain coats. In addition there are dye plants, such as indigo, extensively used for dyeing the universally worn blue garments of the Chinese, and turmeric; oil plants, including the ground nut, the castor-oil plant, and the tallow tree, soap plants, and other useful varieties too numerous to mention.

F. D. H.

BRITISH SONGS FOR BRITISH BOYS.¹

SOME exception may be taken to the title of this book as being not quite accurate, inasmuch as the collection includes several American songs of quite inferior value. But the work deserves commendation on the whole as another help in the direction of restoring to the British people their lawful heritage of national song, a heritage from which the sentimentality of the drawing-room ballad and the vulgarity of the musical comedy have well-nigh excluded them. Mr. Nicholson claims to have avoided over-elaboration in his accompaniments — a very common blemish in modern versions of old melodies—and, on the whole, his claim can be admitted, though we doubt his wisdom in introducing a contrapuntal device in the accompaniment to the "Ash Grove." Moreover, it is quite possible for an accompaniment, without being over-elaborate, to be quite out of keeping with its melody. An instance of this is to be found in the case of the "Minstrel Boy." The accompaniment to that heroic tune should surely be as straightforward and bold as possible. But Mr. Nicholson has introduced harmonies which invest the song with an atmosphere of sentimentality verging upon mawkishness, and this is not the only instance of the kind. We are bound also to observe that the pitch of a great many of the songs is too high for unison singing, too high, in fact, for any boys' voices which have not received a good deal of training.

However, with a few exceptions, the hundred songs in the collection are admirably selected, and some of them occur in only a very few other collections. The editor has shown a praiseworthy instinct for "spotting" the kind of song which is not only good from the musical and literary points of view, but also attractive to the boy of average musical and literary appreciation. Early familiarity with songs of which the melody is good and the general tone and sentiment sound and healthy cannot fail to influence favourably the taste, and to some extent the character, of young people. Whether the prevailing bad taste in songs is to be placed among the causes or the symptoms of national vulgarity is difficult to decide. But the cure of a disease is often furthered by combating its symptoms, and so in any case Mr. Nicholson may claim to have dealt a stout blow on the right side in the battle which all school musicians are fighting against the Philistines, and his book should take a high place among the many works of a similar character which have lately come into being.

The book is issued in two forms: a large volume containing critical and historical notes and pianoforte accompaniments, and a small one containing melodies only, both in staff notation and tonic sol-fa.

¹ "British Songs for British Boys." A collection of 100 national songs designed for the use of boys. Edited by Sydney H. Nicholson, M.A., Mus. Bac., Oxon. (Macmillan.) Edition A, for Teachers, 6s.; Edition B, for Pupils, 1s. 6d.

NATAL TEACHERS IN CONFERENCE.

By ERNEST A. BELCHER, B.A.(Oxon.)
Secretary of the Natal Teachers' Convention.

AMONGST the varied problems with which the statesmen of South Africa are being brought face to face there is no question which will influence the course of history more than the educational one, and, it must be added, there are few questions which present more complex difficulties. If we hope to hasten the federation of South Africa by securing a unity in our educational methods, we have to bring into line the widely differing systems of Cape Colony and Natal and then make these accord with the later development of the new colonies. When one reflects that each of these colonies not only has its own educational ideals but is affected by its own local conditions, the magnitude of the task will become more apparent.

For many years past the teachers of Cape Colony have been accustomed to meet in annual conference: last year, in circumstances of peculiar difficulty, Mr. E. B. Sargant, Director of Education for the Transvaal and Orange River Colonies, arranged for a conference of his own teachers at Johannesburg, and this year the first official gathering of Natal teachers took place in July at Durban. It has been suggested now that the fitting corollary to these colonial gatherings would be a great South African Conference, and there seems some likelihood of such a conference taking place in the latter part of next year. Meanwhile there are two or three aspects of the Natal Convention of more than local interest, and to these I should like to refer.

It was a happy circumstance that the Conference of the heads of South African Education Departments was arranged immediately to follow the Convention, as it enabled the Natal teachers to benefit from the presence of Mr. E. B. Sargant and of Mr. George Duthie, from Rhodesia. The former has already gained a reputation for daring originality which his remarkable paper to the Convention fully upheld; while the latter, as the foster-father of the newest educational infant in this continent, was a figure of more than passing interest. Unfortunately, Dr. Muir, of Cape Colony, was prevented at the last moment from attending; but to balance his absence there was Dr. G. R. Parkin, the Secretary of the Rhodes Scholarship Trust, and his very striking personality and eloquence produced a deep impression on all those who were fortunate enough to meet him.

The high level which was attained by Sir Henry Bale—the Administrator of the Colony and a former Minister of Education—in his opening speech and preserved throughout Mr. Barnett's presidential address marked the whole of the proceedings; and, whatever the practical outcome of the convention may be, there is no doubt that from an academic and polemic point of view it was an unqualified success. It is impossible in a short article to refer to the bulk of the papers and discussions. An abridgment of Mr. Barnett's address is given elsewhere (p. 343), and the list of subjects which I have added at the end of this article is at all events an eloquent tribute to the catholic tastes of the president and committee. Two of the papers, however, possess so wide an educational interest that they deserve fuller notice. The first of these was on "The Training of Natal Youths in special relation to their duty towards the Natives," and the author—Mr. H. V. Ellis, Headmaster of Hilton College—pointed out very truly that, after half a century of British rule, the finest of native races have become a source of great anxiety to every thinking man. It is unfortunate, perhaps, that public opinion at home on the native question should be divided so clearly into two opposite camps—those whose earnest belief in missionary enterprise makes them carry the doctrine of the brotherhood of man to impossible conclusions; and those who

say, in effect: "Give me the raw Kaffir; he is a fine fellow by nature, but let us keep clear of the Christian Kaffir." The fact is that the Christianity of the Kaffirs is too often judged by the "Brummagem" ware, and it cannot be insisted upon too often that possession of a pair of boots is not *prima facie* evidence of Christianity. The problem of the black race must be settled in the schools, and until we can educate public opinion to see this we shall get no nearer the solution of the difficulty. Mr. Plant, the Inspector of Native Education, in a particularly able speech, instanced the common practice of the colonial boy who will lounge on to the verandah of the house with his hat, boots and stick within a few feet of him and order the Kaffir to reach his hat, put on his boots, carry his stick and call a ricksha. And then we talk about the dignity of labour! The native is above all things an imitative creature; teach him by the force of example, sobriety, thrift, courtesy and moral strength of character, and he will prove an apt pupil; but show him the worst side of the white man and he will say, "If this is what a superior race can do, I will do better." Mr. Ellis pleaded very earnestly for the technical training of the native. Excellent work in this direction is being accomplished at many up-country mission stations, and notably by the Trappist Brothers. It has been urged that the effect of developing the intelligence of the native will be to bring him into competition with the white man, and the objection is a serious one, but surely it would be possible to restrict the exercise of any craft he might follow to the service of his own race.

The concluding paper by Mr. Sargant was in some respects the most remarkable contribution of the Convention. Mr. Sargant took as his subject "The Career of Teachers in British Colonies" and gave a very interesting sketch of the Normal Schools in the Transvaal. The chief distinction between these schools and those of similar name in other parts of the world lies in the fact that the training of the teacher is continued with intervals of practical work for a much longer period. Mr. Sargant urged the advisability of founding federal training colleges for Canada, Australia, and South Africa, where the best of the colonial teachers could complete their course of study. Finally, these training colleges should be united to one Imperial institution in connection with, say, the University of London. By means of bursaries and scholarships the colonial of marked ability would proceed from the elementary school, through the successive stages of his training, until he received his first-class certificate which would carry with it a travelling allowance for post-graduate study. No doubt it is true that the average colonial teacher—especially if colonial born—tends to become provincial, and the main advantage of the scheme is that not only will the career of teachers be broadened and ennobled, but a unity of educational aim will be produced throughout the whole British Empire.

The main difficulty Mr. Sargant has to face is one of finance, but a man of his originality will not be daunted by this. Might it not be possible to realise Mr. Sargant's object in the immediate future so far that picked teachers who are taking long leave might receive full pay for that period on condition that they spent some portion of their leave in studying educational methods in some other colony, or at home? For example, I cannot think of anything that would be more valuable to Natal teachers than a period of study in Canada or Germany, and it ought not to be outside the region of practical philanthropy for some of the greater steamship companies to help forward so noble an educational ideal. It is probable that the whole subject will receive the careful attention of an Inter-Colonial Conference next year.

The following subjects were discussed at the Convention:—The Teaching of Latin, Mr. H. W. Atkinson, Headmaster of Pretoria High School. Drawing and Design for Children,

Miss Ellen Firks, Principal of the Normal School, Bloemfontein. School Discipline, Miss A. L. Beeston, Headmistress of Durban Girls' Model School, and Mr. James Forbes, Headmaster of Berea Academy. The Eyesight of Children: its relation to Health and Work, Dr. Arch. McKenzie. Nature Study in Natal, Miss Mary Ritchie, Bellair. The Training of Natal Youths in special relation to their duties towards the Natives, Mr. H. V. Ellis, Headmaster of Hilton College. Secondary Education for Girls, Miss E. J. Moore-Smith, Headmistress of Durban Ladies' College. School Hygiene, Dr. Mary Hannan. The Lantern as an aid to Teaching, Mr. E. A. Belcher, Durban High School. The Teaching of Natural History and Agriculture, Dr. H. Lyster Jameson. The Cadet Corps Regulations, Mr. J. A. McLaren, Headmaster of Newcastle Government School. Museum and Art Collections for Schools, Mr. H. Stubbs, Maritzburg College. Physical Culture, Mr. S. Trouncer Downes, Headmaster of Bellair Government School. The Career of Teachers in British Colonies, Mr. E. B. Sargent, Director of Education for the Transvaal and Orange River Colonies.

A MODERN VIEW OF CULTURE.¹

It is the object of this paper to show that the idea of cultivation in the highly trained human being has undergone substantial changes during the nineteenth century. I propose to use the term cultivated man in only its good sense—in Emerson's sense. In this paper he is not to be a weak, critical, fastidious creature, vain of a little exclusive information or of an uncommon knack in Latin verse or mathematical logic; he is to be a man of quick perceptions, broad sympathies and wide affinities, responsive but independent, self-reliant but deferential, loving truth and candour but also moderation and proportion, courageous but gentle, not finished but perfecting.

There are two principal differences between the present ideal and that which prevailed at the beginning of the nineteenth century. The horizon of the human intellect has widened wonderfully during the past one hundred years, and the scientific method of inquiry has been the means of that widening. The most convinced exponents and advocates of humanism now recognise that science is the "paramount force of the modern as distinguished from the antique and the mediæval spirit,"² and that "an interpenetration of humanism is the condition of the highest culture."

Emerson taught that the acquisition of some form of manual skill and the practice of some form of manual labour were essential elements of culture, and this idea has more and more become accepted in the systematic education of youth. The idea of some sort of bodily excellence was, to be sure, not absent in the old conception of the cultivated man. The gentleman could ride well, dance gracefully and fence with skill, but the modern conception of bodily skill as an element in cultivation is more comprehensive, and includes that habitual contact with the external world which Emerson deemed essential to real culture.

We have become convinced that some intimate, sympathetic acquaintance with the natural objects of the earth and sky adds greatly to the happiness of life, and that this acquaintance should be begun in childhood and be developed all through

adolescence and maturity. A brook, a hedgerow or a garden is an inexhaustible teacher of wonder, reverence and love.

Men of science insist to-day on nature study for children, but we teachers ought long ago to have learnt from the poets the value of this element in education. The idea of culture has always included a quick and wide sympathy with men; it should hereafter include sympathy with nature, and particularly with its living forms, a sympathy based on some accurate observation of nature. We proceed to examine four elements of culture:

Character. The moral sense of the modern world makes character a more important element than it used to be in the ideal of a cultivated man. Now character is formed, as Goethe said, in the "stream of the world," not in stillness, or isolation, but in the quick moving tides of the busy world, the world of nature and the world of mankind. To the old idea of culture some knowledge of history was indispensable. Now, history is a representation of the stream of the world, or of some little portion of that stream, 100, 500, 2,000 years ago. Acquaintance with some part of the present stream ought to be more formative of character, and more instructive as regards external nature and the nature of man, than any partial survey of the stream that was flowing centuries ago.

The rising generation should think hard and feel keenly just where the men and women who constitute the actual human world are thinking and feeling most to-day. The panorama of to-day's events is an invaluable and a new means of developing good judgment, good feeling, and the passion for social service, or, in other words, of securing cultivation. But some one will say the stream of the world is foul. True in part. The stream is what it has been, a mixture of foulness and purity, of meanness and majesty; but it has nourished individual virtue and race civilisation. Literature and history are a similar mixture, and yet are the traditional means of culture. Are not the Greek tragedies means of culture. Yet they are full of incest, murder and human sacrifices to lustful and revengeful gods.

Language. A cultivated man should express himself by tongue or pen with some accuracy and elegance; therefore linguistic training has had great importance in the idea of cultivation. The conditions of the educated world have, however, changed so profoundly since the revival of learning in Italy that our inherited ideas concerning training in language and literature have required large modifications.

It is impossible to maintain that a knowledge of any particular literature is indispensable to culture. When we ask ourselves why a knowledge of literature seems indispensable to the ordinary idea of cultivation, we find no answer except this—that in literature are portrayed all human passions, desires and aspirations, and that acquaintance with these human feelings and with the means of portraying them seems to us essential to culture. The linguistic and literary element in cultivation therefore abides, but has become vastly broader than formerly, so broad, indeed, that selection among its various fields is forced upon every educated youth.

The store of knowledge. The next great element in cultivation is acquaintance with some parts of the store of knowledge which humanity in its progress from barbarism has acquired and laid up. This is the prodigious store of recorded, rationalised and systematised discoveries, experiences and ideas—the store which we teachers try to pass on to the rising generation.

The capacity to assimilate this store and improve it in each successive generation is the distinction of the human race over other animals. It is too vast for any man to master, though he had a hundred lives instead of one; and its growth in the nineteenth century was greater than in all the thirty preceding centuries put together. In the eighteenth century a diligent

¹ Abridged from the presidential address of Dr. Charles W. Eliot, before the National Educational Association. Reprinted from *Science* for July 17th, 1903.

² John Addington Symonds—"Culture."

student with strong memory and quick powers of apprehension need not have despaired of mastering a large fraction of this store of knowledge. Long before the end of the nineteenth century such a task had become impossible.

Culture, therefore, can no longer imply a knowledge of everything—not even a little knowledge of everything. It must be content with general knowledge of some things, and a real mastery of some small portion of the human store. Here is a profound modification of the idea of cultivation which the nineteenth century has brought about. What portion or portions of the infinite human store are most proper to the cultivated man? The answer must be—those which enable him, with his individual personal qualities, to deal best and sympathise best with nature and with other human beings.

It is here that the passion for service must fuse with the passion for knowledge. We have learned from nineteenth century experience that there is no field of real knowledge which may not suddenly prove contributory in a high degree to human happiness and the progress of civilisation, and therefore acceptable as a worthy element in the truest culture.

Imagination. The only other element in cultivation which time will permit me to treat is the training of the constructive imagination. The imagination is the greatest of human powers, no matter in what field it works—in art or literature, in mechanical invention, in science, government, commerce or religion, and the training of the imagination is, therefore, far the most important part of education.

I use the term constructive imagination, because that implies the creation or building of a new thing. The sculptor, for example, imagines or conceives the perfect form of a child ten years of age; he has never seen such a thing, for a child perfect in form is never produced; he has seen in different children the elements of perfection, here one and there another. In his imagination, he combines these elements of the perfect form, which he has only seen separated, and from this picture in his mind he carves the stone and in the execution invariably loses his ideal—that is, falls short of it or fails to express it.

Constructive imagination is the great power of the poet, as well as of the artist, and the nineteenth century has convinced us that it is also the great power of the man of science, the investigator and the natural philosopher. The educated world needs to recognise the new varieties of constructive imagination.

It is one lesson of the nineteenth century that in every field of human knowledge the constructive imagination finds play—in literature, in history, in theology, in anthropology, and in the whole field of physical and biological research. That great century has taught us that, on the whole, the scientific imagination is quite as productive for human service as the literary or poetic imagination. The imagination of Darwin or Pasteur, for example, is as high and productive a form of imagination as that of Dante, of Goethe, or even Shakespeare, if we regard the human uses which result from the exercise of imaginative powers, and mean by human uses not meat and drink, clothes and shelter, but the satisfaction of mental and spiritual needs.

It results from this brief survey that the elements and means of cultivation are much more numerous than they used to be; so that it is not wise to say of any one acquisition or faculty—with it cultivation becomes possible, without it impossible. The one acquisition may be immense, and yet cultivation may not have been attained. We have met artists who were rude and uncouth, yet possessed a high degree of technical skill and strong powers of imagination. We have seen philanthropists and statesmen whose minds have played on great causes and great affairs, and yet who lacked an accurate use of their mother tongue, and had no historical perspective or background of historical knowledge. We must not expect systematic education to produce multitudes of highly cultivated and symmetrically

developed persons; the multitudinous product will always be imperfect, just as there are no perfect trees, animals, flowers or crystals.

Let us as teachers accept no single element or variety of culture as the one essential; let us remember that the best fruits of real culture are an open mind, broad sympathies and respect for all the diverse achievements of the human intellect at whatever stage of development they may be to-day—the stage of fresh discovery, or bold exploration, or complete conquest. The moral elements of the new education are so strong that the new forms of culture are likely to prove themselves quite as productive of morality, high-mindedness and idealism as the old.

THE TRUE AIM OF EDUCATION.¹

By P. A. BARNETT, M.A.
Superintendent of Education, Natal.

THE very essence of success in education is movement in new ways and to novel enterprises. We must needs be perpetually pushing our horizon further away, putting our children into sympathetic and intelligent relations with every considerable acquisition made by the world in the region of knowledge. If we do not we shall remain as unprogressive as the Chinese, or as a community of ants. Mere growth in bulk or numbers is not progress; an ant-hill is only an ant-hill, even if it is six feet high. We shall always be asking the community to do more and better things than it heretofore has done for our children, and our work. There are certain principles in which the interest of teachers is more definite and more poignant than the interest usually taken by people outside our profession, and if these principles affect our daily tasks as we stand before our pupils, then we must do our best to apply them, in so far as we loyally can, and to stimulate public opinion to adopt them by whatever legitimate means lie to our hands. I desire particularly to commend to your consideration the extraordinary difference between the true proofs of a good education and the tests which we are content to apply; the difference between the ultimate and substantive results, and the sort of early or superficial sampling that satisfies us. First of all, it is not difficult to show that we tend to pursue ends that are largely conventional; we keep one another in countenance by tacitly consenting to regard certain things as desirable without being at all clear as to their object; nay, in some cases, having abandoned the solid fruit for the shrivelled skin.

Teaching of Modern Languages.

Has it ever, for instance, occurred to you how purely conventional is our orthodox procedure in the teaching of modern languages? One would think—we do think—that the important achievement in this subject is the accident, the very skeleton of grammar. Thousands of us have thus been laboriously taught French or German for years, only to find that, after all, we cannot speak half-a-dozen consecutive sentences without an appalling mental and even physical strain. Fortunately, this scandalous waste of time is getting less common because saner views and the reforming spirit help us to realise that the primary purpose of learning a modern spoken tongue is that it should be spoken. In effect, the school understands by "French" or "German"—ask any schoolboy—mostly certain grammatical schemes discovered by analysis, and concatenated in an order

¹ Abridged from the Presidential Address to the Teachers' Convention held at Durban, June 30th to July 2nd, 1903.

unknown to nature. Thus: it is difficult to imagine any sane conversation or narrative requiring such a barbarous piece of inconsequence as *Je suis, tu es, il est, nous sommes, vous êtes, ils sont*. Yet that is what we have agreed should be taught our children as French. French! It is not even sense. But we can examine this, and get it set out on paper, and "mark" it—testing speech without speaking, and labelling as good French scholars people who could not bargain in recognisable French for a pound of candles. Even in teaching our own language, we are victims of the conventional fallacy. Why should English children put their thoughts together with so much more difficulty, be so much less articulate, than French or German or American children? It is largely because we waste such an inordinate amount of time and labour on analytical grammar, parsing, analysing, classifying, learning lists and paradigms, instead of copiously exercising the constructive or composing faculty. Indeed, it has been noted by one of the finest masters and critics of English now living that this kind of procedure is in England almost a badge of the primary school, a caste-mark, from which the secondary schools have been in a great measure preserved by the salutary operation of classical studies.

Mathematical Instruction.

It is convention, again, that prematurely splits up the school teaching of mathematics into arithmetic, algebra, geometry, trigonometry, and so forth; for mathematics should be taught to young people as much as possible graphically, concretely, compendiously, if it is ever to be real to them. I have never been able to understand why it is criminal to teach that $(a + b)^2 = a^2 + 2ab + b^2$ by geometry; and I am proud to think that the professors and specialists of to-day are preaching the application of concrete and graphic methods which at least one ignorant layman has always advocated. The truth is that this excessive formalising, conventionalising, abstracting of school subjects paralyses the youthful mind just when it should be stimulated by a sense of making and putting things together.

Literature in the School.

I must give you a final illustration of my point by citing the method usually followed in "teaching" English literature. We have been doing this now systematically for at least a generation, and the world is flooded with admirably annotated plays and poems, and such-like. Yet note what the young people, brought up on these industrious and able works, read when they choose for themselves—the hideous and odious "comic" or maudlin literature that cumbers and disfigures our railway book-stalls, the inane rubbish that young men and maidens get from the libraries in the rare cases in which they read a book between covers; and, above all, their blank ignorance of the greatest books in the world, the Bible included. The truth is that, while the stuff of English literature is the finest material of education we have, we sicken our children of the little that we use of it by converting that little into a mere gymnastic; getting them to know all about the minutest parts of the book and its origin and authorship before we have infected them with a knowledge of and a liking for the book itself.

Useful and Useless Subjects.

It is possible to regard all studies that are not immediately marketable as purely conventional or useless, to think all higher science studies, for instance, mere waste of time; advanced mathematics, futilities; Latin and Greek, mere learned trifling; to appraise book-keeping and shorthand at a higher value than the humaner linguistic and literary studies, more "useful" than natural philosophy, as it used to be called. This error is a very common phenomenon. Well, we have to

make all just allowance for the proper views of the examiner and the "business man," and to convert them to a humane view of education, showing them that even for their particular purposes they stand to gain and not to lose on its adoption. Such questions, however, cannot be settled satisfactorily by any summary process, by any magisterial statement on the part of any person, however eminent, of what is and what is not "wanted." In order to arrive at any real solution, we have to come to some understanding as to the things that matter most in life.

The End in View.

We may assume that we all desire, above everything, that our children should be sensitive to wholesome and noble influences, and should be moulded by them; should be clean and good men and women, and should prefer holy and beautiful and gracious things to corrupt and ugly and mean things. Since it is in youth that the predominant tastes are implanted, the school must make this its first business. All good discipline conduces to it, but no discipline is so powerful as the use and habit of good literature, "sacred," and "profane." The enjoyment of good literature cannot, indeed, make a godly man or virtuous woman, but great literature is, after all, the greatest work that man has achieved. It is an inexhaustible store of wisdom and pleasure, covering all life and all time, applicable to all states of feeling, and eternally so applicable. The school must depend, then, for its success first and foremost on literature, not merely on its apparatus, but on literature itself. One of the chief reasons why literature is so valuable is that, as the school is concerned in it, it is not marketable. A man or woman, a boy or girl, cannot get money for their sensitiveness to fine literary feeling and knowledge of *belles lettres*, or acute historical perception. Yet these things put us into closest relation with other human beings; they treat of and touch emotions that are universal and most characteristic of mankind.

After the "humanities" technically so called, our children should be familiar with the world which is "the garment by which we know God." They should know, by personal contact and continuous observation, the earth, the wind, the rain, the sunlight, and the animals, flowers, and trees about them. Truly, a man ignorant of such things cannot be said to be educated, for he goes through life with one eye shut, and one ear closed. Most of us live many removes away from the primitive realities on which our lives depend, and, as we develop a more complex and abstract civilisation, living more in towns and in books, our organised education should do more and more to re-establish the broken connections. And, be it noted, we are only imperfectly alive if we lose touch with the primitive manly and womanly activities that keep us up and doing. It is true that our strenuous pursuit of outdoor amusements, our love of fresh air, and, I must add, our wars, protect us from physical decadence; but no race can prosper—nay, it cannot live—unless it can dig and delve for itself, and cook for itself, and clean its own boots.

To these—to literature and history, nature-knowledge and handiness—we must add, of course, mathematics, as a very essential school subject. The mathematical sciences do not only serve for immediate use in our dealings with one another, they are also an incomparable gymnastic in close and continuous reasoning. And, most important of all, they are both the framework and finish of scientific, that is, perfectly ordered, knowledge; for the strongest element of proof and determination of fact is its reduction to a mathematical formula. Therefore, even if mathematics are not, as Plato and Comte taught, the whole foundation of science and of education, they are prime and indispensable parts of it. Now, although it is likely enough that we are all agreed in a general way that this, or something

like it, is the way in which we should look at our school curriculum, the tests that we actually apply are at least inadequate. The greatest thing of all, the finest product of all that preparation which we call education, the good life, can be tested by no instrument or procedure which we can manipulate. The proof of a holy life is holiness of living, and even when a man dies he does not leave the real evidence in our hands. As in life, so in a school, we can measure morality and worth only very roughly. The most we can do is to recognise cheerfulness, the physical basis of all virtue, truthfulness, obedience, respect for property and rights, and a sound public opinion. None of these things can be recognised, much less can they be cultivated, unless there is a large measure of personal liberty allowed, and unless government is urbane, not robustious, menacing, bullying. To test the conduct of a school by a machine-like order, by silence, by effectiveness of punishment, by any spick-and-span primness, is to apply a purely conventional test, to look through darkened glasses. For certain purposes, and within certain limits, these things are valuable indications of conditions of discipline, but we must not suppose that when they are achieved our work is done—that we have what is chiefly needed. To speak truly, the more significant and important a subject of school solicitude is the less easily we can test it. Studies derive their chief worth from their effect on character, and character is, of all things, the hardest to estimate with justice. Yet, just because we cannot test certain important things by any accurate instrument, we tend either to neglect them or else to conventionalise them, to distort them just for the purpose of measuring (or “examining”) them; to try to squeeze circles into squares, because we can measure squares but not circles. From life, character, conduct, pass to literature. Do our tests touch this, or do we not rather test the possession of accessories to it?

From all this follow two conclusions of great importance to teachers. The first is this: That the school has to maintain a running fight against its own inherent tendency to conventionalise its studies and solicitudes. The second is this: That we need a very varied curriculum for the express purpose of providing for those incalculable persons who fit so ill into the orthodox school mould, the minor Darwins, Newtons, Scotts, Swifts; for “dull” boys, as we call them, like the Duke of Wellington, Wordsworth, Humboldt, Banks the botanist, John Hunter the surgeon, Goldsmith and Sheridan. And there is a third reflection of less direct moment to teachers as such, but of serious importance to all citizens: that these things cannot be done cheaply. I do not mean that we want particularly expensive apparatus and gorgeous buildings, for an intelligent teacher in a quiet room with half-a-dozen test tubes and a few corks, can give a good many valuable lessons. I mean that to provide plain schools enough, and qualified teachers in sufficient numbers, and proper variety in curriculum; to supply institutions complementary of the school proper, “continuation” schools, “technical” schools, high schools, colleges, libraries, and so forth, the community must make up its mind to invest heavily.

ONE principle of education which those men, especially who form educational schemes, should keep before their eyes is this: children ought to be educated, not for the present, but for a possibly improved condition of man in the future; that is, in a manner which is adapted to the idea of humanity and the whole destiny of man. This principle is of great importance. Parents usually educate their children merely in such a manner that, however bad the world may be, they may adapt themselves to its present conditions. But they ought to give them an education so much better than this, that a better condition of things may thereby be brought about in the future.—Kant.

ITEMS OF INTEREST.

GENERAL.

THE parent anxious to learn how his boy has acquitted himself at school during any particular term examines the school terminal report, which reaches him a day or two after his boy's return from school, with much attention—but in many cases with no comprehension. There is often too little explanation, and in some cases a needless complexity, about the report, with the result that the parent can form but a poor idea of how his son compares with other boys in his class. An examination of a number of school reports has led us to the conclusion that there is room for an inquiry into the best form of report to give the parent at a glance the means of telling how his boy is working at school. We should be glad to receive from headmasters and from headmistresses—for what is true of the boy's report applies equal to that of his sister's—copies of the form of school report in use by them. We hope it may prove possible, with varied expert assistance, to suggest some directions in which school reports may be simplified and otherwise improved.

SINCE the publication of our note of last month dealing with the London Education Bill, the Bill has become an Act. There is little of educational interest to add to what has already been said. During last month the Bill passed its third reading in the House of Commons and through its successive stages in the House of Lords. The discussions by the Lords have served only to accentuate the arguments advanced in the lower House. So far as alterations in the Bill are concerned, we have only to record the addition of a clause and the acceptance of amendments proposed by the Marquis of Londonderry. The new clause provides that:—“(1) As from the passing of this Act, any public elementary school provided by the London School Board before the passing of this Act, which is wholly or partly situated outside the County of London, shall, for the purposes of this Act, be treated as, and for the purposes of the principal Act be deemed to have been, wholly situated within the County of London and within the nearest metropolitan borough. (2) Any public elementary school provided by the local education authority which is situated partly in one metropolitan borough and partly in another shall, for the purpose of this Act, be deemed to be situated in such one of those boroughs as the local education authority determine.” The amendments are as follows:—“Where governors, or managers, are appointed by the local education authority on the governing body of any institution aided by grant from the local education authority, the qualifications required by the scheme or trust deed of the institution shall not apply to such governors or managers,” which was the original form of subsection 9 of Schedule 1, now reads, “the provisions of the scheme or trust deed of the institution imposing any limit on the number of the members of the governing body, or requiring any qualification for those members, shall not apply as respects such governors or managers;” and an amendment limiting the operation of subsection 11 to the managers of public elementary schools provided by the local education authority.

THE eleventh summer meeting of university extension and other students has been held during the past month at Oxford. Upwards of eleven hundred visitors were present and great interest was shown in the varied programme provided. The inaugural address was delivered by Mr. Choate, the United States Ambassador, and he discussed American university education. After sketching the growth of the great universities in the United States and describing the rapid spread of universities

and colleges in the nineteenth century, Mr. Choate paid a fitting tribute to American munificence towards education and to the broad-minded policy of the State in assisting by grants and legislation the provision of schools of every grade. He then went on to explain that this enlarged system of universities, colleges, and professional and technical schools rested on the broad and firm foundation of the common schools, which from the beginning had been the peculiar care of the people. The general policy is that each State owes to each of its children of both sexes an education at the public expense up to the point at which they are able to sustain themselves in the struggle of life. According as the condition in life of its parents permits, every child may, without expense to them, pass through the successive grades of primary, grammar, and high schools, and is prepared not merely for its narrow vocation in life, but also for the discharge of that public duty which the possession of the suffrage involves. Upon this broad and deep foundation American universities rest; out of it they have grown, and with it they form one entire and coördinated system upon which a Government depending wholly on the sum of public opinion of all its citizens may safely abide. We have already (p. 266) given particulars of the sections into which the meeting was divided and of the conferences and special classes provided, so that it is unnecessary to add more details. It must suffice to say that like its predecessors this meeting proved an excellent opportunity for teachers to exchange views with colleagues from different countries and at the same time to enjoy the beauties of a delightful university city.

THE summer vacation school opened at the Passmore Edwards Settlement, Tavistock Place, by Mrs. Humphrey Ward last August and conducted with great success under the direction of Mr. E. G. Holland, of Highgate School, has been continued this year. Applications for admission were received from 1,208 children but accommodation was forthcoming only for 700 of them. In referring to this work last year we expressed the hope that the experiment would be copied not only in many parts of London but in the large provincial towns. So far as we have been able to learn, the only such schools yet in working order are the one in the metropolis and a second in Hereford. It is not sufficiently recognised by middle-class parents, who, as a matter of course, arrange an annual summer holiday for their own children, that the elementary school child in large towns is apt to find the August holiday a sad experience. The choice between a close living-room and a hot, dusty thoroughfare is not exhilarating, and it is easy to understand that a vacation school with half the time in a pleasant garden is hailed with delight. Such holiday schools are common in America and might with advantage be established in this country by the local education authorities.

THE London County Council has had under consideration the scheme for a great Institute of Applied Science in London outlined in Lord Rosebery's letter to which reference was made in our last issue. Briefly put, the offer conveyed by Lord Rosebery amounted to this—that the land, buildings and equipment required for advanced technological teaching and research, to the value of £500,000 will be at once provided, and steps will be taken to secure other funds for both capital outlay and maintenance, provided that the Council express, in general terms, its willingness to contribute, when the buildings are equipped and ready to be opened, a sum of £20,000 a year towards the maintenance of the educational work. It is satisfactory to be able to record that at the meeting when the scheme was discussed the following resolutions were adopted by the London County Council: (a) That the Council expresses its high appreciation of the important proposal contained in Lord Rosebery's letter, and would cordially welcome the establishment of further provisions in London for advanced

technological teaching and research; (b) that the Council, in response to the request contained in Lord Rosebery's letter, places on record its opinion that, when the land, buildings and equipment for the proposed additional technological teaching and research are provided to a value of not less than £500,000, the Council will be well advised to contribute . . . £20,000 per annum, towards such part of the work as falls within the statutory definition of technical education, subject to the following conditions:—(1) That a scheme be prepared to the satisfaction of the Council, for the constitution of the governing body, and the adequate representation of the Council thereon; (2) that financial arrangements, adequate to the whole maintenance of the proposed work, are made to the satisfaction of the Council; (3) that, in view of the national scope and utility of the proposed work, substantial contributions towards maintenance be made from funds of a national character; (4) that due provision be made in the scheme to prevent overlapping and secure coördination of the work already carried on by the university colleges, polytechnics, and other science and technological institutions; and the proper connection of the whole with the University; (5) that a sufficient number of scholarships, including free places, be placed at the disposal of the Council; (6) that it be considered whether other counties and boroughs should not be invited to contribute towards the maintenance, receiving in return the right to send their picked scholars for instruction under the proposed scheme.

SEVERAL sets of regulations, for the Session 1903-4, for schools of different grades, have been published by the Board of Education during the past month. The volume dealing with secondary day schools does not appear to differ in any important essential from previous issues. A second volume contains regulations for evening schools, technical institutions, and schools of art and art classes, and with it was issued a circular letter to managers of schools explaining the regulations. The rule under which the rate of grant payable for science instruction given in the day-time was half the rate payable for such teaching during the evening is abolished, and grants for advanced instruction in day technical institutions will be specially assessed. The explanatory circular also urges the advantage of fixed salaries for science and art teachers, and explains with commendable fairness how such salaries should be estimated. A third publication contains the syllabuses and lists of apparatus applicable to schools and classes other than elementary. The method of arrangement in the volume is different from that of previous years. Much of the information which used to be contained in a special code for evening continuation schools is now issued as a part of the new publication under the heading "Syllabuses in Subjects on which the Board do not hold Examinations."

THE official report of the Allied Colonial Universities Conference and Dinner is published in the August number of the *Empire Review*. One of the most important points brought out by the Conference, and referred to by Mr. Balfour in a speech at the subsequent dinner, is that the end of university education should be research. Each university should be a centre for the advancement of learning, and facilities should be provided by which post-graduate students from all parts of the Empire may proceed to laboratories or schools where the investigations which they desire to undertake can be carried on under the guidance of men of distinguished eminence in the particular field of study selected. Mr. Balfour also remarked in his speech that he was not satisfied with the system of education which consists chiefly in the study of the classical languages. "But," he remarked, "when he asked what the substitute was, he was less happy than when he considered the classical ideal, for they would never find science a good medium for conveying

education to classes of forty or fifty boys, who did not care a farthing about the world they lived in except in so far as it was concerned with the cricket ground, or the football field, or the river." If science is to be taught by discourses to classes of forty or fifty pupils, then we agree that it is no better than classical study for developing intelligence. Only a small proportion of such a class would do justice to any subject brought before them. What men of science urge is that, in all scientific instruction, the pupils should be working with things instead of manipulating words, for by this means they are brought in touch with the realities of life, and gain experience which will enable them better to face the strenuous conditions of modern times.

THE increasing importance attached to the adequate training of schoolmasters and schoolmistresses in secondary schools can be appreciated by an examination of the arrangements being made for the coming session in the departments of education at the university colleges in different parts of the country. At the Owens College, Manchester, complete courses of training both for primary and secondary school teachers have been mapped out and published in a helpful prospectus. The course of training for secondary schoolmasters and schoolmistresses is adapted to meet the demands of persons who have graduated at a university and are about to enter the teaching profession and to qualify for registration under column B of the Teacher's Register. Prof. Findlay will lecture on the theory of education and on school organisation and methods. Prof. Sadler will take up the history of education from the Renaissance to the end of the eighteenth century with special reference to the sixteenth century, and will also deliver lectures on problems of American education in their bearing on corresponding questions on English education. Prof. Alexander will be occupied with psychology, ethics, and logic. In addition to these courses, lectures of a special kind have been arranged for schoolmasters and schoolmistresses actually engaged in teaching. There are also to be lectures open to the public without fee.

OUR attention has been directed by the Rev. Canon Barnett to an open prize competition which has just been held for an original design for a poster to advertise an exhibition at the Whitechapel Art Gallery. School children were specially invited to compete in the competition and the prize was five pounds.

THE result of the L.L.A. examination of 1903 in connection with the University of St. Andrews has been published and shows that 902 candidates entered as against 929 last year; 231 entered for the first time, 667 passed in one or more subjects and 115 received the diploma of L.L.A.

WE have received a copy of Part X. of the "Statistical Register" of Western Australia for the year 1901 and previous years dealing with education, science, and art.

THE list of students rewarded by the Board of Education in the National Competition, 1903, a copy of which has been received, shows that gold medals were awarded to Sarah C. V. Jarvis, of the Battersea Polytechnic, for designs for printed muslins; to Edith M. Linnell, of Birmingham, for designs for silver brooch, buttons, cloak clasp, hat and lace pins; to Fred. Halton, of New Cross, for a model of a figure from the nude; and to Edith Mason, of Taunton, for a design for a lace zouave. Edith Mason and Sarah Jarvis have also been awarded Princess of Wales' scholarships.

SIR JOHN T. BRUNNER, M.P., and Dr. Ludwig Mond, have offered to present to Northwich and the county of Cheshire a secondary school equipped for the teaching of 200 scholars,

which will be worked in conjunction with the Verdin Technical School, Northwich.

MR. JAMES WAUGH, headmaster of the Cardiff Higher Grade School, has been appointed to succeed Dr. J. J. Findlay as headmaster of the Cardiff County Intermediate School. Mr. W. H. Richards, head of the Building Trades department at the Northern Polytechnic, Holloway, has been appointed principal of the new Brixton Technical Institute of the London County Council. Mr. W. Gannon, principal of the Norwich Technical Institute, succeeds Dr. Ryan as principal of Woolwich Polytechnic.

MR. MOSELY, who last year organised the Industrial Commission to the United States, has completed his arrangements for a Commission to make an educational inquiry in the same country. The Education Commission will start on October 3rd, and will visit educational institutions of every grade in the United States, following an itinerary which has been drawn up by President N. M. Butler, of Columbia University. The Commission includes gentlemen familiar with the administration of education, university professors, and also acting schoolmasters. Among the last class we observe the names of Mr. H. Coward, the President of the National Union of Teachers; Mr. W. C. Fletcher, Headmaster of the Liverpool Institute; and the Rev. Dr. Gray, Warden of Bradfield College. At the conclusion of the tour, each commissioner will be invited to submit a report, which will be included in a subsequent volume to be published with a preface by Mr. Mosely.

THE Home Counties Nature-Study Exhibition will be held, by permission, at the offices of the Civil Service Commission (formerly the buildings of the University of London), Burlington Gardens, London, W., from October 30th to November 3rd. Prospectuses, regulations, and prize lists, may be obtained from Mr. Wilfred Mark Webb, Hon. Secretary, 20, Hanover Square, W.

THE success list of the Society of Arts Examinations, held in March last, was issued at the end of July. The examiners are among the most leisurely in England. The Scotch Education Department with over 50,000 candidates for its Leaving Certificate manages to complete the work in somewhat over a month. In the French examinations of the Society of Arts, the papers have improved somewhat of late. But again this year the prizes and medals are awarded to candidates from Guernsey. We think it would be better if the Society followed the practice of the Société Nationale des Professeurs de Français, and classed candidates from the Channel Islands separately from those whose native tongue is not French.

IN May last the teachers of modern languages in France founded a Société des Professeurs de langues vivantes de l'Enseignement public on the lines of our own Modern Language Association which was founded in 1893. They held their first meeting on May 28th, the conveners including M.M. Maurice Potel, Georges Jamin and Guiraud. They number already nearly 200 members and have issued three numbers of their *Bulletin mensuel*. The chief reason for the existence of the new Society is the necessity of conferring as to the best means of teaching foreign languages after the "direct method." This method was rendered compulsory in France by a ministerial decree last year. While modern-language teachers in England are still discussing methods and schemes of study, the Gordian knot is cut for those in France, and they can at once approach the main question. There are, therefore, advantages in ministerial despotism.

MR. SANDLANDS, author of a pamphlet "The True Theory of Voice Production," writes that he cannot admit the justice of the notice in the August number of THE SCHOOL WORLD. We have submitted his letter to the writer of the paragraph, with whose review we are in complete agreement, and he remarks in his reply:—"A reviewer may surely say that he does not understand Mr. Sandland's 'true theory,' and if Mr. Sandlands will read the notice again he will see that it does even recommend him and the Brigstock treatment. 'Mr. Sandlands is well known as a curer of voice ailments'—these are my words; and I should not hesitate to send a patient to Brigstock. Surely an author may be content with this. It is one thing to be a successful curer of voice ailments, and quite another thing to write a clear account of a 'true theory of voice production' and to show to all and sundry how the cure is effected. This, I maintain, Mr. Sandlands has not done."

THE Civil Service Commissioners have announced that an open competitive examination will be held in London and various provincial centres on October 13th, 1903, for not fewer than 150 vacancies in the Second Division of the Civil Service. Application for permission to enter must be made on or before September 24th, on forms obtainable from the Secretary, Civil Service Commission, Burlington Gardens, W. The limits of age are 17 and 20. The subjects of examination will be as follows:—Handwriting and orthography, including copying manuscript; arithmetic; English composition; and not more than four of the following subjects, viz., précis, including indexing and digest of returns; book-keeping and shorthand writing; geography and English history; Latin; French; German; elementary mathematics, viz., Euclid, books I.-IV., and algebra up to and including the binomial theorem; and inorganic chemistry, with elements of physics. Only two of the three languages may be taken up. The salaries of second division clerks are £70—£5—£100, £100—£7 10s.—£190, £190—£10—£250; higher grade, £250—£10—£350. The entrance fee is £2.

SCOTTISH.

MR. JOHN MORLEY, in proposing the toast of the "Merchant Company Schools" at the annual dinner of the company in Edinburgh, made reference to the work in commercial and scientific education undertaken by the company, which he cordially supported. At the same time, he thought these would only be of value if based upon a liberal general education from which Latin and Greek should not necessarily be excluded. He commended to the consideration of the company the example of Germany, where specialised commercial and technical education was provided on a scale far in advance of anything in this country. There they insist that students must have seven or eight years of a thoroughly liberal education before they approach the threshold of specialised and technical education. Mr. John Cowan, Master of the Merchant Company Schools, in thanking Mr. Morley for his address, said that they had been considering the necessity of enlarging their schools to relieve over-crowding. They had determined to incur an expenditure of £50,000 in extending their accommodation, and he was pleased to announce to the meeting that Dr. Andrew Carnegie had promised to give the last £10,000 of that sum.

A LOCAL Committee for the training of teachers, under the Scotch Code, has just been formed in connection with the University of Glasgow. The course of training is open both to graduates and to under-graduates. Every under-graduate must be not less than 18 years of age, and have passed the university preliminary examination in arts or science, or its equivalent. A moderate fee will be charged for the course of

training, and candidates who pay this fee will be free from any obligation to serve in a particular class of school. Any qualified student may obtain the training without payment of the fee; but every such student must come under an obligation to enter, within a reasonable time, upon recorded service in public or state-aided schools under the code. The committee is also prepared to consider applications for a limited number of scholarships of varying amount from students who may require aid in the prosecution of their studies.

AT a meeting of the local committee for King's students at St. Andrews University, Principal Stewart called attention to Article 91 of the new Education Code, which made considerable changes in the financial arrangements of the scheme. Under former codes any surpluses that might accrue in the administration of the scheme were placed to a guarantee fund, out of which were paid any claims for repayment to the Education Department of maintenance allowances of students who failed to follow out the teaching profession. Under the new code the Government would only allow to the local committee such sums as they had actually expended, so that it would not be possible in the future to keep up a guarantee fund from surplus grants. The responsibility for the repayment of maintenance allowances would thus fall upon the individual members of the committee, and Principal Stewart thought that such a provision would make the working of the scheme for King's students impossible. It was agreed to appoint a committee to confer with the Education Department upon the matter.

AT a meeting of the Secondary Education Committee for Morayshire correspondence was submitted from the Department anent the Committee's proposal to send teachers to Paris for a course in French. Their Lordships, while sympathising with the suggestion, regretted they were not empowered to give pecuniary assistance to such a project, but they trusted the Education Committee would be prepared to incur the expenses themselves, which they had full power to do under the constitution of their Committee. After some discussion it was agreed to allow a sum of £10 to each of six teachers towards expenses and class fees in Paris on production of a certificate that their attendance and progress had been satisfactory.

SIR HENRY CRAIK has repeatedly directed attention in his reports on secondary education to the difficulty of retaining pupils in secondary schools beyond the age of 15 or 16, and he very rightly puts the blame for this unsatisfactory state of affairs upon the employers of labour, who offer no encouragement to those who remain longer at school than their fellows. The extra year or years will be amply justified in the long run, but of immediate tangible value they can show nothing. But it is not only that this extra time of hard study carries with it no privileges; it entails a real tangible penalty. The youth who enters commerce after an extra year's study finds himself the fag of his companion who left a year younger. In industrial pursuits it is the same. A year or two longer at school means a year or two longer in finishing an apprenticeship. Principal Laurie, of the Heriot-Watt College, like the heads of other secondary schools, has found the work of the institution handicapped and crippled by this consideration, and has addressed himself successfully to find a remedy. He has just come to an arrangement with several large engineering firms in Edinburgh whereby they have promised to take a limited number of students annually from the Heriot-Watt College into their works, in many cases at a reduced premium, allowing them to begin their apprenticeship at the end of their second winter session and reducing their whole apprenticeship by one year. The success of this experiment will be keenly followed in other industrial centres, and Principal Laurie and the

employers concerned were alike to be congratulated on the settlement which has been found.

WELSH.

THE educational problem, from the point of view of organisation in Wales no less than elsewhere, is that of centralisation or de-centralisation. Complete centralisation at Whitehall has proved too great a strain on England, and *a fortiori* on Wales. We shall now have local education authorities. The constitution of a Central Welsh Board for secondary education has suggested the desirability of continuing this scheme of centralised organisation for Wales, and, though the old Central Welsh Board would not be under the new conditions an adequately representative Board, the principle embodied in it will be continued under the new Act.

IN the draft schemes submitted to the Board of Education there have been proposals for a new constitution. Sir William Anson has now put forward an alternative scheme for such a Welsh Joint Board, to consist of a committee appointed by members elected by the combining Welsh County Council and County borough authorities. On the Joint Board there must be not less than one-half of the constituent members chosen from members of the combining councils. There must, however, be provision for persons of experience in connection with the training of teachers and of the examination and inspection of the various kinds of schools in the combined area, of which a number (to be fixed) shall be women.

THE matters to stand referred to the Joint Committee shall be such matters relating to the exercise by the combining councils of their powers under the Act as relate to the training of teachers, and the examination and inspection of schools, together with such other matters relating to the exercise of the said powers as the combining councils may, with the sanction of the Board of Education, from time to time determine, and any difference as to any matter of administration by the Joint Committee may be referred by any combining County Council to the Board of Education, whose decision shall be final.

PROVISION is made for entry of any Welsh County Council, or for withdrawal, under certain conditions, though the number of such combining councils is not to fall lower than six. In the appointment of any executive committee by the Joint Committee, due regard shall be had to the inclusion of persons specially experienced in respect of the training of teachers, and of the examination and inspection of the various kinds of schools in the combined area. Mr. Lloyd George is reported to have said: "The scheme is very well drafted, and, as far as I am concerned, I think it will suit us. The Board has accepted the principle for which we were contending. . . . It is the greatest step taken towards the administrative unity of Wales within living memory. . . . The Board of Education seem to have made a sincere effort to meet the desires of the Welsh people for educational autonomy." But Sir William Anson's scheme is more. It is a model scheme which will probably have a regulative effect on other schemes for parts of England, and perhaps will be kept in view when a new Scottish Education Bill is brought before the country.

ANOTHER question involving the principle of centralisation is a National Museum for Wales. The difficulty is to settle the location of such a museum, for all will admit its desirability. At the recent National Eisteddfod at Llanelly, Sir John Williams pointed out there are three possibilities for a settlement: (1) a museum situated in one place; (2) a corporate institution dividing its contents between the three constituent

colleges of the Welsh University; (3) a corporate institute in a building in one place, with local branches at the sites of the three Welsh colleges or some other convenient places, the former to lend exhibits. Sir John Williams also pointed out that the solution of the location of the Welsh library and a Welsh museum need not, and indeed might advantageously not be the same. A resolution was passed calling on the Welsh members and County Council representatives to summon another conference for further discussion of the whole question.

HOWELL'S School for Girls at Denbigh has stood out from the Welsh Intermediate County School system. It is hoped, as the Bishop of St. Asaph has explained, that it may occupy in the education of girls a position like that occupied by Llandovery and Christ College, Brecon, in the education of boys. It is interesting, however, to notice that the head mistress announced that the school had sent in six candidates for the Matriculation examination of the University of Wales. We are glad to note that independence of the school does not mean detachment from the Welsh University system.

CURRENT HISTORY.

THE Swiss have taught us that there is almost nothing impossible in mountain engineering, and we are, therefore, not at all surprised at the development of railways in the Scottish Highlands. Every now and then we hear, and regard as a matter of course, that some new line has been opened to places of romantic or historical interest. Such, for example, is the opening this summer of a line along the course of the Caledonian Canal, one of whose stations is at Fort Augustus. Would the '45 have been possible if such a railway had then existed? It may sound a difficult, if not absurd, question. But there may be materials for answering it in the story of the late Boer war. The Highland glens in the olden days were practically impenetrable but by the leave of the clans who inhabited them. "It is a far cry to Loch Awe," was an old saying, but locomotives have long traversed its valleys, and the Highlands of Scotland are now the playground of the English tourist. The whole story tempts one to regard it as a fulfilment, in a way undreamt of by the prophet, of Isaiah xl. 4-5.

THE story of the Trinidad riots of last March, or rather of the report of the Commission on that matter, which has just been published in a Parliamentary paper and a Blue-book, are worth consideration in any attempt to describe our unwritten British constitution. It supplies a striking example of the publicity under the glare of which our officials live, and of that almost complete lack of a *droit administratif* which distinguishes Great Britain from her Continental neighbours in general. The whole circumstances of the riot were fit for delicate handling, and might have justified much reticence, yet the whole story is laid bare in the official documents, and further investigation is demanded. Till Charles I. was executed in 1649, things of this kind were impossible. Elizabeth did not reveal administrative secrets to her Parliaments, and Buckingham was more blamed than he need have been because he would not tell James' and Charles' Parliaments the whole story of the war with Spain and France. Charles II. began to solve the problem of a *modus vivendi* between King and Parliament, and the solution was not reached till after 1832.

It seems probable that the capital of the Australian Commonwealth will be situated at Tumut, natural mutual jealousies between the component States making such well-known places as Melbourne, Sydney, &c., ineligible. But where is Tumut? and how is the name pronounced? The former question is

answered by the papers that announced the decision. The latter may not need an answer if some new name could be given to this small town. For such a course we could find precedents in previous instances of such a choice. Our American cousins of the United States were easily provided with a name for the site of their capital. The "Father of his country" was so manifestly the *one* man of 1789 that "Washington" was almost inevitable. When Epaminondas of Bœotia made a capital for Arcadia, he called it Megalopolis, the "great city." And the question of names for consciously founded cities reminds us of Alexandria of Egypt, founded and named by the Macedonian conqueror, and of Alexandria in North Italy, named for Pope Alexander III.

IN July, after a reign of twenty-five years, and a life which dated from 1810, Leo XIII. passed quietly away. Fifteen days later the Romans were told in the traditional manner, and the rest of the world by the modern telegraph, that Pius X. reigned in his stead. The papers have been full of the careers of both these ecclesiastics. But here we remark not on these modern events, but on the antiquity of the throne thus vacant and thus again filled. Even if, with the most sceptical of historians, we go back no further than Gregory the Great, who sent S. Augustine to these then heathen shores, the throne of the Roman bishop is the oldest in Europe. The Roman Emperors, after being no more than a title for a century and a half, perished finally in 1806. How modern seem all the temporal powers beside this venerable yet still powerful monarchy. And it is elective, open, at least legally, to every member of the Catholic Church who acknowledges the authority of the Pope. It is subject, therefore, to no perils of minority or of inheritance, and, if only the Cardinals, the Senate of the powerful spiritual State, are true to their trust, the method of succession must secure wisdom in the occupant of the See. All the world, therefore, is bound to have good wishes for Pius X.

RECENT SCHOOL BOOKS AND APPARATUS.

Modern Languages.

John Bull in France. By Léon Delbos. xvi. + 196 pp. (Clarendon Press.) 2s.—Many teachers are of opinion that the learning by heart of artificial conversations is beneficial to their pupils. We are not of that opinion, after having spent many years in proving its futility. Conversations based on pictures or on the natural objects of the class room have always proved more efficacious. Not but what this book is a great improvement on the old Chardenal, and Richard and Quélin manuals. Here M. Delbos shows us John Bull landing at St. Malo, visiting Brittany, making his way to Paris, where he meets his niece who is at school there, and then returning to England by way of Calais. This occupies 200 pages, with the French and English opposite each other. "Arts and crafts" is an excellent translation of "Arts et métiers," but does it convey the same idea to an Englishman's mind as the French does to a Frenchman?

Contes et Nouvelles des meilleurs auteurs contemporains. Edited by Jules Lazare. 132 pp. (Hachette.) 1s. 3d.—M. Lazare has followed up his well-known "Half-hours with Modern French Authors" with this work, in which the extracts are longer and complete, and the authors still more modern. They include Alphonse Daudet, Paul Margueritte, Paul Arène,

François Coppée, and others. There are notes in French to each piece, and a vocabulary of the more unusual words. We cannot help thinking that the latter would have been more useful if they had not been printed in a solid block, but in parallel columns. The type of the extracts is unusually clear.

Exercises in French Prose. With Vocabularies for the use of Middle Forms. By E. G. H. North and L. G. d'A. Huntington. ix. + 168 pp. (Rivingtons.) 2s. 6d.—This is a book written on the same lines as North and Hillard's deservedly popular "Latin Prose Composition." There are three preliminary pages of general hints, the rules are commendably brief, and there are 160 exercises of about half a page each. The authors have desired to combine the advantages of oral teaching, exercise in grammatical rules by means of sentences and continuous prose writing. The only criticism we would make is that there are too many exercises of mere detached sentences; it would have been better to introduce continuous pieces earlier. The vocabularies are sufficient.

Hirschfeld's Italian Prose Reader. By Carlo Scotti. 352 pp. (Hirschfeld.) 2s.—This new edition should prove very useful to students of Italian, almost from their first lesson. Dr. Scotti has first given 26 pages of short anecdotes, and afterwards longer extracts, first from living writers, and then going backwards in chronological order to the classics of the fourteenth century—Dante, Petrarca, and Boccaccio. At the bottom of each page are footnotes explaining the harder words and phrases, with which the beginner is likely to be unacquainted.

Le Voyage de Monsieur Perrichon par Labiche. Edited by G. H. Clarke. xiii. + 84 pp. (Blackie.) 8d.—This is another volume of the supplementary series of French plays which Messrs. Blackie have added to their Little French Classics. Mr. Clarke prefixes a very interesting sketch of the rise of the drama in France from the twelfth century. The notes are short, but quite sufficient in the hands of a good teacher.

Amis et Amiles and Aiol. Adapted from the "Chansons de Geste," by Mrs. J. G. Frazer, with notes by F. B. Kirkman. xvi. + 27 pp. (Black.) 6d.—A reader for elementary forms in the series edited by Mr. Kirkman, of which we have spoken favourably on previous occasions. The notes are of two kinds; those on textual difficulties are given in English, those on historical and literary allusions are given in French as footnotes. There is a vocabulary in which we have found no omission, while the printing of the book is very much in its favour.

History.

The History of France. By A. Hassall. vi. + 246 pp. (Dent: Temple Primers.) 1s. net.—This is a short history of France from Roman times to the present day. Its compass forbids more than a dry compilation of events, which are correctly given. There is an index as well as short bibliographies, but no maps.

Little Notes on Shakespeare's England. By A. Andrewes. 124 pp. (Swan Sonnenschein.) 1s.—This book consists of short chapters on the social life of England in Shakespeare's time, intended for those who are just beginning to read some of his plays. It is a simple but useful little compilation from Green, Drake, and other writers.

History in Biography. Vol. III. Henry VII. to Elizabeth. By F. M. West. xvi. + 216 pp. (Black.) 2s.—This book follows on the lines of previous volumes of the series which

we have already noticed. It contains fifteen biographies of Tudor statesmen and other heroes, a list of chief authorities, two maps, chronological summaries, a sketch of social conditions, genealogical tables, a two-page index, and many illustrations, both pictorial and poetical. The biographies tend, we think inevitably, to be history of the ordinary kind, because the history of Tudor statesmen is so largely the history of the period, but the work is well done, the information correct and clearly told.

The English as a Colonising Nation. By J. Hight. 307 pp. (Whitcombe and Tombs.) 2s. 6d.—The author of this book is lecturer on Political Economy and Constitutional History at Canterbury University College in New Zealand. We are not, therefore, surprised that more than a third is given to "the South Seas," and of this third, half is devoted to the story of New Zealand. It is intensely patriotic, and Rudyard Kipling's "Song of the English" is printed in sections at the end of each part. But, with this exception, the story is generally correct. There are many illustrations and a fair index.

On the Shores of the Great Sea. By M. B. Syngé. vi. + 202 pp. (Blackwood.) 1s. 4d. *The Discovery of New Worlds.* By M. B. Syngé. vi. + 216 pp. (Blackwood.) 1s. 6d. *The Awakening of Europe.* By M. B. Syngé. vi. + 229 pp. (Blackwood.) 1s. 6d.—These are the first three of five "books" collected under the title of "The Story of the World." The first is occupied with the years B.C., the second with the middle ages in the broadest sense of that term, the third with the years 1520-1745. The other two are to treat of the struggle for sea power and the growth of the British Empire. There are a few illustrations, not particularly good, and a "Teacher's Appendix," consisting of a list of books of various merit. Of course such little books do not contain the "story of the world," but rather stories, such as may interest children, from the various periods of history, Hebrew, Persian, &c., before Christ, and exclusively European after that date. Here and there we have come across some extraordinary statements, but, on the whole, the stories are correct, whether mythical or historical, so far as is perhaps needed for the young folk for whom they are evidently written.

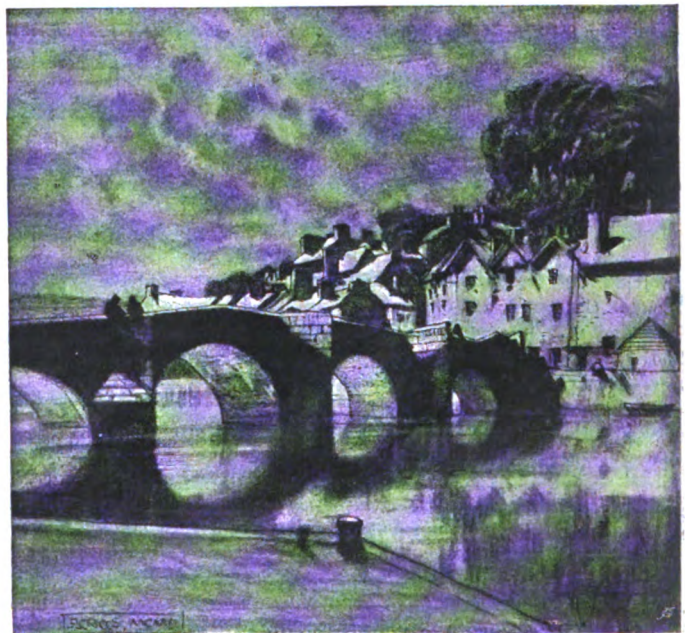
Geography.

Highways and Byways in South Wales. By A. G. Bradley, with illustrations by Frederick L. Griggs. xii. + 418 pp. (Macmillan.) 6s.—Together author and artist have produced a book which is in every way charming, and the form of publication is quite in keeping with the delightful contents. Mr. Bradley will secure the interest not only of the visitor to the romantic places he describes, but also of the reader who wishes to acquaint himself with this picturesque country, and yet not to leave his arm-chair. The book should appeal in a particular manner to teachers of geography and history, for its chapters abound in quaint and absorbing incidents concerning some of the counties of South Wales and their former and present inhabitants, stories of just the kind to add an air of reality to the lessons of the class-room. Boys and girls learning history and geography would with pleasure supplement their lesson work with private reading if they were given access to such delightful books as this. The volume might with advantage find a place in every school library, and it would meet with much appreciation as a prize-book. We reproduce one of the eighty-eight illustrations, which are of uniform excellence.

Name Lists for Repetition Maps. By G. T. Warner. viii. + 48 pp. (Blackie.) 1s. 6d.—The study of geography necessitates, at first, more or less *memoriter* work in order to gain a knowledge of location. These "name lists" are in use at Harrow in connection with a weekly repetition lesson; the method consisting in inserting on outline maps the names and positions of places which the pupil prepares out of school. Full directions for its use are given in the preface to the book. The fact that it is employed with success at Harrow will commend it to teachers generally. We have no fault to find either with the selection of names or the method indicated. Specimens of the work to be done, on outline maps, are given at the beginning of the book.

Geographical Readers. Home and Neighbourhood. Stage I. 132 pp. Stage II. 151 pp. (Newmann.)—The inevitable uncle appears in these reading books. This time it is "dear 'Uncle John,'" who, with the assistance of Mr. Brown, imparts most of the geographical information the books contain to two "wide-awake" children, Alice and Frank. On the whole the lessons are interesting, but the facts are not always above suspicion. The children are told that the sun goes round the world, and that there is a fire inside a volcano, which is described as a burning mountain. Original verse is introduced from time to time, and is intended, the preface says, "to aid the subject discussed." The way in which this is managed can be gathered from the following sample verse from a poem: "At the Port:"

- (5) Here tea and coffee come in chests,
Cotton and wool in bales,
Here flax is made a welcome guest,
And hemp to make our sails.



Cardigan Bridge. (From "Highways and Byways in South Wales.")

Science and Technology.

Steel and Iron for Advanced Students. By Arthur H. Hiorns. xvi. + 514 pp. with 131 illustrations. (Macmillan.) 10s. 6d.—The more advanced students in the classes of colleges and schools in which this subject is studied, will find this a

most useful book. The descriptions of the more important processes, and of the materials and fuel employed in iron and steel works are brief but to the point. The book contains many typical analyses of the raw materials, the products and the bye-products. It deals with the methods now practised in smelting and working the metal in some of the best works here and abroad. It describes some of those alloys of iron, possessing remarkable properties, which have recently been discovered and are now manufactured for special uses in the arts; such as: special tool steels, highly magnetic alloys, non-magnetic alloys, &c. The illustrations are clear and there are many references to original papers, especially to the more recent ones, which will be useful to those desiring detailed information. There are chapters on the theories held regarding the structure of steel; on hardening, tempering and annealing; on the microscopic structure of iron and steel; and on conductivity and magnetic properties. The book is therefore fully up to date. The theories on the structure of steel are fairly stated. In some parts, owing principally to conciseness of description, the meaning is obscure; this is to be regretted, especially so when for various reasons fuller descriptions might have been expected. The chapter on the microscopic structure of iron and steel is the last but one in the book, yet it must be read in conjunction with the chapters in the middle part on the theories of the structure of steel and on hardening.

Sun, Moon, and Stars. Astronomy for Beginners. By Agnes Giberne. xvi. + 329 pp. (Seeley.) 5s.—This is a new edition of a book which is now in its twenty-sixth thousand. A new chapter has been added dealing with recent results and views on various celestial bodies, and this will help to give the book a new lease of life. The text is very simply written, but the sentimental side of astronomy is, perhaps, a little too prominent for the present generation. Such expressions as "countless millions," "innumerable stars," "the stars of the universe are uncountable," may be impressive but they are none the less misleading; for many lines of reasoning lead to the conclusion that the number of stars of all magnitudes does not exceed one hundred millions.

A Class Book of Botany. By G. P. Mudge, and Arthur J. Maslen. xvi. + 512 pp. (Arnold.) 7s. 6d.—The authors state that their object was to meet, in one volume, the requirements in Botany of the Intermediate Scientific Examination of the London University, and of the Advanced Stage Examination of the Board of Education. This task they have performed in a most creditable manner, and teachers and students whose work is regulated by the syllabuses of the examinations in question, will be grateful for a work containing information which in the past had to be gleaned from several different books. Great care has obviously been taken to incorporate the results of recent work, and as a consequence the book is very full; indeed we fear that the average student may find it somewhat embarrassingly so. One could perhaps scarcely expect much originality of treatment in such a book, but the result is nevertheless one to be highly commended. The illustrations, upwards of two hundred in number, have all been specially drawn for the book and will be found useful.

An Introduction to Botany. By William Chase Stevens. x. + 436 + 127 pp. (Heath.) 6s.—This book approaches the ideal introduction to botany more nearly than any other we have seen. Each chapter commences with clear instructions—on heuristic principles—for laboratory or field work, and concludes with a discussion of the facts observed. The method is in itself an excellent one; the manner in which it is carried out is almost beyond praise, for the experience of the practical

teacher and the lucid style of the expert are apparent throughout. The chapters on flowers, with their delightful quotations from Sprengel, are in themselves sufficient to dispel for ever the strange notion—still commonly held—that botany is a dry subject. The illustrations are numerous, and worthy of the text, which is saying much. The book is not "written up" to any of our familiar syllabuses: a fact which will perhaps render it all the more useful to the teacher, though it may detract somewhat from the wide circulation it so thoroughly deserves. An appendix on the herbarium, laboratory equipment and processes, together with a glossary and a "key and flora," add greatly to the value of the book.

The Nature-Forms Object Lesson Books for Scholars. Book I. By F. H. Shoosmith. (Charles and Dible.)—This book contains fifteen plates of outline drawings of various objects of natural history, suitable for use as drawing copies or as sketches to be coloured. Each plate is faced by a simple description, and instructions for colouring are also given. The book will be found useful in the lower classes of schools.

Mathematics.

A School Geometry. Part III. Circles. By H. S. Hall and F. H. Stevens. ix. + 137 to 210 + ii. pp. (Macmillan.) 1s.—This third part contains the substance of Euclid's Book III. 1-34 and part of Book IV. Euclid's logical sequence is in the main retained, but the propositions are grouped differently and their number is reduced. We cordially sympathise with the "attempt . . . to curtail the excessive body of text which the demands of examinations have hitherto forced as 'bookwork' on a beginner's memory." It is possible, we think, that compression might with advantage have been carried further, though it may perhaps be better meanwhile, as experience is being gained, not to be too rash in making innovations. Euclid's third book is probably the least satisfactory of all his books, and the rearrangement here given is certainly an improvement. The exercises are easy and are well within the competency of the average pupil. In the treatment of tangency the method of limits, of course, appears. We think that on p. 170, par. 3 should precede 2 and that 2 (i.) should be used instead of 2 (ii.) in proving theorem 46, p. 173. The proof given on p. 173 is much better than that now becoming current, though it could be improved by a more careful statement of the fundamental element of a limit. The angles OQR, OPT, are equal so long as OPQ is a triangle, but when Q coincides with P the proof that they are equal is no longer valid. Rather, if PS is perpendicular to OP, PS is the tangent, because Q can be taken so near to P that the angle RPS shall be as small as we please; the fixed straight line PS is therefore the limiting position of PQ.

A Course of Pure Geometry. By Dr. E. H. Askwith. xii. + 208 pp. (Cambridge University Press.)—It is to be hoped that the reform of geometrical teaching will increase and not diminish interest in geometry. Though the time that may be gained by a rearrangement of the fundamental propositions of geometry will probably be claimed, in part at least, for laboratory and general science work, yet some should be allotted to the study of geometry beyond the elements in the case of pupils who have any mathematical aptitudes. For such pupils this "Course" is an excellent guide. The text is simple, clear and accurate, and the selection from the vast range of material in modern geometry is most judicious. The book would not be at all difficult for a senior pupil, and the time he spent upon it would be well repaid by the intellectual stimulus he would certainly gain not less than by the new knowledge acquired. As an introduction to the more complete treatises, this "Course of Pure Geometry" can be unreservedly recommended.

Elementary Graphs. By R. B. Morgan. viii. + 76 pp. (with 16 plates.) (Blackie.) 1s. 6d.—This little book is an easy and interesting introduction to the methods of drawing and interpreting a graph. The functions plotted are chiefly linear and quadratic, but the curves also include the circle and the rectangular hyperbola. The applications are mainly to statistics and prices. In the plates the lines are much too thick if accuracy in reading off coördinates is desired. The points through which a curve is to pass should be represented in some other way than by a dot if the record of the point is not to be lost.

Algebra. Part II. Adapted to the requirements of the Second Stage of the Directory of the Board of Education. By E. M. Langley and S. R. N. Bradly. 216 pp. (Murray.) 2s.—The parts taken up are involution and evolution, surds and indices, quadratic equations in one and two variables, ratio, proportion and variation, and graphs; there is also a chapter containing proofs of certain theorems in Part I. The style is simple and the difficulties of beginners are usually noted and considered. Too much space seems to be given to surds in comparison with that allotted to such an important subject as graphs, and there is just a tendency to refer too much to other sources of information instead of giving the information needed. For instance, Horner's method, referred to more than once, is important enough to find a place; room might have been given for it by excising some of the exercises for revision. Possibly examination requirements have dictated to a certain extent the inclusion and exclusion of particular subjects. The book seems well adapted for the examinations in view, but, even for these, the "awkward numbers" referred to on p. 73 should be faced in the text, especially as methods of approximation are at times discussed (e.g., pp. 24, 25) in an interesting way.

Exercises in Arithmetic (Oral and Written.) Part I. By C. M. Taylor. iv. + 124 + 16 pp. (Edward Arnold.) 1s. 6d.—For teachers who wish additional examples this collection will be serviceable; the exercises are in addition, multiplication, subtraction and division, problems involving money being included as soon as possible in each stage. The specimen examples on pp. 122-124 are hardly distinctive enough to be worth giving.

Drawing.

Philips' Brushwork Concrete Arithmetic. By F. F. Lydon (Philip.) Books 1-4, 3d. each net.—This is a most amusing and interesting set of little books which aims at bringing simple and attractive exercises in brushwork to the aid of the teacher in impressing upon young students the most elementary notions of number in a concrete form. The copies consist of flowers, trees, birds, soldiers, and other objects likely to attract young children, and the simple arithmetical rules are clearly and ingeniously illustrated. In the first two books, which deal with addition and subtraction and are intended for quite young children, complete outlines are very wisely given to be filled in by the pupils.

Memory Drawing of Plant Form and Design. By W. R. Bullmore (Kings Lynn: The Arts and Crafts Co. London: Chapman & Hall.) Parts 1 and 2. 1s. each net.—Mr. Bullmore has taken a step in the right direction in providing us in these small issues with careful and tasteful flower drawings followed by designs based upon the same plant showing how it can be conventionalised. Each part contains six plates three of which are devoted to the natural forms and three to designs founded upon them. The flower studies are excellent, cleanly and straightforwardly put in, judiciously chosen, and arranged so as to show those characteristics of growth which the de-

signer must know. The designs which follow them are less satisfactory.

Art in the Nineteenth Century. By Charles Waldstein. vii. + 91 pp. (Cambridge University Press.) 2s. net.—This little volume contains a lecture which was delivered by Dr. Waldstein at the University Extension Summer Meeting held at Cambridge in 1902. Serving as it did as an introduction to a series of lectures on art, literature and music, the book necessarily covers a rather wider field than can be treated very satisfactorily in a small volume appearing by itself, but there are doubtless many students who heard the address delivered who will be glad to possess it in more permanent form.

Nature's Laws and the Making of Pictures. By W. L. Wyllie, A.R.A. 74 pp. Illustrated. (Edward Arnold.) 15s. net.—Mr. Wyllie is addressing himself in this book primarily to artists or would-be artists, but his instructions are so plain and practical that they should be of use to all students of drawing who want some knowledge of perspective. The truth is that the artist in general has not by any means a mathematical brain, and many a young student who is fairly puzzled by perspective as it is usually taught would, if given such simple directions as those which are here provided by Mr. Wyllie, learn gradually by actual practice that knowledge of the subject which he probably could not acquire by any other method bearing a more scientific dress. The book is admirably illustrated both by the author's own work and reproductions from old masters, and should certainly give teachers, especially those who have to take sketching classes, a great deal of help.

Miscellaneous.

King Solomon's Mines. By H. Rider Haggard. 256 pp. 1s. 3d. *Robinson Crusoe.* By Daniel Defoe. 255 pp. 1s. 3d. (Cassell's Continuous Readers.)—These abridged editions are sure to secure a wide popularity in schools. The abbreviations in "King Solomon's Mines" have been made with Mr. Rider Haggard's approval, and the boys who are given this volume as a class-book will, we are sure, consider themselves very fortunate. "Robinson Crusoe" requires no recommendation: he is a welcome guest wherever British boys are to be found.

Cassell's Union Jack Series Readers. Book III. 174 pp. 10d.—This book maintains the high order of excellence of its predecessors, which have already been noticed in these columns. The illustrations are, as usual, particularly good.

The School Manager. 1903. By Joseph King. vi. + 88 pp. (Arnold.) 1s.—The scope of this booklet is well defined by its sub-title: "A handy guide for the management of public elementary schools, with the Education Act, 1902 (full text), and other appendices, including rules for planning and fitting up schools." Managers will find in its pages, concisely expressed, just the information they require on frequently recurring questions.

The Schoolboy's Pocket Book. A little book of helps and hints for boys. By a Public Schoolman. 31 pp. (London: Smith's Publishing Company, Ltd.) 6d.—This little book for the waistcoat pocket can do no schoolboy any harm, but is well calculated to do a great many of them much good.

An Index to the complete Encyclopædia Britannica. The eleventh of the new volumes. Vol. xxxv. of the complete work. 1092 pp. (Black and The Times.)—This elaborate and carefully compiled index makes the task of consulting the thirty-four volumes of the completed Encyclopædia both easy and pleasurable. There is no need to say more about the volume, since no one who has the volumes already noticed in these columns will rest content until they possess the index, which is certainly one of the most useful and elaborate we have seen.

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.

Correspondence Club for the Study of Pedagogics.

THE qualifications shortly to be required of all teachers in secondary schools who desire registration in accordance with the recent Order in Council have again brought into prominence the value to the schoolmaster of an acquaintance with the contents of the educational classics written by those great educators on whose practice and experience most of our educational systems are built. In comparatively few years there will be in all probability in the secondary schools of the country two classes of teachers: first, the practised veterans whose skill and success depends almost entirely upon principles evolved from personal experience, and scarcely at all upon their knowledge of the results arrived at by their scholastic ancestors; and, secondly, the young men and women, the products of some system of training, from whom a theoretical knowledge of no educational secret is hid, who know as familiar friends Quintilian, Ascham, Mulcaster, Rousseau, Herbart, and the other educational giants, but who as yet scarcely know the "smell of powder," to whom the familiar contest of the class-room—where the educator's desire is pitted against the schoolboy's inertia—is merely an ill-defined presentiment. How will it be possible for the Jews to have dealings with the Samaritans? Somehow to establish in advance a bond of sympathy, to complete a means of intellectual communication, seems to be well worth a considerable effort.

To adopt the line of least resistance is, as a rule, a plan of campaign which saves much irritation and reduces friction to a minimum. Now, personal experience is gained only after much prayer and fasting, whereas a theoretical acquaintance with the conclusions at which others have arrived is much more easily obtained, and the expenditure of nerve-energy is much less. The workable plan seems to be, therefore, for the veterans to supplement the valuable results of their own educational practice by acquainting themselves with the conclusions at which the masters in education have arrived, and having done this they may fairly expect to be regarded as scholastic Gamaliels—and the theoretically well-equipped tyros will sit at their feet with a becoming humility.

The question is: How to gain this familiar knowledge of the great books in education most easily. Attendance at lectures is inconvenient and perhaps a little *infra dig.* The man who has borne the heat and burden of the day regards educational difficulties from a different point of view from the inexperienced beginner, and the same lecture is not likely to be equally useful to both. My suggestion is that acting teachers in secondary schools shall co-operate in a friendly way, and set about a joint-study of a few typical educational classics. The plan I propose is that six or eight acting schoolmasters or schoolmistresses in secondary schools form a correspondence club and conduct it in some such way as this: One teacher will become the honorary secretary, and the first thing he will do is to request each member to name some book he wishes to form the subject of study for a particular term. When, by voting or otherwise, the book has been selected—say, Rousseau's "Emile"—the secretary will divide the book into as many parts as there are weeks in the term, and each of these divisions will represent the subject for each member's private reading and study for one week. Each week every member will forward to the secretary any remarks criticising or amplifying the

author's opinion in the light of his own experience, or, should any such arise, stating his difficulties, and each subject will be dealt with on a separate sheet. The secretary will add to any sheet by any member such remarks as his experience suggests. The whole set of sheets will be fastened together by the secretary and posted to a second member of the circle, who adds his comments and posts the sheets to the third member. This course is repeated until the budget of opinions again reaches the secretary, who then sends to each member his original difficulties or conclusions annotated with the additions made by every member of the club.

This method of study would result not only in a thorough knowledge of the contents of the chosen book, but, what is much more valuable, in the formation of a rational idea as to how the conclusions of a previous epoch in educational history should be modified in the light of modern experience.

The plan seems to me feasible and worth a trial. If six or eight schoolmasters or schoolmistresses among readers of THE SCHOOL WORLD think the same, and would like to try it, I shall be pleased, if it is their desire and they will write to me, to act as secretary for one such correspondence club, and to assist in the formation of other clubs.

22, Elmstone Road, S.W.

A. T. SIMMONS.

I HAVE read the suggestions of Mr. Simmons for the formation of Correspondence Clubs for the study of the Science of Education. I cordially agree with all that he says, and think that he deserves well of the profession for the trouble he has taken, and proposes to take, in the interests of the scientific study of the principles of education.

JOHN ADAMS.

I IMAGINE there will be many who will wish to avail themselves of the offer made by Mr. Simmons in the above letter. In the past, teachers of every grade, of every subject, have too often been possessed of the parochial spirit: satisfied in doing their own work in their own way, they have rarely cared to take into account and study the body of doctrine bearing on the practice of their profession to be found in books or to consider other peoples' methods. The conception of a theory of education is only now beginning to take root among us. Any course of action which will contribute to the formation of the habit of reading and to reflection on such a subject, which will give rise to an inquiring and critical habit of mind in the teacher, is to be warmly commended and should be heartily supported. It is to be hoped that even some of the senior, more experienced members of the profession will be prepared to take part in an experiment of so helpful a character. Finally, I would urge that whatever be the course of reading chosen, it should be a wide one; that the fact deserves to be kept in mind that, in some respects, modern conditions are very different from those prevailing in the past.

HENRY E. ARMSTRONG.

THE suggestion of Mr. Simmons to form a "Correspondence Club for the Study of Pedagogics" seems to me an excellent one. Judging from the scorn with which many trained teachers meet the proposals of untrained secondary schoolmasters, the transition period during which we of the old system must work in union with those of a newer generation who will join us full of the theory of education, but with not much practical experience, will require some bridging over. Under the old conditions a new colleague was always glad to receive hints from those who had been for some years engaged in teaching, and we must all of us remember much valuable assistance given ungrudgingly by our older colleagues. How can we in our turn do the same for the younger generation? From my own experience I can only recall two or three men new to the teaching profession who had

studied the theory of education before entering on their work. They were, I remember, by no means ready to take, or ask for, any advice until they had discovered by very bitter experience that, though we knew very little of the theory, yet, as regards the practical side of teaching, we were able to carry on our work with an amount of efficiency which their knowledge of theory was quite unable to give them. I gathered from these unfortunates (for really while under the spell of their theory they were great sufferers at the hands of their pupils) that it was because of our ignorance of the doctrines they had learnt that our opinions for the first term or two were not worth listening to. In the future it will not be a few isolated individuals, but every new colleague who will be instructed in the Theory of Education, and it behoves us to make ourselves in some degree capable of exchanging views, during the earlier stages of their career, with the products of the New Regulations. Owing to my small personal experience of the effects of theory undiluted by practice, I am at present sceptical as to the good to be obtained by a prolonged study of the theory of education, but, as my experience may have been an unfortunate one, I am glad to have such an opportunity as the scheme which Mr. Simmons suggests to get a better insight myself into the subject. Of course I am aware that the new regulations demand a study of the practice as well as the theory, but what no amount of preparation can provide for, is that kind of Form (most of us have come across it some time in our careers) which doesn't play the game, which never acts under treatment as the books say it should, and which we find behaves itself perfectly normally with some old hand who is able to subdue it solely through his experience. If now, by some such scheme as that of Mr. Simmons, we can get a knowledge of the doctrines which have been taught to our new colleagues, they will probably be ready to ask and take advice from just such old experienced hands as I have mentioned, and we can pass on to them the benefits which we in our apprenticeship received. Sitting in the shade in an old country garden, Mr. Simmons's scheme appeals strongly to me; whether towards the end of a long term's work it will appear so agreeable remains to be seen. If I might offer a suggestion, it would be that the book to be discussed should not be divided into parts to fit the term, but into suitable weekly lengths, and carried on from term to term if required, and that during the last fortnight of each term the scheme should be dropped, because in many cases this period has to be devoted to examination work, and very little time can be spared for other subjects. As Mr. Simmons has so kindly volunteered for the secretarial work, which will probably be no small amount, I shall be glad to be enrolled as a member, and also to do what I can to get others to join. The idea is such an excellent one that I trust it will have great success.

City of London School.

T. WIDDOWSON.

School Societies.

THE increased demand for specialised study at an early stage in the school course brings with it two dangers serious enough to force the schoolmaster to consider means by which they may be met. These dangers have to do with the attitude of the pupil to the formative and literary subjects which precede, and form the basis for the acquisition of specialised information, while he is still at school. In the first place, there is the tendency for the pupil to take a utilitarian view of his school work. Having in view the prospect of ultimate specialisation, and the necessity of passing external examinations qualifying him to embark upon his life's work, he is apt to focus his attention on all that he imagines will be profitable for such examinations, and to pursue with less energy subjects which he will shortly discontinue. Secondly, after leaving school, finding himself less advanced in these special subjects than he had hoped, his feeling for his school work may become one of regret.

The progress, he supposes, might have been more rapid had specialisation come earlier, and had less time been devoted to subjects the practical utility of which is not to him obvious. The fear, then, is that a boy while at school may not exert himself sufficiently to gain an adequate culture-basis to fit him for specialised study, and that when he has left school the disappointment consequent on finding himself so far from a working knowledge of the subjects, on which his prospects in life now largely depend, may rob him of some of the respect for his school course, and affection for his school, which should be one of the most valuable inheritances from school life.

One means for meeting these dangers may be found in school societies. Few schools, happily, are without a school paper or a school debating society, and these become at once valuable in this connection if the procedure of the latter conforms to the ordinary procedure of a business meeting, and the speakers feel bound to acquaint themselves with the subject matter of each discussion, and if the school paper aims at a literary standard. But with a little ingenuity other forms of societies can readily be devised, notably play reading and essay societies, one effect of which should be to enable boys about to leave school to feel that they have a use for their earlier humanistic studies which is not utilitarian, but that these studies have reached a certain definite standard to which they can look back with respect, and from which they can proceed to extend their powers for themselves.

The reading aloud of plays, not confined to Shakespeare, has certain advantages over other forms of readings. It is a method of studying a branch of literature peculiarly definite in itself, but remarkably varied by the genius of different writers. It is for boys a breaking of new ground, where all start fair, and while it appeals to æsthetic appreciation and stimulates the ethical judgment, it leads also to a right understanding of what is good in dramatic representation. Further, the reading aloud of parts is a valuable exercise in itself, and excites rivalry making for progress.

In the case of the essay society there is a danger. The composition of the essays must not be allowed to interfere with the ordinary preparation of school work. Fortunately the difficulty is easily solved. It can be arranged that all essays shall be written in the preceding holidays, and the order of reading be balloted for at the beginning of the term. It increases the general interest of the meetings if the reading of the essay be followed by a short discussion in the form of an *impromptu* debate. The subjects should be as various as possible, but a good basis for some will be found in subjects which have recently been set for school prizes, since in this case the writer will know what authorities dealing with his subject matter are available and have some acquaintance with what that subject matter entails.

I have found such meetings, in which a master can meet boys engaged in various specialised forms of work on terms of strict equality, and in his own rooms, very pleasant social occasions; and I believe that they in some degree achieve their purpose, arousing a genuine interest in literature for its own sake, and enabling those, who are about to leave, to feel that their school training, even where of no definite utilitarian value, has reached a certain standard from which they can advance by their own efforts. I append a list of work of this kind, which we have recently covered at Epsom.

(1) *Play Reading Society*.—The following have been read within the last three years. The meetings occurred once a week during the two winter terms.

Shakespeare, "King Lear," "The Merry Wives of Windsor," "Twelfth Night."

Marlowe, "Edward II.," "Arden of Faversham" (Temple Dramatists series).

Goldsmith, "Good Natured Man," "She stoops to Conquer."

Sheridan, "The Rivals," "The School for Scandal."
 Tennyson, "Queen Mary," "Harold."
 Browning, "Strafford."
 Pinero, "The Times," "The Cabinet Minister."
 Ibsen, "The Lady from the Sea," "Rosmerholm," "Hedda Gabler," "One of the People."

(2) *Essay Society*.—Midsummer Term, 1903. The subjects chosen by the readers, two of whom were masters, were :—
 Ossian, Historical Poems, Local Character, Goldsmith, Venice, South Devon Scenery, The Bases of Democracy, Calvin, Masques, Holland's Struggle for Independence, Tales in Verse, Two Dictators of Literature.
 The College, Epsom. T. S. FOSTER.

Changes in Pronunciation.

We are all told in our youth that language is a living thing and constantly changing. But this is rarely brought home to us, except when we read eighteenth-century verse, and note that "tea" rhymes with "say." I have recently had staying with me a French teacher of English in Paris who had not visited England for some years. He assured me that our pronunciation of *i* sounds had much altered in ten years: that whereas it had been the custom to say "civilization" and "tribunal," we now say "civilization" and "tribunal." The same change is occurring in France, where the *a* sounds are broadening, especially in Paris. For instance, *pässer* and *tässe* have an "ah" sound, much as in the southern English *päss*; but this has not yet reached words like "*pässif*," which are not used by the people.

DE V. PAVEN-PAYNE.

The Measurement of Mental Fatigue.

THE simple experiments recorded below were made in connection with discussions on the question of Mental Fatigue, arranged by the Manchester Froebel and Child-study Association. The three questions on which I attempted to obtain information were: (1) At what parts of our school day is fatigue most marked? (2) What is the effect of the gymnasium hour? (3) What is the effect of the workshop hour? The class selected was one of twenty-five boys in the Lower Modern School, whose ages averaged 12½, and as they had just made a beginning with German the following test was applied. The boys having been directed to have paper ruled and prepared, ten nouns were given to them in English from the vocabulary they had already acquired, and they were told to arrange in columns the gender, declension, genitive singular and nominative plural of these nouns, adding the definite article. In each case five minutes were allowed for the exercise.

Without giving here all the figures obtained, the following seem worth recording. As each of the twenty-five boys could score forty points, it will be seen that the possible maximum in every case was 1,000.

<i>November 10th.</i>	Total possible: 1,000.
Middle of last morning hour	872
Beginning of afternoon school	895
End of afternoon school	840

Here there was evidently a considerable rise after the rest afforded by the luncheon interval, but a falling off two hours later when afternoon school closed. About a month later the test was applied at nearly the same times, with the following result:

<i>December 1st.</i>	
End of morning school	933
Beginning of afternoon school	954
End of afternoon school	930

It will be seen at once that practice has made the test an easier one, and higher marks are obtained. The curve is the

same, but the differences are less marked. Turning next to the effect upon the same class of an hour in the gymnasium, the following result was obtained:

<i>November 20th.</i>	
Before gymnasium	900
After gymnasium	840

Between these tests the boys would have spent fifty minutes at physical drill, the elastic ladder, parallel bars, and similar exercises. The fall is very marked, and fully bears out what has been urged elsewhere as to the fatiguing effect of gymnastic exercises. A week later, a similar test was applied with the following result:

<i>November 27th.</i>	
Before gymnasium	895
After gymnasium	894

On inquiry I found that on this particular occasion, owing to an interruption, no violent gymnastic work had been done during the hour. The result, therefore, rather confirms the accuracy of the test than otherwise. In order to have some record of the subjective test, questions were put to each member of the form on several occasions as to the effect of the gymnasium hour upon him. The result turned in the same direction, and enquiries from much older boys in the school elicited no uncertain replies to the effect that the gymnasium hour was fatiguing, and that they were always glad when the time table was so arranged that this hour came at the end of the morning.

The period for manual training comes last in the day for the particular form, and the results of tests designed to answer Question 3 were as follows:

<i>November 25th.</i>	
End of morning school	898
End of afternoon school—after workshop	908

This seems to show that the workshop hour is not a fatiguing one. In order, however, to obtain a more satisfactory trial, the test was applied a week later in the workshop itself, at the commencement and at the close of the carpentry hour. The result seems to point in the same direction:

<i>December 2nd.</i>	
Beginning of workshop hour	920
End of workshop hour	912

The general conclusions which it seems fair to deduce from these simple experiments are: (1) Fatigue is marked at the end of morning or afternoon school, but there is a decided recuperation due to the interval between the two. (2) It is a fallacy to suppose that a gymnasium hour affords opportunity for recuperation. Both subjective and objective tests are against this idea. (3) The workshop hour is not so fatiguing as those devoted to some other subjects.

The Grammar School, Manchester. F. A. BRUTON.

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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.

Supplement to "The School World," Sept., 1903.

PAPERS ON SCHOOL CURRICULA

FOR

Discussion in Section L, Educational Science,

OF THE

BRITISH ASSOCIATION,

ON

SEPTEMBER 10TH AND 11TH, 1903.

Proposed Scheme of Discussion.

(From the Official Circular.)

THE Organising Committee has decided to continue the procedure adopted at previous meetings—namely, to confine the discussions to a few broad subjects.

It is proposed to devote two days (September 10th and 11th) to an organised discussion on "School Curricula," based on a series of short papers contributed in advance, so that there may be time to print and distribute them; separate questions will be dealt with in separate numbered paragraphs, so that it will be possible to discuss together the corresponding paragraphs in the several introductory papers.

The Organising Committee suggest that the discussion should follow lines laid down broadly in the following scheme:—

Character of curriculum (general) suitable for:—

- (a) Primary (preparatory) schools,
- (b) Secondary schools,

with reference to such questions as:—

(1) What subjects, if any, all children should first study in common.

(2) Whether the training should not in all cases necessarily include:

- (a) Literary instruction;
- (b) Practical instruction (science, drawing, manual, and physical training, &c.).

(3) How far up the schools both these should be carried.

(4) At what stage and to what extent divergence from the general preparatory course should take place, and what should be, broadly, the curriculum of each type of school, the types to be considered being schools preparing for:—

- Commercial professions;
- Domestic professions;
- Engineering and applied science professions;
- Literary professions.

(5) To consider what should be the treatment in the above several types of school of the two branches of instruction:—

- (a) Literary;
- (b) Practical;

i.e., what should be the subjects included under these two heads in various types of schools, and how, broadly, they should be dealt with.

By J. ADAMS, M.A., B.Sc.

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I.—GROUPS OF ESSENTIAL SUBJECTS.

THE subjects that all children should study in common fall naturally into four groups. (a) The three R's, as the necessary preliminary to all formal study; (b) English composition and drawing as means of expression; (c) Drill, some form of manual work, singing and the rudimentary laws of health; (d) Nature-study, geography, and picturesque history and biography.

The relation of these subjects to those of the later curriculum will be discussed under (3).

2.—LITERARY AND PRACTICAL SUBJECTS.

It is now generally admitted that training must in all cases necessarily include both literary and practical instruction. Hitherto the struggle has been to find a recognition for practical work in a curriculum that is mainly literary. It is just possible that we may have now to fight for a literary element in a course that is essentially practical. In our reaction against bookishness, we must not fall into the opposite error of neglecting the training that books alone can give.

3.—CO-ORDINATION OF ELEMENTARY AND HIGHER STUDIES.

While all training should include both theoretical and practical instruction, the nature of the subjects to be taught and the amount of time to be devoted to each must vary with the stage of advancement of the pupil. The categorical answer to the question, "How far up the schools should both practical and literary instruction be carried?" is "Up to the very end." With regard to individual subjects, it is very difficult, and perhaps not quite necessary, to determine the precise point in the curriculum at which they should be dropped. In point of fact, there are many subjects that are never really given up, though they become gradually content with but small special attention. Often a subject disappears from the time-table altogether as a separate subject, and yet deserves, and actually receives, a great deal of attention from the teacher. The three R's find no place in the time-table of our higher classes, yet to the end of their school course the pupils are, or ought to be, acquiring increased skill in their application of these three R's.

Lord Avebury has suggested a useful name for the class of

studies that are merely ancillary. He calls them "knife-and-fork" studies, the implication being that there are other studies that take the place of the dinner upon which the knife and fork operate. In using the figure, Lord Avebury had in mind mainly the three R's, but the distinction is a relative, not an absolute one. What is a dinner study at one stage becomes a knife-and-fork study at another. In fact, education might be not inaptly described as the process of reducing dinner studies to the level of knife-and-fork studies. To the student who has merely mastered the three R's shorthand is a dinner study, but at a later stage shorthand takes its place as knife and fork. To the schoolboy botany is a dinner study, to the senior medical student it is a knife-and-fork study. Thus each subject that the pupil masters is not thrown out of the curriculum in reality, though its name no longer appears on the time-table: it becomes a means of mastering other subjects. Reading, writing, dictation, and even arithmetic, disappear from the time-table long before they are fully mastered. But they are perfected by their use as auxiliaries to other subjects. In a really good secondary course, these elementary subjects are being perfected by being applied to the ordinary work of the higher subjects. The secondary-school teacher who is above attending to details of spelling, punctuation, handwriting, and clearness of reading and speaking, is neglecting his legitimate work. In a well-equipped school, with a good staff and small classes, the greater part of the formal teaching of the three R's could cease at the age of ten, though occasional formal lessons, particularly in arithmetic, should be provided up to the age of twelve. With regard to all the other subjects suggested under (1) for common study there is no need that they should ever be dropped, though the form in which they are carried on and the material upon which the mind is cast may be changed. Geography and history, for example, may altogether change their character as school subjects, and yet the lessons of the earlier stage may retain their value. They are indeed incorporated in the minds of the pupils. To use the Spencerian figure, "facts have become faculty." The subjects thus do not merely change, they develop. Nature-study may be given up entirely in favour of systematic botany or physiology, or chemistry, but it leaves behind it its mass of knowledge with the corresponding bias towards scientific method.

4.—COURSES FOR PUPILS OF DIFFERENT LEAVING AGES.

Before dealing with the curriculum for the various classes of schools suggested, a preliminary general distinction must be made between those schools in which the pupils do not remain beyond the fourteenth year and those in which the lowest leaving age is sixteen. In the former class of school the greatest care must be taken that the ancillary subjects are thoroughly mastered, as there is not here the same chance for revision that is found in the later school-life of the others. This need not, however, prevent such schools from adopting a one-year or a two-years' course, after the completion of the preparatory course. Excellent examples of such supplementary courses are to be found in the Code of Regulations for Day Schools issued by the Lords of the Committee of the Privy Council on Education in Scotland. There we find four courses mapped out:—

(a) A *Commercial* course, including: Arithmetic, book-keeping, common commercial documents, handwriting, shorthand.

(b) An *Industrial* course, including: Geometry and mensuration, applied arithmetic, woodwork or ironwork, mechanics.

(c) A course for *rural schools*, including: Nature-study of a special kind, geometry, study of newspaper market-reports, the keeping of accounts, woodwork or ironwork.

(d) A *Household Management* (girls') course, including: Housekeeping, laws of health, arithmetic, scale drawing, dress-making.

This scheme has been severely criticised for beginning specialisation at too early a stage, and the objections carry some weight, but we must remember that by the conditions of the case the children are bound to specialise at fourteen, that is, they begin work at that age. The special training for one or two years at school has at least the effect of making this premature specialisation more intelligent than it would otherwise be. It has to be noted further that the scheme is one which is compulsory (if certain grants are to be obtained), and therefore includes only the minimum that will satisfy the Committee. There is really nothing to hinder each such pupil beginning one modern language at the age of ten, and leaving school at fourteen with a real working knowledge of that language. This could be worked in as an extra to each of the above courses, without any undue pressure, if the antiquated methods of language teaching are abandoned. Though the framers of the Scotch Code have omitted all foreign languages, they have drawn up an admirable scheme for the teaching of English in schools of the class with which we are now dealing. I am not aware of a better scheme of teaching English than that to be found in the Fifth Schedule of the Scotch Code.

In schools in which the leaving age is sixteen and over, the divergence between the common curriculum and the more or less specialised should in no case take place before the age of twelve. In the case of pupils going forward to a literary course, a certain amount of time might be given between the ages of ten and twelve to the memorising of those parts of Latin grammar that are usually maintained to be better prepared at this stage than at any other. The time necessary for this work could be deducted from that given to nature-study and history.

Between the ages of ten and twelve the subjects would be the same as those already mentioned under (1), except that the three R's are now largely suppressed as formal subjects, their place being taken by elementary geometry and algebra and the rudiments of two modern languages. It has to be remembered that the drawing lessons have already prepared the way for geometry, so the increase is not so great as it seems.

Even when specialisation begins at twelve it ought never to affect more than one-half of the work. That is, there ought to be always a solid half of the school curriculum devoted to the training of the pupils as human beings irrespective of the particular line of life they propose to follow. The whole trend of a pupil's course may be towards one or other of the four groups of professions suggested, and yet a large body of his studies may be common to all four groups of pupils.

5.—CURRICULA FOR VARIOUS TYPES OF SCHOOLS.

(a) *Commercial Professions*.—Here the curriculum should include those special forms of calculation that are essential to business: book-keeping, shorthand, *précis*-writing, two modern languages, economics, and commercial geography. I am aware how unsatisfactory book-keeping as a school subject is, but it need not be taught in the way to which objection is so frequently taken. As a rule it gets too much time on the time-table. So far as possible the two languages should be confined to French and German. In certain businesses Spanish is no doubt of prime importance, but for general training the ordinary two languages are excellent, and we are not here considering a mere cram commercial college.

(b) *Domestic Professions*.—In dealing with students looking forward to work of this kind there is a specially strong tendency to run to excess in practical work. Cookery, laundry-work, needlework, cutting-out, appear to make up a sufficiently varied course, and indeed the amount of time the practical part of each of these subjects demands is so great that there is a difficulty in finding room for the more general studies that enable a

student to approach the practical work with the proper equipment. The special subjects that underlie the practical parts of this course are : calculation, including specially mensuration and the metric system ; drawing (freehand, and with instruments), particularly on squared paper ; chemistry ; physiology (with special reference to health) ; elementary economics.

(c) *Engineering and Applied Science Professions.*—Here there are two main lines of development according as the pupils are to follow professions that deal mainly with organic or inorganic matter. In both there must be training in scientific method, but the relative importance of the different sciences will be different in the two cases. In engineering and other sciences that deal with dead matter the special subjects should be mathematics, physics, mechanics, drawing, chemistry. In those professions that have to do with life in any form, the special subjects should be, biology chemistry, physics.

(d) *Literary Professions.*—Here we are dealing with those who require that special form of training that was formerly regarded as necessary for all. The special subjects here are Latin and Greek, and a special treatment of French and German, the mother tongue, and general history.

6.—CONSIDERATIONS OF CULTURE IN THE CURRICULUM.

In schemes like those suggested above, we are apt to forget that we are, after all, training men and women as well as business men, cooks, engineers, and editors. Accordingly it is well to lay stress on the universal side of many subjects that in special forms are restricted to specific professions. In this way the literary part of the curriculum should be made as general as possible, that is, as free as may be from specific applications to professional purposes. English composition need not by any means become tainted in school with the peculiar turns of the counting-house. The vocabulary and idiom of the different professions can be very readily picked up by an intelligent pupil who knows good English. The reading of what is known as literature is the best possible preparation for all sorts of professions that require the power of expression. It is not that the study of pure literature gives the power of expression in general, but it gives the pupil power over the language, and thus enables him to apply it to any purpose, whether æsthetic or practical. There is at present a very strong and a very healthy tendency to favour the reading of great books themselves, rather than books about books. Every encouragement should be given to those who are advocating the reading of several first-rate books, rather than the reading of a series of lectures on a wide range of literary history.

French and German should be treated on the same principle. It is easy to make fun of the boy preparing for the counting-house by puzzling his way through a German passage dealing with goslings and golden hair. But there is, after all, only one German language, and it is better that it should be approached on the human side rather than the commercial. The young merchant, or the young chemist, is all the better of knowing a little about German as a language before he begins to use it as a mere tool. Granted that the modern languages are treated in a broad human way, and not as mere drill-grounds for grammar, it must be admitted that students of all kinds may be taught together irrespective of the use to be made of the language at a later stage. If treated as culture subjects till the close of the school period, those foreign languages will be easily turned into mere tools as soon as the need arises. The first essential is that the pupil should leave school with the power of reading easily and intelligently the foreign languages he has studied. To attain this end he must have read widely during his course. Nothing can make up for the lack of wide reading. Composition in the foreign language is an admirable culture training,

leading to the corresponding practical advantage of facility in writing. The commercial pupil must acquire the power of composing in the foreign language, but this is less essential in the case of the scientific pupil, though of course highly desirable.

The same thing is true about mathematics. In order that each class of student should be able to make the proper applications to his own subject, all the pupils must study mathematics in general. This does not mean that we must study mathematics in the abstract merely to sharpen our wits. It means that we must study mathematics in order that we may deal with mathematical formulæ in an intelligent way. The domestic, scientific and commercial professions all demand a knowledge of mathematics in some form or other. In the case of the literary professions it is not essential that mathematics should be studied in any great detail. Some geometry and algebra treated in the broadest way is enough to give the literary pupil the mathematical point of view, but beyond this it is not necessary to urge him to study unless he has a bent that way.

Of the practical subjects, probably drawing is of the most general application. As a means of expression it ought to be studied by all classes of pupils. Custom is largely responsible for the present prevalent belief that drawing is a matter of genius. One reason for the misunderstanding is to be found, without doubt, in the word *Art*, as used in the "Science and Art Department." All men are not called upon to be artists, but all men can be trained to use a pencil to express their ideas in more or less diagrammatic form. If some can add artistic skill, theirs is the gain : but the lower advantage should be secured to all.

Laboratory work of all kinds, after the merely preliminary stages, is essentially technical, though, as we have seen, various professions may have a large common share in the same science. The general way of treating laboratory work is now so well known that it calls for no treatment here.

By Prof. H. E. ARMSTRONG, Ph.D., LL.D., F.R.S.

"Man is a tool-using animal. Weak in himself and of small stature, he stands on a basis, at most, for the flattest-soled, of some half square foot, insecurely enough ; has to straddle out his legs lest the very wind supplant him. Feeblest of bipeds. Three quintals are a crushing load for him : the steer of the meadows tosses him aloft like a waste rag. Nevertheless, he can use tools, can devise tools ; with these the granite mountain melts into light dust before him. He kneads glowing iron as if it were soft paste ; seas are his smooth highway, wind and fire his unwearying steeds. Nowhere do we find him without tools : without tools he is nothing, with tools he is all."—Teufelsdröck.

I.—NEED FOR REFORM.

THE time may not be ripe for an immediate revolution in the curriculum of our schools, because teachers are not prepared, indeed are not competent, to carry out the changes which a revolution will entail ; nevertheless, it is clear to many of us that great changes must be made to fit modern education to modern requirements : and we shall fail in our duty if we do not formulate a constructive policy which will determine action. It is all important also to form public opinion—to lead the public to consider how relatively worthless the present system is and how much more effective education could be made if those who are concerned in it would really take stock of the position and avail themselves of the opportunities and the rich stores of knowledge and experience at their disposal ; if they would but act scientifically and without prejudice.

2.—THE BASIS OF A RATIONAL CURRICULUM.

The education of the future must be practical and individual, such as will directly fit boys and girls for their work in the world, such as will appeal to their sense of intelligence, such that they will value it instead of shirking it whenever possible.

Literary methods must give place to practical methods; workshop methods must take the place of didactic desk methods. The schools of the future must be in charge of broad-minded, practical men and women, trained scientifically and in the world as well as in academic groves. Consequently, the training of teachers, examiners and inspectors must be conducted on more rational and practical principles than heretofore, in order that a race may arise capable of coping with a rational, practical curriculum.¹

At present there is a tendency to put teaching on a psychological basis: we need to put it on a practical basis. I do not mean that psychology should be excluded but merely that it should take its proper subordinate place. Unless we are very careful we shall turn out pedants more pedantic than any of those who have heretofore engaged in teaching. Teachers must be taught both to think and to use tools, to abhor formulae. Every teacher should be more or less imbued with the spirit of inquiry.

3.—CURRICULUM FOR PREPARATORY SCHOOLS.

The establishment of a proper curriculum is of vital and fundamental importance, more particularly in the case of primary or preparatory schools.

The foundations of character are laid in the very earliest youth. It is only by teaching young children to work properly that we shall be able to overcome the difficulties which meet us later on. Teaching young children to work properly involves teaching them to work as individuals, honestly—not as sheep in herds. The curriculum must be chosen so as to admit of this. It will be necessary to consider very carefully, from this point of view, what is being done in kindergarten schools. There is undoubtedly too great a tendency to be playful and trivial in some of these—a want of elasticity of method due to lack of originality. The intervention of a few competent male teachers in this field would be of value.

4.—ESSENTIAL SUBJECTS FOR ALL PUPILS.

The subjects which all children should at first study in common must be such as to develop *all* their faculties.

Every child should be taught to read well and to like and use books—a very large amount of time should be devoted to reading—the habit of reading out loud should be carefully cultivated. At whatever age children leave school, they should be well read for that age and know how to turn to books for information. Although education is carried out mainly with the aid of books, the real use of books is in nowise taught. (Carlyle's opinion on the value of books is worth noting in this connection—see "The Hero as Man of Letters"). A boy or girl seldom, if ever, leaves school knowing how to read effectively.

The teaching of our own language, of history and to some extent of geography, should be largely incidental to reading. Mere lesson-learning should be abolished, both in and out of school. Children should be encouraged, indeed taught, to talk

rationally and much about their work and of things around them.

It is open to question whether, in preparatory schools, there should be any attempt made to teach languages other than English specifically—whether all that is desirable, all that is necessary, might not be done by gradually dissecting out from our own language the French, the Teutonic and the Classic elements, thus laying the foundation of foreign vocabularies and creating an interest in other languages. Under no circumstances should Latin or Greek be taught until the secondary course is entered upon; even then the study of these languages should be confined to those who had shown distinct literary ability during their study of English. When this policy is pursued the classical languages will again become of educational value.

At most half the school time should be devoted to literary studies—to studies conducted by literary methods. *At least half* should be given to practical studies—to experimental and manual work.

The prime object in view in experimental work should be the formation of character—the cultivation of some measure of thought-power and of a seeing eye, not the acquisition of knowledge.

Literary training might be given largely in connection with such work to supplement that given through reading; there would be something real to write about, something seen, felt or discovered, so that the habit of writing about real things would gradually be acquired.

The teaching of mathematics and of drawing should also be made incidental to the experimental work.

With regard to manual training, something far more real than what is now done must be introduced into schools. This class of work should be made as attractive as any game; in fact, it should be organised on a similar footing, directly in co-operation with the scholars. It is of the utmost consequence that various branches of manual training should receive adequate and serious treatment in all schools: it should be the pride of every British boy to excel in some kind of handiwork. No conception of the educational value of such work has yet entered into the minds of most heads of schools. It is to be hoped that in all schools ere long there will be more co-operation between teachers of different subjects—more co-ordination of studies; this will render possible a less rigid time table, so that at times, if necessary, boys and girls—like men and women—may engage in tasks requiring hours or even days for their completion.

5.—THE CULTIVATION OF INTEREST AND INDIVIDUALITY.

In the boarding school of the future there should be little or no evening lesson-learning of the conventional type: the time will be far more usefully spent and in a more healthy manner in experimental and manual work. And set lessons will not be imposed as home work for day scholars: grown-up men and women expect to have their evenings free—why should not children be treated with equal fairness and consideration? The school will coöperate with the parent in securing that some good use be made of leisure time: training will be given in the art of utilising leisure hours, an art which we entirely neglect to develop at present. In fact, the school must be so ordered that the child will slide naturally from it into the world: there will be no break, no sense of escape from slavery into freedom; the world will appear but as a continuation school and the habits of study acquired at school will but be confirmed as years go on. As long as the present stupid practice of eternal lesson-learning goes on and so little is done to create interest and cultivate breadth of understanding, so long as children are asked to do the work of grown-up people and are denied the opportunity of working

¹The only chance of our securing competent teachers lies in the establishment at the Universities of distinct Schools of Teaching, corresponding to the existing Schools of Engineering and of Medicine, in which professional requirements are most carefully considered in teaching all subjects. There need be no fear that such a system would induce undue limitations—the human mind is sufficiently expansive to take care of itself unless deprived by a false system of education of all power of initiative. There is great danger that the system which is coming into existence may discourage the development of individuality and favour the development of unpractical habits—of an arm-chair attitude.

in ways suitable to their age, which they can understand, we shall make no progress : school will not be a true preparation for life.

Lastly, in the future, besides manual training, general physical training must receive a due share of attention. When the formalities of classics no longer fill the mind, the example set in classic times may meet with some recognition : some effort will be made to embody Greek ideals in our scholastic practice.

The worship of the enchriridion being terminated and the examination virus so much attenuated that its lethal effects are inappreciable, in education preferential treatment will give way to free trade ; some sense of proportion will prevail.

6.—THE HIGHER SCHOOL CURRICULUM.

The higher should differ from the preparatory school mainly in the extent to which proclivities which become manifest during the preparatory course are given scope for development, in the increasing difficulty of the tasks set and in the increasing demand for results.

We need to get rid, as far as possible, of all differences based on social distinctions. A differentiation is brought about naturally because different social conditions necessarily beget their own differences, the education received at school being, after all, but a minor part of the general education of the individual.

Moreover, we need to revert to the common-sense practice of not so long ago : boys and girls should leave school at latest at seventeen years of age ; and if they desire to specialise, should then avail themselves of the opportunities for special study provided at the universities and technical schools. No protest can be too strong against the prevailing practice of depriving our youth of independence and individuality by keeping them so long in leading strings : few appreciate how serious is the check we impose on their development, how great the tax on parents. It is done partly because of the preposterously high standard set in the scholarships examinations at the universities ; partly in the interest of the schools—to retain senior boys to act as junior instructors in manners and games and as advertising media.¹

Bearing in mind that education is a preparation for life, not merely for professional work, the bias in favour of preparation for a professional career should be as limited as possible. Literary and practical studies should therefore be continued throughout the school career. It is often urged that scholars having this or that bent are unable to master certain subjects ; no doubt this is true but, as far as possible, the teacher should strive to overcome such inertia. It is undoubtedly the fact that scholars having literary tastes find a difficulty in mathematics, for example : probably, it may almost be said certainly, the difficulty would in great part disappear if the subject were taught practically, in an interesting manner not in the form of abstract propositions. This argument is of general application.

7.—GENERAL AND PROFESSIONAL EDUCATION.

Undue specialisation may have an effect the very opposite to that which it is argued makes specialisation desirable. Thus, to take the case of literary specialisation : it is perhaps not unsafe to predict that the success of the literary man of the future will depend quite as much on his general knowledge and scientific

¹ It may be argued that if boys and girls leave school at 16 or 17 years old their literary training cannot be carried sufficiently far ; the argument will certainly not be put forward on behalf of "practical" subjects. The answer is that those who engage in "practical" studies must on leaving school also pay some attention to letters. It would be no hardship to engineering students, for example, to require them to devote some time to literary study. But the literary side must recollect that the argument applies equally to them—that some amount of "practical" study must be required of them.

training as on his special literary ability. It cannot be denied that the literary class are in serious want of subject matter : this can only be supplied from sources which are at present closed to them through their ignorance of the laws and phenomena of Nature and their inability to appreciate the labours of scientific workers. In all careers the preliminary qualification of most worth is general intelligence.

Arguments such as these favour the conclusion that in schools generally both literary and practical studies should at all times receive adequate treatment and that specialisation should as far as possible be avoided. The differences that should be allowed to arise between different types of school should be differences in the character of the work done within either of the two main branches—in the character of the reading or in the choice of subject matter for the experimental studies.

It is clear that, in the case of those preparing for commercial professions, modern languages will be relatively far more important than classical ; whilst the study of classical languages will be of special value to those preparing for literary professions. Neither of these classes of scholar will derive special advantage from the study of mathematics : this subject, however, is one to which special attention should be paid by all who contemplate adopting a profession of which physical science is the basis, such as engineering. It is of the utmost importance, on the other hand, that those who are to adopt a medical or scientific career should have had thorough training in experimenting and observing from the earliest years onwards. Failure to cultivate these habits in early years can never be fully repaired even in the case of the genius ; in ordinary cases the neglect is fatal.

8.—THE DOMESTIC PROFESSION.

If there be one profession on behalf of which it is desirable to plead that special attention should be given to the requirements of later life in organising the school curriculum, it is the domestic profession. Surely, women are not as men. Let us face this question, in this section, without prejudice but without hesitation. When I consider what my own children have done at school, what girls generally are doing, I am in despair—the training is so hopelessly unpractical, so academic, so narrow in its outlook. There is so little insight and originality displayed by women in diagnosing and providing for women's requirements ; female educators are so obstinate and difficult to persuade, so limited in their conceptions. It is a very serious outlook for the country that the higher education of women is almost entirely in the hands of those who have been trained in schools where academic views prevail almost exclusively. The very fact that women have only asked that they should be allowed to do as men do, to have what men have, is proof that they have failed to understand the position they hold. We cannot all do alike, we must share the work of the world between us. I was horrified, a few years ago, when in San Francisco, to find that, whilst the women had displaced the men from office employment, the household work was in the hands of Chinese men. This process is going on everywhere at present : in this country we shall be forced soon to train our boys to domestic service. Surely, if this be the result of the higher education of women, we must have got hold of the wrong end of the stick somewhere.

9.—AIMS OF SCIENTIFIC INSTRUCTION.

As to the treatment to be accorded in the several types of school, to the several branches of instruction, confining my remarks to the practical work, I will refer only to one point—to the character of the work done in order to give training in scientific method.

In the first place, it is essential that whatever be done should

be done thoroughly: the object in view is to teach method; it is not primarily a question of results. The requirements of examining bodies of the present irrational type must be resolutely set aside.

The various branches of science are not of equivalent value as educational instruments. Physics and chemistry are the foundations, as it were, of scientific belief; they underlie all natural phenomena, all vital changes. But although it is necessary, before attempting in any way to consider the nature of the processes which attend life, to understand the fundamental principles of physics and chemistry, there is no reason why the biological sciences should not receive attention at a very early stage. In physics and chemistry experiments can be made in a way and with a degree of completeness which is impossible in the case of the biological sciences; the latter, however, afford unrivalled opportunity of cultivating observational power. But in future the object of schools will be to give their scholars a broad outlook over Nature; to create interest in all that goes on around them.

Education has too long been cabined and cribbed in every direction: while advocating culture its high priests have pursued a narrow if not a selfish policy. Let it be our privilege to take our pupils out into the world, there to seek counsellors that may feelingly persuade them what they are; that like the exiled Duke in the forest of Arden they may find:—

"Tongues in trees, books in the babbling brooks,
Sermons in stones, and "—above all—" good in everything."

Then shall they find a true religion.

By Miss S. A. BURSTALL, B.A.

Headmistress of the Manchester High School for Girls.

(Abstract.)

I.—INTRODUCTION.

BROAD curriculum advocated rather than a narrow specialised curriculum. Reasons:

- (a) Actual acquisition of knowledge.
- (b) Training of the mind; different subjects train different faculties.
- (c) Development of the child; subjects should be suited to the child's age.

2.—GENERAL CHARACTER.

(a) *Primary schools* (1 and 2).¹—Practical instruction more important than literary; things, not words, interest the child, and nature rather than man.

(2b) Manual and physical training should occupy half the school hours during early years. Nature-study should be the central subject of curriculum, reading correlated with it.

(2b and 5) Modelling, drawing, and brushwork should come early; writing later. Arithmetic must be concrete; easy examples of all rules.

(2a and 5) Literary instruction—poetry and history stories, literature. Geography, meeting-place of *a* and *b*, is essentially a study of the primary school, and should be studied thoroughly from the earliest stages. Grammar—the least possible.

(Question of a foreign language; this brings up types of primary schools.

3.—TYPES OF SCHOOLS.

(4) For those leaving school at fourteen, the public elementary school (E.)

For those leaving school at sixteen, seventeen or eighteen, the preparatory, or junior school section, of a secondary school (P.)

Schools of type (E), no foreign language. Much English;

literature and history. Suitable history book needed. Existing curriculum of English public elementary schools bad, and needs reform; work for new education authorities. Excellence of curriculum in American and German schools of the people. Should a foreign language be taught in these schools during the last year? Yes, in the higher primary school. American custom of a year's Latin. Foreign language in England should be French.

In schools of type (P.) a foreign language should be taught. Important to note change at ten years of age.

(1 and 4) Opinion of the late Prof. Withers that junior-school method and curriculum should not remain the same throughout. What should change be?

Suggested answer, after ten years of age. Differences.

(3 and 4) A.—Less manual work and nature-study.

B.—More formal abstract instruction, arithmetic, grammar, spelling, lists of names, dates, &c., in geography and history.

C.—Carpentry or sewing proper begin.

Problem, should the foreign language begin here? Some say the second modern language should, some say Latin. Manchester High School plan, French at six, Latin at twelve for clever children.

(b. 4) True secondary education begins at twelve to thirteen.

(3) Its characteristics:—

(a) Literary education now predominates.

(b) Science proper and mathematics begin.

(γ) Smaller proportion of time to manual and physical training; afternoon subjects.

Suggested division of time; one third science and mathematics, one third languages, one third humanities in English (see table p. 7).

(4) Divergence of different types of schools and pupils.

I.—*Boys and girls*; marked difference in years twelve to sixteen; girls need care during this period, and cannot work hard and continuously without injury to present or future well-being.

II.—*Leaving age*, sixteen or seventeen, eighteen, nineteen. The middle or second-grade school, or section of a school; importance of recognising this.

4.—COMMERCIAL PROFESSIONS.

(4 and 5) Boys leaving about sixteen can learn two modern languages well, some Latin, good arithmetic, geography; general literary and scientific training; and possibly some technical subject like shorthand in the last two years.

Girls can do this by seventeen or eighteen. Zurich Girls' High School.

5.—ENGINEERING AND APPLIED SCIENCE PROFESSIONS.

(4 and 5) Should a boy entering these leave at fifteen or sixteen? Not if he is to be a "captain of industry"; but many must do so. They can learn mathematics, drawing, science; acquire a reading knowledge of French and German, but no Latin. General English literary training essential.

6.—DOMESTIC PROFESSIONS.

(4 and 5) In some schools the girl who is going home to be with her mother is not enough considered. She must have a *literary education*, with history and modern languages, practical science, and a housewifery course in the last year. Housewifery course may mean half time to technical subjects, cookery, needlework, domestic economy and laundry. Can the management of children be taught?

Such a girl cannot learn Latin and mathematics if she leaves at sixteen. Zurich curriculum.

Existing higher grade and science schools hitherto unsuitable to girls; too much physical science and mathematics.

¹ References in brackets are to the questions suggested in the Official Circular (see p. 1 Supplement).

7.—LITERARY PROFESSIONS.

(4 and 5) Pupils leave at eighteen. Curriculum for boys and girls similar. Importance of classical studies ; some one science should be kept up if possible. The future primary school teacher ; Swiss and American plan.

Specialisation allowed at fifteen or sixteen, *e.g.*, girls begin Greek, or trigonometry, or German, or chemistry, or secretarial work.

8.—SUBJECTS FOR SCHOOLS OF DIFFERENT TYPES.

(5) Subjects in different types of schools stated above. Some broad principles.

An *outline* course, with typical examples accurately known and properly understood, does not mean superficiality.

Organisation.—Different courses.—Classical, scientific, commercial, &c., overlapping in some subjects of general education, may be given in different parts of the same school. This plan works very well in large schools, *cf.* America. Or a particular school may give one or two courses only ; *e.g.*, a small school may refuse to specialise in classics or in science, or any school may fix a rigid curriculum and appeal to one type of pupil only, like the American manual training high school.

Local differences and local conditions and needs make variety essential. Freedom vital in education.

I. Age 12-13.	II. 13-14.	III. 14-15.	IV. 15-16.	V. 16-17.	VI. 17-18.
HUMANITIES.					
History ... } Geography ... } Literature ... } English, &c. } 8	Same as I. ... 8	Ancient History ... } English History ... } Geography ... } Literature, &c. ... } 8	General European and English History, Geo- graphy, Literature, &c. (4 periods com- pulsory, 4 optional.)	English Literature and History ... 4 Mathematics, Algebra and Geometry ... 4 One foreign language 4 (All compulsory.)	
LANGUAGES.					
French, German } or Latin ... } 8	Same as I. ... 8	Same as I. ... 8	Latin 4 German 4 French 3 Greek 4 (Only one compulsory.)	Specialisation in Languages.	
SCIENCE.					
Arithmetic ... } Elementary } Geometry ... } Elementary } Physics ... } 8	Arithmetic ... } Geometry and } Algebra ... } Nature Study ... } 8	Mathematics ... 8 Physics 8 Nature Study (alter- nate with some En- glish Study) ... 2	Mathematics ... 5 (Compulsory.) Physics, Chemistry, Botany, &c. (One compulsory, rest optional.)	Specialisation in Science and Mathe- matics.	

The figures denote minimum number of lessons per week. Physical training and one branch of hand-work compulsory throughout. English composition included in the Humanities section.

(a) *English* should be a compulsory study throughout in every type of school ; this should centre round *history* in the later years.

(b) *Correlation of subjects* must be arranged, *e.g.*, history, geography, literature ; or physics, mathematics, manual training ; natural history, geography, brushwork. Again foreign textbooks may be used, *e.g.*, a French universal history, a German geometry, &c.

(c) Good teachers ; modern methods ; unity and coördination of different types of schools, must be assumed.

(d) Few subjects should be learnt at one time.

(a) In regard to *Literary subjects.*—

History.—Some universal history should be taught in schools where pupils remain to eighteen.

Languages.—French and Latin ; or French and German. All three for pupils on the literary side remaining till eighteen. Greek for a few only ; study the life of the foreign nation, not mere linguistic machinery.

(b) *Practical subjects.*—Science not to be the centre of secondary school curriculum ; too much often taught, especially to girls. Biological science valuable. Manual training should be continued throughout ; one branch should be compulsory in university matriculation examinations, just as mathematics is.

9.—CONCLUSION.

Limitation of material to be learnt essential ; masses of detail not necessary for thoroughness, *e.g.*, anomalous forms in Latin grammar, the less important metals in chemistry, details of battles and campaigns in history.

By G. F. DANIELL, B.Sc.

Chairman of the Education Committee of the Teachers' Guild.

I.—CURRICULUM INQUIRY BY THE TEACHERS' GUILD.

WHEN I received the honour of an invitation to read a paper on Curricula to this Section, I felt that the most useful response would be the submission to you of a summary of the conclusions to which the numerous meetings of the London Sections and Provincial and Colonial Branches of the Teachers' Guild have arrived.

In the spring of 1902, Canon Lyttelton suggested that it would be both interesting and valuable to obtain and collate the views of teachers on the subjects essential to an ideal curriculum, and on the order in which they should be taken (*e.g.*, should Latin be begun before French, or *vice versa*?). The idea developed, and during the autumn of 1902 and the spring of 1903 a series of meetings was held, altogether about thirty in number, and reports have been received at the Guild headquarters. So far as I am aware, the summary which it is my privilege to present to you as a representative of the Guild is without parallel in this country as an expression of the carefully debated, collective opinion on purely educational problems of a large body of practical teachers.

SCOPE OF THE INQUIRY.

Referring to the scheme wisely devised by your organising Committee for this discussion, I must draw a distinction between

primary education of those who will usually leave school at age 13 or 14 (elementary schools) and the work of the preparatory schools, whose pupils enter secondary schools, where they will remain until 17 or even 19. The Teachers' Guild, alike by constitution and membership, aims at coördinating all branches of education, and is as deeply concerned with curricula for elementary as for secondary schools. We deliberately confined ourselves in the first instance to the problems presented by secondary school curricula, and propose to deal with the simpler but quite as important question of primary—or rather elementary—school curricula within the next twelve months. Next January, we hope to hold a Conference in London to discuss, *inter alia*, to what extent should the education in one type of school be a preparation for the school above it. Further, one of our Branches in the North of England, where elementary teachers are strongly represented, is under invitation to draft questions on Curricula for Elementary Schools, and to lead a discussion thereon.

2.—CLASSIFICATION OF RESULTS.

I have classified the returns with reference to secondary (including preparatory) schools as follows :—

Part I. contains the conclusions with regard to which there is practical agreement. To this part I attach very great weight, as it contains an unexampled statement of opinions expressed with remarkable unanimity by experienced teachers of both sexes in various districts of the British Isles and in South Australia. May I not reasonably hope that this return will prove of value to this meeting, and that it will worthily receive the attention of the Education Committees responsible for higher education throughout England?

Part II. will suggest topics especially suited for debate.

Part III. contains suggestions, some of which may prove to be of considerable value, but the Guild as a body is not responsible for the opinions therein expressed.

3.—ESSENTIAL SUBJECTS.

Part I.—I gather from reports kindly furnished by officers of eleven Branches and six London Sections that there is practical unanimity as to the following :—

The curriculum should include—

- (1) Religious instruction.
- (2) English (attention being given to oral as well as to written composition).
- (3) French.
- (4) Latin (two London Sections and the Guernsey Branch made this optional).
- (5) History.
- (6) Geography.
- (7) Arithmetic.
- (8) Algebra, begun informally as generalised arithmetic.
- (9) Geometry, formal study should be preceded by lessons in form and measurement.
- (10) Science, which should begin with object lessons or nature study, and become formal at about the age of thirteen.
- (11) Handwork, including sewing for girls.
- (12) Drawing.
- (13) Physical exercises (some include swimming).
- (14) Class singing.

It was further agreed (1) That French should be begun before Latin.

(2) The ordinary curriculum for boys and girls leaving school at sixteen and seventeen should not include Greek.

(3) Specialisation should not be allowed until the general development of the pupil is secured, usually not before sixteen.

4.—UNDECIDED QUESTIONS.

Part II.—There was a conflict of opinion as to the following :—

(1) Whether German should be compulsory; the majority made this optional.

(2) Whether English grammar should be treated as a separate subject; majority affirmative.

(3) Whether language and literature should be taught separately (*i.e.*, separated on the time-table); majority affirmative.

(4) Whether separate lessons on civics should be given or whether this should be taught through history; majority for the latter.

(5) What should be the age for beginning laboratory work; thirteen was the favourite age.

(6) Whether the use of Euclid's Elements should be retained; majority for retention.

(7) Whether instrumental music and shorthand should form part of the ordinary curriculum.

5.—SUGGESTIVE OPINIONS.

Part III.—The following opinions were expressed by one or more Branches or Sections :—

(1) That no subject should be included in the curriculum to which a definite minimum of time could not be allotted.

(2) That each subject included should be carried through to the fullest extent possible in the school.

(3) That dancing and hygiene should be taught in schools.

(4) That domestic science should be taught in girls' schools, including household book-keeping.

(5) That handwork should not take the form of Sloyd.

(6) That boys should be taught shooting.

(7) That scholars leaving at sixteen or seventeen years of age for a scientific career may substitute extra practical science for Latin.

(8) That history should be correlated with literature and geography with elementary archæology.

(9) That the history and appreciation of art should be taught, to include styles of architecture, sculpture, painting, and the lives of great artists.

(10) That botany is the most convenient subject for the study of natural history; objects should be compared, drawn, and described.

(11) That laboratory work should be begun whenever science work is begun.

6.—EARLY SPECIALISATION UNDESIRABLE.

It will be seen that questions 1, 2, and the first part of 5 propounded by your Organising Committee are answered in a straightforward manner. With reference to questions 3 and 4 of your Committee's scheme, it can hardly have escaped notice that we are emphatically against too early specialisation. We do not, and will not, encourage the formation of different types of schools in which young boys or girls are to be prematurely directed into a groove leading to commercial, domestic, applied science or literary "professions." In our opinion it is undesirable that our boys and girls, or even our young men and maidens, should associate only with those who are to follow similar callings to those to which they are themselves destined. We consider it essential, not only for higher reasons, but for commercial efficiency viewed from the national standpoint, that a proper all-round training and discipline, a broad basis of general knowledge, habits of inquiry and discrimination, and a cultivated intelligence, should be a possible attainment for every earnest boy or girl. The requirements of specialisation will best be met by allowing talented pupils to devote the

greater part of their time during the last year—or at most two years—of school-life to their particular subject of study. Those specialising in literary subjects should continue to work for a few hours each week at, say, one practical subject, and *vice versa*. The latter part of question 5, as it deals with method, opens so vast a field that I have not space to deal adequately with the important issues raised. I ought, however, to say this at least, that the carefully prepared returns received from Branches of the Guild afford the clearest evidence that teachers of quite young children attach, and rightly, the greatest importance to method.

7.—PRACTICAL IMPORTANCE OF EXCHANGE OF VIEWS ON CURRICULA.

I wish to state my conviction that curriculum discussions are of much utility. They help the teacher in the practice of his craft without detriment to his individuality. In this connection I venture to quote the first recommendation contained in the Report of the Education Committee to the Council of the Guild.

That any attempt to formulate a rigid Code is undesirable, and that consequently discussions on curricula should be periodically promoted in order that :—

(1) Interest in such problems may be maintained, and individual experiences and methods be made common property.

(2) Teachers isolated by distance or otherwise may be kept in touch with recent improvements.

(3) Teachers, particularly specialists, may acquire knowledge of, and sympathy with, the work of colleagues in subjects other than those in which they are specially occupied.

(4) Specialists may receive useful criticisms from colleagues who may be regarded with reference to their special subject as "intelligent outsiders."

(5) The claims of new subjects to admission to the curriculum may be demonstrated to the non-specialist.

(6) Suggestions may be afforded as to what subjects can be omitted from an overcrowded time-table in order to avert the peril of "shallowness."

In conclusion, may I presume to assert that the British Association can bring to bear on curricula problems an extra-pedagogic influence of a freshening character, and of a width transcending the limits of any existing organisation in England? I hope this section will, by its action in this matter, encourage Teachers' Associations in the pursuit of educational science.

By W. C. FLETCHER, M.A.
Headmaster of Liverpool Institute.

1.—DIFFICULTY OF DEFINING GENERAL PRINCIPLES.

THE whole question of curricula is emphatically one as to which it is not safe to be dogmatic, or even severely logical. Logic is excellent when premisses are secure; but in this subject little is secure. Especially is this the case in England where we are only entering on a period of fresh life and development, and where experiments have been neither organised nor well considered; where also their results are still incomplete, and often unknown even to those who have been making them. Nor does foreign experience help very much. Conditions are widely different. It is not easy to allow for differences of aim and of national ideals. What is success from one point of view is failure from another. A method that has a measure of success under one set of conditions may prove worthless under others. It is not denied that there may be—to some degree already is—a science of education. But as in all sciences in which human nature is con-

cerned, its data are often doubtful, its occupation of the field incomplete, hence its doctrines disputable, and to be enforced only with great caution and self-restraint. It should not then be forgotten that in discussion of curricula—still more, of course, in their enforcement—conclusions must not be sharply defined, and that behind any curriculum lies a much more important matter—the personality of the teacher.

2.—KNOWLEDGE FOR ITS OWN SAKE.

A further statement of principle—or rather negation of principle—should be made. Utility is no guide. Not that utility is objectionable as extremists have urged, but that it is unattainable. Of no conceivable subject in a school curriculum other than reading, writing, and the bare elements of arithmetic, can it truly be asserted that it will be "useful" to all, or even to any considerable fraction of the whole number of children. To nine boys out of ten, French or German will probably be as useless as Latin. Geography should be immensely interesting to a boy, but whether it will ever prove of any financial value to him is much a matter of chance. Knowledge is of infinite value to the race—and the more widely distributed knowledge is, the more certain is it to prove its value. But of 100 men possessing a certain body of knowledge, only one may get an opportunity of turning it to account—just as of 100 research chemists only one may make a discovery which repays the cost of his training and maintenance.

Where much is uncertain, utility if obtainable would be a serviceable guide, but in fact it cannot be had, and whether we will or no, we are thrown back on to training for training's sake, and subject matter has to be judged in the main by its suitability in this respect.

3.—FACULTIES TO BE DEVELOPED.

After the bare elements, the absence of which distinguishes the legal "illiterate" from the rest of the community, the essentials to be secured, if possible, are:—(1) the power of accurately following thought properly expressed; (2) the power of thinking accurately oneself; and (3)—which can perhaps hardly be separated from (2)—the power of accurately expressing one's own thought. This is what we mean by mind training. Education does—or should—include also the discipline and development of the emotions and judgments, æsthetic and moral, as well as merely intellectual.

These two sides of education—disciplinary and æsthetic they may perhaps be called for shortness—constantly overlap, but they must both be kept in mind if a curriculum at all tolerable is to be secured.

4.—CONTINUOUS AND "FINISHING" COURSES.

To come to the specific questions suggested for consideration. Here I speak chiefly of secondary schools, particularly of second grade schools—those, that is, where boys mostly leave at 16 or 17. Such a school has probably to deal with two different sets of boys—(1) those entering the school itself quite young, straight from home, a kindergarten or a school for little children; (2) those coming at 12, 13 and 14 from Primary Schools, these again consisting of two widely different classes of boys: (a) picked boys coming with scholarships; (b) boys whose parents consider that a year's finishing at a higher school will be of service, or who have found out—often too late—that the work the boy is doing is meagre and unsatisfactory. So long as these three classes exist curricula must be adapted to local conditions, and will vary according as one or other of the three classes predominate. On the other hand, the nature of

the curriculum laid down as the ideal, or enforced in a particular case, will react either directly or indirectly through administrative arrangements, on the entries.

5.—UNIFORMITY OF CURRICULUM DESIRABLE IN LOWER AND MIDDLE FORMS.

Whatever differences exist between school and school, it is, in my opinion, desirable that (in the lower and middle classes at least) all should follow the same curriculum. Here, I believe, the advantages of uniformity outweigh those of variety. Certainly the burden of proof lies on those who desire variety. The practical convenience and economy of uniformity are considerable. It checks any tendency towards undue parental interference, and trains the spirit which says "I don't like this subject—I'll do something else." If it be urged that one boy does better at one subject, another at another, it is to be answered—(1) no one knows what he can do till he tries, and the chance of escape often means that he won't try; (2) the curriculum can be wide enough to embrace every boy's best subjects, and it is not good for him (at an early stage) to confine himself to those and neglect things he does not take to so readily. While as to the boy who is said to be a hopeless duffer at one subject and good at others, I don't believe in his existence. Boys differ in relative capacity for certain subjects of course, but a boy who can make anything out of one can do so out of another, unless he is mis-handled.

A common curriculum is a powerful factor in that community of interest and feeling which should be maintained as far as possible, and whose maintenance is especially difficult under the conditions of city school life. No considerations of utility, which at best are uncertain and probably delusive, seem to me sufficient to outweigh this vital consideration, and I conclude that provided a curriculum is wide enough to include most boys' special interests, and the general obvious practical needs, it should not be altered to suit the idiosyncrasies of individual boys, nor the wishes of their parents. This does not, of course, apply to the top form of a school, where a considerable amount of variety and specialisation can, and should, be permitted.

6.—PLACE OF MANUAL WORK.

Manual work, *i.e.*, work in clay, wood, metal, &c., does sometimes give the needed chance of interest and success to a boy who in ordinary school subjects is a "hopeless duffer." This alone would justify its inclusion in one form or another in all curricula, but it does not need this justification. I can conceive no boy who is not better for it in itself; it gives valuable assistance in making arithmetic and drawing more real and intelligible; some forms of it demonstrate as nothing else does the difference between accurate and inaccurate work, hence have a considerable moral value; it interests most boys, so making them more favourably disposed to school work as a whole, no small advantage; if in even a few cases a boy "finds himself" and becomes a skilled mechanic instead of a clerk, it has a practical utility which few subjects can claim. The only objection which can be urged with any reason is that it is an additional burden upon a time table already overcrowded. To this it may be answered that the change of work and fresh interest aroused give boys a stimulus which at least in part compensates for apparent loss of time in some other subject. Further, that its value is so high that it is properly a "first change" on a time table, and that we must revise if necessary our estimate of the relative importance of other things. I would add, however, that its importance is greatest in the lower and middle classes, where boys' stock of experience of concrete fact is small, their interest in speculative and abstract thought weak, and where,

therefore, time may with advantage be spared for "outside things." In the top classes, where boys' minds, their reasoning powers, and intellectual interests are developed and where they have a sufficient body of practical experience to prevent words being empty symbols, manual work, except as a relaxation, is unimportant, unless it is to be carried on to a high development, and this becomes craft work, not school work.

7.—THE DISCIPLINE OF SCIENTIFIC STUDIES.

Natural science does not seem to come under the head of practical instruction in at all the same sense as manual work.

It is true that actual handling and examination of things, actual construction and measurement is an essential part of it, but it is not the whole, nor, as every teacher knows, the most difficult part. Exact statement of what is observed, coördination of new experience with old, the disentanglement of the essential from the accidental, the building up by reflection and discussion of a coherent body of truth, demand clearness of thought and, what can seldom if ever be divorced from that, clearness of expression. These requirements make natural science properly handled an admirable discipline, but it is a discipline which has quite as much in common with the discipline of mathematics and literary subjects as with that of manual work. But further it should be added that the influence of natural science teaching has reacted most favourably on the older subjects. Anyone with the scientific habit of mind will approach the teaching of, say, Latin in a way very different from the traditional method. He will lay much more stress on observation and reason and enquiry than on dogma.

8.—THE GENERAL CURRICULUM.

Manual instruction then in one form or other should be carried on in the lower and middle classes, natural science in the middle and upper, not excluding, of course, simple observational science, even among the youngest boys if conditions permit, and literary subjects throughout.

As to the latter, they will include, beside mathematics, history, geography and literature with languages. In my opinion, if adequate attention is to be given to other essentials, not more than two languages should be attempted except by boys in the upper forms specialising in this direction. Unless nursery methods are used there is, I think, no advantage in beginning even one language earlier than 10 or 11 (for the average boy) and he should have at least a year at this before he begins the second. The fact that deferring languages makes it easier to incorporate boys coming from the upper standards of primary schools is an important additional advantage. This general curriculum should be carried right through the school except into the highest form. That is to say, up to about 16 boys should be kept together; if by this time they have a competent elementary knowledge of the subjects indicated, they may with advantage if they stay longer at school be allowed to concentrate on subjects which more especially interest them, whether for professional or purely scientific purposes. Earlier specialisation has, I believe, no advantages. One last point though one of detail I should like to urge: nearly all our subjects are disciplinary. There is the less need to make those subjects which have an obvious æsthetic and emotional value disciplinary also. Great freedom of treatment should, therefore, be allowed to teachers in literature—scripture especially if it is taken—and, in the lower classes, history. Provision should, of course, be made for the inclusion of these subjects, but they should not, by being made compulsory subjects of external examination, be put in danger of being robbed of their highest value.

By T. E. PAGE, M.A.,
Assistant-master at Charterhouse.

I.—THE MEANING OF "EDUCATION."

"EDUCATION" is a word of such large scope and ambiguous meaning that it seems idle to discuss any question with regard to it until its true sense is, at least partially, determined.

It may describe either the training and development of human faculty or the imparting of positive information in various departments of human knowledge. Often, doubtless, the two processes appear absolutely one, for they constantly go on side by side (all mental training bringing with it some acquisition of knowledge, and all acquisition of knowledge helping to form the mind), but they also need to be sharply distinguished. The whole character of education will vary according as it aims at storing the mind with a certain amount of useful facts or at shaping and strengthening its powers. The object of the one method is the attainment of definite results in the present; the object of the other larger but more indefinite possibilities in the future. The one asks of every study, "What is it good for?" The other, "What will it make the future man good for?" A boy educated on the one system may leave school possessed of certain acquirements which have an immediate market value, while a boy educated on the other may know almost nothing that is practically useful and yet possess a capacity so trained as to be fitted for the hardest and highest work. No doubt, the struggle for existence forces upon most a large surrender of higher aims to lower and immediate needs, but the ideal remains none the less the true standard of endeavour. Not stunted attainment, but fitness for continued progress is the proper product of education. It must indeed often stoop below the dignity of its high mission to become the servant of commerce and a provider of daily bread, but it is only by keeping its loftier aim steadily in view, even under the lowliest conditions, that it will ever win the best, or even the most profitable, results. The study of ready reckoners or books on "Commercial German" in which there is not a single word worth reading can never make men, while to speak of such study as "education" is to prostitute an honourable word.

2.—THE SCOPE OF EDUCATION.

Education may deal with (1) moral and religious, (2) intellectual, (3) physical, and (4) technical training.

The first of these divisions may here be put aside. The spirit of morality and religion is, like a pure and invigorating atmosphere, essential to healthy educational life, but it evades inclusion in a curriculum. In so far as it can become a part of schoolwork, moral and religious teaching passes into division (2), being closely connected with "Literary Instruction," so that, when it is asked [Question 2a] "whether training should in all cases necessarily include" such instruction, one strong proof that it must do so is that the historical and intellectual side of morals and religion cannot otherwise be dealt with. And, assuredly, there is no fairer or fuller field for either literary or historical study than is to be found in the Bible. The old question, *Putasne, intelligis quæ legis?* still demands but too often does not receive an answer. To learn, with regard to that goodly company of writers who have left to us the rich library of Scripture, what manner of men they were, how and in what surroundings they wrote, and exactly what they had to teach—this study ought to have a first place in any plan of school work. Only there should be no misunderstanding. Time devoted to this subject must be devoted to a real examination of what the Bible is and says, not to the eccentricities of Hellenistic Greek or trivial lists of obscure Israelite kings. As for summaries of

Old Testament history, manuals of doctrine and the like, they for the most part stand in no connection with either education or religion.

As to division (3) it may safely be said that "physical training" is not a necessary part of a school curriculum. Whatever its importance in primary schools, in secondary schools, and especially the higher ones, such training is fully, perhaps too fully, secured by a great variety of games which, in addition to their physical effect, help to develop nerve, readiness, resource and other qualities in a way which no formal course of drill or gymnastics can equal. The Roman writers frequently dwell on the value of active outdoor sports in producing a robust hardness, capable of standing rough wear and tear, while they speak with contempt of the merely muscular strength developed in the gymnasium, and on such a point the Romans were good judges.

With regard to "manual training," doubtless the payment of manual skill is steadily increasing, while that of the lower forms of "headwork" is steadily decreasing; a good mechanic is more secure of good pay than an average clerk or a moderate schoolmaster; and the old saying of the Rabbis, "he that teacheth not his son a trade teacheth him to be a thief," has nowadays real point. It must be remembered, however, that on the whole pupils in secondary schools are not meant to earn their living with their hands, so that it is unwise to encourage them to take up that manual work which is in youth usually more attractive than mental effort. To use their hands well is to most boys an easy task, and to wrestle with any mental difficulty a very hard one. To lead them, therefore, into a belief that deft handling of compasses, drawing-pencil or turning-lathe is a real part of education is to lure them into the easy path they are too ready to follow, which keeps closely to the lower levels of life.

Technical training (4) has nothing to do with education proper. In special cases it may be advisable to admit it, but it has no place in any *general* curriculum.

3.—THE THREE NECESSARY ELEMENTS OF EDUCATION.

If the right meaning has been now given to "education," and the field of its exercise been rightly limited, it follows that it consists in such *intellectual* training as will produce the best general capacity, and such training falls into certain necessary divisions. Man possesses in an eminent and unique degree the two gifts of speech and reason, both these powers being closely linked together; while, as he lives in a material environment, a knowledge of which is essential to his well-being, and which continually affects the mind through the impressions of sense, he is ceaselessly urged to that study of nature which is called "science." Possibly the cultivation of memory deserves to be treated as a separate division of education—and the subject certainly deserves special study—but, as its use and exercise is developed by all teaching, we may, perhaps, eliminate it in tracing the necessary divisions of any course of study, and say that there are three, and three only:—(1) Literature; (2) Mathematics; and (3) Science.

4.—ALL THREE ELEMENTS MUST BE COMBINED.

It is on the proper combination of these three that the success of any curriculum must depend. But there must be *combination*, for assuredly education at its best is the equal and harmonious development of all the faculties, not an effort to force abnormal growth in any one, just as physical training is a training of the whole body, and not of any part, though, of course it often "pays" to develop extraordinary excellence in a single direction. Specialisation—the concentration of all power on a single object—is forced on men, when their education is over, by the ever-increasing competition of modern life

and the enormous growth of knowledge and technical skill which drives those who would succeed into a single groove; but the very fact that specialisation and an elaborate division of labour is becoming more necessary in the actual work of life renders it the more imperative that in the period of preparation for that work, in the period of growth, there should be the utmost possible breadth and freedom. [Question 3.] There are no doubt many boys who have considerable incapacity for most lines of study, combined with marked capacity for some single pursuit, and such cases need tender handling, but in the vast majority of cases premature specialisation should be distinctly discouraged as fatally checking mental growth, and above all, as fostering that weakness of mind and character which must result from always "taking the line of least resistance," from always pursuing what is easy and pleasant, while shirking all that is hard or uncongenial. That a lad with some literary tastes should refuse to do sums or shut his eyes to the results of science is irrational, and will in the end only produce literary feebleness, while the scientific boy who ignores literature may well remember how many masters of his own pursuit have set him a very different example, and that, in spite of Darwin's famous confession, "atrophy" of any portion of the brain is not a disease from which they have commonly suffered. Speaking for myself, with thirty years' experience in a public school, I can only deplore the policy of the great Universities, which by refusing all reward to general excellence in several pursuits forces most boys of promise, often two or three years before they leave school, into one single and often very narrow path of study. Nor is it a less deplorable result of this policy that the men they send out to become teachers are almost always men of one pursuit. It is not a good thing that the classical and mathematical, the foreign language and science masters in a school should be mutually incapable of understanding each others' merits, and should secretly cherish or openly avow the maxim *omne ignotum pro inuitili*. What is the use of a good curriculum in such circumstances? The best plan of operations will fail if the officers who have to put it into execution are out of touch with one another.

5.—THE POSITION OF SCIENCE.

The curriculum in most secondary schools was until recently (1) Literary and (2) Mathematical, such subjects as history and geography (the latter with far too large an addition of mere map-making) being somehow tacked on to the literary part of the work. Lately, however, science, long treated in schools as a sort of Cinderella, has shown a tendency to play the part of an imperious queen. "In the smaller grammar schools," says Sir W. Anson,¹ "I am told they have practically abandoned Greek, that they have almost abandoned Latin, and that geography, history and literature are either neglected or untaught," while "everything has trended in the direction of a scientific education," and a more disquieting statement could not be made. For whatever marvels science has achieved, it has not yet shown that it is the best instrument of mental training, so that on this subject even Mr. Balfour² passes from philosophic doubt to almost positive disbelief. Indeed, "science" is a most delusive word, the potency of which largely depends on the vagueness with which it is used. "Science shook the thrones of heaven and earth," cries Shelley, and "Let science grow from more to more" is the prayer of Tennyson, while such phrases as "the marvels of science," "the achievements of science," "a scientific age," are on every lip. But as a thing which can be taught "science" does not exist. You can teach physics, physiology, biology, botany, or chemistry, and each of these subjects has a different educational value, but

perhaps none of them can be called essential to education. Their material importance, their marvels, their fascination—these are neither questionable nor questioned, but their value as instruments of education may be disputed. About the value, on the other hand, of mathematics there can be no doubt: experience has demonstrated their power to strengthen and invigorate the mind; *μηδὲς ἀγεωμέτρητος εἰσὶν* is still written large over the door of knowledge. For others, too, less capable of abstract thought, study of the laws of language and the effort fully to understand and appreciate the great thoughts of great men is a discipline that has stood the test of time. But the value of the study, say, of botany, of electricity, or of geology, as a means of training is, as yet, to say the least, "not proven." Primarily, most of the sciences rest on the basis of an enormous accumulation of observed facts, and it is *after* the facts have been accumulated that reason, intelligence and imagination begin to find in them a field for exercise. But the young learner begins with no facts and at best only amasses a few, so that a science which becomes highly stimulating to the mind when pursued far may be exactly the reverse at its commencement. Where scientific studies have an educational value is in the power of accurate observation which they encourage, and in the continual demand they make that every statement should be promptly tested by experiment. There is no better complement and corrective to linguistic and mathematical study than to bring the student from words and ideas into close contact with facts by actual experimental work (mere book study seems of little value) in some branch or branches of science, while, if such a thing be feasible, it is certainly desirable that no one should leave school without having acquired some knowledge of the large outlines and broad principles of the chief sciences. What is to be deprecated is that the teaching of science should assume too large a place in education, owing to a vague opinion that, because science is of the highest practical value, it therefore affords the best training for practical life.

6.—PROFESSIONAL TRAINING UNDESIRABLE IN SCHOOLS.

If the remarks already made have any truth, the "broad" character of the curriculum in secondary schools has been sufficiently indicated, nor does it seem that it should suffer material alteration so as to be accommodated to the various "types" of schools suggested for consideration. [Question 4]. Indeed, these "types" of schools seem to be unreal. How can a school be set apart for "commercial professions" so as to exclude boys preparing for "domestic professions" or for some branch of "engineering"? And what is common to all "commercial professions" so that a "type of school" can be adapted to them? Or what is a "literary profession"? Does it prepare lawyers, or writers, or journalists, or clergymen? Or, if it prepares them all, what is the "type" of education that exactly suits them all? Is it not a fact that this assumption of "types" of education springs from a belief that it is advantageous (1) to narrow education to a special end, and (2) to eliminate all that is "useless" or "unpractical"? Yet, assuredly, (1) education implies not limitation, but free, large, many-sided development. Its object is not to swathe, bandage, and manipulate the mind until, like an infant among the Indian Flatheads, it assumes some "typical" form, but to give it at least some chance of natural growth. And (2) the "useful" and the "practical" may be the *end* of education (though this is to exclude art, beauty, and poetry from its purview), but they do not even so become the best *means* to secure that end. The study, for instance, of Greek is "useless," and it would be idle to seek anything practically "useful" in Plato and St. Paul, but those who have learned even partially to understand such writers are better trained even for the merchant's office than those who have

¹ *The Times*, July 10th, 1903.

² *The Times*, July 11th, 1903.

studied such "useful" things as commercial German¹ and colloquial French.² Similarly theoretical geometry is more really serviceable in education than drawing figures to scale,³ and shewing by measurement that the angles at the base of an isosceles triangle are equal, while proficiency in algebra is better than skill in book-keeping.

7.—CURRICULUM AFFECTED BY LEAVING AGES OF PUPILS.

What the exact arrangement of literary, mathematical, and scientific training in a curriculum should be it is impossible to state precisely, for it is absurd to suppose that one curriculum will suit all varieties of schools, from small local grammar-schools to the large public ones. Obviously the training suitable for boys who stay at school until 18 or 19 and then proceed to some University to spend three or four years more in preparation for some learned profession must differ from that of boys who have to begin actual work at 16, and each school must modify its curriculum to meet its own special needs.

In a grammar school, for instance, in a manufacturing town, it may be just as right to include practical teaching of mechanics as it would be to exclude it from some of the great boarding schools. So, too, it is better for a boy to learn Greek than Latin, better to learn Latin than French or German, while any of these affords a better means of training than his own tongue, but what language or languages shall be actually taught must depend on circumstances, provided always that when only one foreign language, and that a modern one, can be included in the curriculum (and this is the lowest standard for a secondary school), it shall be taught thoroughly, with no shirking of difficulties, and so as only to introduce the learner to what is best and highest in its literature. But in every curriculum what is vital is that its main plan and purpose be sound, that it help to form a complete man capable of using all his faculties of speech, reason, and observation to best advantage, and, above all, that it impress on his mind a deep conviction that what he has learned is as nothing to what he has yet to learn and must go on learning through life. The lad who has been taught to regard the passing of some paltry examination, the securing some small post, or the acquisition of some little technical skill as the goal of education will never go far or be worth much. "I count not myself to have attained," says St. Paul, "but . . . reaching forth (*ἐπεκτείνόμενος*) unto those things which are before I press forward to the mark." And what he says of the spiritual life is equally true of intellectual and practical life.

8.—INFLUENCE OF EXAMINATIONS AND TEACHERS.

One word remains to be added to these vague, discursive, but I believe, honest notes. Examinations many and manifold, complex and confusing, are at present the real masters of education. They control the whole course of study, and it is absolutely idle to establish any systematic curriculum until sense, system, and simplicity are in some measure introduced into examinations. Further, the best curriculum is worthless without good teachers. Huxley could turn a piece of chalk into food for the mind, and Darwin draw wisdom from a worm, but it remains

¹ Books of this type degrade education. "The second class is more comfortable and better upholstered than the third." "Yes, and how delightful that each of us has a corner-place." "Also we have saved 25 per cent. by taking a return ticket"—this is the type of conversation provided in them to refresh the student after he has made out several invoices, and learned how to describe "shoddy" in euphemistic German.

² Are such books as "Tartarin sur les Alpes" or "Le Père Goriot," useful as they are for colloquial French, really a means of mental discipline? What too of a French schoolbook which gives an illustration of an Englishman asking in a restaurant for "*une âme frite*"?

³ I lately saw a hundred of the top boys in a school doing a paper in Euclid in which the first three questions required little but mechanical skill in the construction of figures.

written for all time that "the instruction of fools is folly." And yet what is there nowadays to tempt those who are wise—at least as the world counts wisdom—into the calling of a teacher? Teaching, the highest of arts, is universally held the meanest. In our great schools, which should set a great example, orthodoxy, housekeeping, social gifts and athletic skill for the most part rank above it. In an age of cheap distinctions none has ever been bestowed upon a simple schoolmaster. Pay is generally meagre and security of tenure often conspicuously wanting, while for the vast majority of the profession that independence and liberty which is essential to progress is sternly repressed. Under such conditions education cannot flourish, and until much is done to raise the general status of the teaching profession abstract discussion of theoretical questions can produce little real result.

By J. L. PATON, M.A.,

High Master of Manchester Grammar School.

I.—COMMERCE AS A PROFESSION.

I WELCOME the term "Commercial professions." To get the word "profession" means winning half the battle. There has been hitherto a line drawn between business and the professions, a line which necessarily involves a presumption of inferiority as against business life. A profession is supposed to call forth the higher faculties of intelligence and character; it is an end in itself, and evokes that pleasure which comes from the exercise of higher faculty. But business, it has been hitherto supposed, is not an end in itself, nor is it a pleasure; a man engages in it in order to gain money, the qualities of mind and soul which it calls into play are not the highest or the best; once eliminate the ulterior motive and no one will ever dream of doing business for its own sake. Directly on the other hand we call business "a profession," that line of demarcation is removed; the position of the business man gains prestige. We recognise that for business life careful and scientific training is required.

This, as I say, is half the battle. It is what Cobden and many great men have told us for generations: "Ich wüßte nicht," says Goethe, "wessen Geist ausgebreiteter wäre, ausgebreiteter sein müßte, als der Geist eines echten Handelsmannes." But it is a lesson we are very slow to learn. It is still supposed that, if a boy is no good for anything else, he is good enough for business, just as in Wellington's boyish days any fool was thought good enough to be food for powder. And it is still assumed that it is only waste of time, if a boy is destined for business, to keep him at school after he is fifteen years of age. But directly we speak of commerce as a profession, we have put away both these false ideas and open up a new field of possibility and hope.

2.—SPECIAL COMMERCIAL SCHOOLS UNDESIRABLE.

So far, then, I approve my title. But I cannot approve the idea of a special school preparing for commerce. I should never think of sending any son of mine to a school preparing for any one definite profession. Whether it be medicine, law, the church, or commerce, or even schoolmastering, it is hardly fair to earmark a boy at the age of ten, or perhaps younger, for this or that particular walk in life. Up till the age of fifteen, every school ought to be what Ruskin calls a "discovering school," finding out for what a boy is best fitted. And even supposing we were able to discern that our little hopeful of ten was destined to be a bagman and could be nothing else, it is inflict-

¹ "Wilhelm Meister."

ing irreparable wrong on the young life to pen it up during all its school years with no boys but those of the same tastes temperament and purpose in life. Specialised classes I admit there must be, every secondary school must bifurcate towards the top, but such classes should be put as late as possible, not as early. Also, I have personally a strong disbelief in the German differentiated schools. I much prefer the English type with its modern and classical sides, or its special departments in the top classes. I believe the classical boys lose some of their academic aloofness by rubbing shoulders on the cricket field, at the debating society, and in all the agencies of school association with other boys who are at closer grips with the actualities of life, I believe that modern side or science boys catch something of the liberalising influence of Plato and Æschylus, and all sorts of boys gain by the mutual rivalry and the harmonised variety of the microcosm.

Some two years since, at the Headmasters' Conference,¹ Mr. Glazebrook, of Clifton, suggested that if business-men believed seriously in commercial education, they ought to found and endow to the tune of £200,000 or £300,000 a special school, with all the equipment of a public school, but "arriving at this one thing only." One is relieved to find that neither the Conference itself nor the business-men made any sort of response to this suggestion. If they had done so, the native good sense of the British parent would have saved the situation. "No," he would have said, "I do not wish to cut off my boy from all the old traditions and finer *ethos* of the best English schools, by sending him to a school specially peopled by predestinate bagmen."

3.—NOT MANUAL DEXTERITY BUT MENTAL DISCIPLINE.

It will be seen that by "education for commercial professions" is meant an education not only unmistakably secondary, but, if I may coin the term, super-secondary; that is, based on a sound general education of a secondary grade. Up to the age of fifteen or sixteen, that is, up to the standard which is represented, at the very lowest, by Honours in the Junior Oxford and Cambridge Locals, the thing "commercial education" should not be so much as named among us. The term has been soiled by all ignoble use. It has been used to connote a sort of manual dexterity, consisting in a special kind of calligraphy, shorthand, typewriting, and other finger business, with a sprinkling of book-keeping and long tots to give an intellectual flavour to the whole. The product of such commercial education is a piece of human mechanism which we may hope shortly to supersede with a newly-developed phonograph-typewriter, as it has been already to some extent superseded by Babbage's Calculating Machine.

Not that I underrate manual dexterity and that formal neatness which such training fosters. On the other hand, I should say that in our best secondary schools, speaking generally, not sufficient attention is given to this matter. Every boy, whatever he is going to be, ought to be taught to be business-like in these matters, and you can't begin too early. The genius boy is by nature casual, he lives in the present, like the private of the Buffs, he "never looks before": he is marvellously given to untidiness both in his own person and within the whole circumference of things within his reach; he stains himself with ink like an ancient Briton delighting in a new and unlimited supply of woad: he has no sense of order, he leaves things about, and expects them to put themselves back in their places, or presumes that a sister will come along presently, and put these little odds and ends right for him: he has a genius for forgetting and for putting off anything the least bit irksome till he is forced to do it; and he is withal sublimely unconscious

of his own delinquencies and painfully surprised that anyone should attach any serious importance to them. All this has to be eradicated. It cannot be removed like an *appendix vermiciformis*; it has to be counteracted by long, painful and unflagging discipline. The young colt has to be broken in to habits of neatness and precision and method. Sisters can do much in the matter, as a matter of fact they do most; but masters must coöperate with sisters; the unregenerate boy needs the double pull. He must be punctual at school, he must keep his engagements, he must bring with him what he is told he will require, his books, his pen, paper, blotter and mathematical instruments; he must be made systematic; he cannot be allowed to write one day in pencil and another day in ink, one day in an exercise book and another day on a loose bit of paper, as though "anything will do." He must be taught, as Thring said, "to honour his work." So far as may be, by rigid routine these things must be made habitual. The master himself must have a good deal of the drill sergeant about him. Too many of us are just overgrown boys, our own desks are scenes of most admired disorder, our own methods of correcting exercises are not as neat as might be, nor are we prompt enough in giving back exercise work, we put it off till a more convenient season and our faulty example cancels the effect of many excellent admonitions.

These are the things which are most essential in the earlier years for commercial training, or indeed for any other, and in these matters, so far as my experience goes, the German School has a great pull over our own ordinary Secondary School.

4.—CHARACTER AND SCOPE OF FOUNDATION STUDIES.

On the subjects and the standard of the teaching I do not dilate, because I have already indicated the Junior Oxford and Cambridge Local Examinations as the minimum requirement before specific preparation for commerce should begin. Two things only I would like to indicate. We English schoolmasters think in the terms of different examinations, we can't help it, but the examination indicates after all merely the terminus, and not the mode by which we arrive at it. The mode or the method is, however, the most important thing in these earlier stages. The mother-tongue is not taught as well as it should be. Two things need to be insisted on: (1) Clear articulation, with some differentiation of the various vowel sounds, too apt to be lost in an indiscriminate *er*-sound. (2) The proper formation and management of sentences. I hold myself that the best way to teach English composition is to make boys answer your questions always with one or more complete sentences; to give them as much speaking to do as possible on their legs, and to begin the practice before they attain to years of self-consciousness. We must give up our short, jerky questions, unless it be exceptionally for the purpose of livening up a class which is semi-dormant. We think they save time, and the English system of place-taking encourages them; but the price we pay for them is this, that no other European nation so much abuses its native tongue as we abuse the tongue that Milton and Shakespeare spoke.

Again, in modern languages we must discard the heavy classical method of grammar and exercise. Sound must come first. Speech cannot be articulated till the vocal organs have learned to form the component sounds. All this work at present falls on the modern language master. If I had my way in reforming the teaching of English, we should find a good deal of the work already done before the boys came to the modern language master. With the phonetic drill will be combined, at a very early stage, a course of object and picture or action lessons in French or German, as the case might be, the object being to establish from the first the direct association of the foreign word or sound with the object instead of with its English name, and to make the boy feel his legs at once in the new language by using it from the first for purposes of conversation.

¹ Report of Headmasters' Conference, Cambridge, Dec., 1901, pp. 28-9

We will suppose now that our boy has passed through this stage, that he has a fair equipment in English, in one modern language at any rate, in arithmetic, geometry and algebra, in the history of his country, and the geography of the chief countries of the world; also some elementary and practical knowledge of drawing, mensuration, physics, and, perhaps, chemistry; if Latin too, so much the better. We pass now to the commercial department, the specific preparation for commerce. We assume that, "in whatever matters it is our duty to act, those matters it is also our duty to study." How do we set about it?

5.—SPECIFIC PREPARATION FOR COMMERCE.

The first subject in which specialisation is possible is *Arithmetic*. This must begin, if it has not begun already, with thorough drill in the metric system and the monetary systems, the weights and measures of other countries with which England trades. "The art of capturing the customer," as Mr. Oldham says,¹ "is very often the art of saving him trouble." The English firms, if they want to open up new markets must quote prices in the weights and measures and coinage of the country. The next thing is to learn the decimalisation of English money, and therewith all manner of rapid and abridged processes of calculation. Closely in touch with arithmetic, and taught by the same master, must go commercial knowledge—questions of freight and navigation, insurance and tariffs, companies, shares, computation of annuities, mortgage loans, the elements of banking and bills of exchange; how debts incurred in London may be extinguished in Hamburg, the rate of exchange, and difference between gold and silver standards of currency. Systematic instruction in these things will involve the working out of practical problems by arithmetic at every step, and care must be taken that there is plenty of mental computation. The terms used must be made real as much as possible by reference to actual reports of commerce and current newspapers, also by visits to the Docks, to the Clearing House, to the Mint, to large commercial and industrial houses. Clearly this is not a matter of text-book merely; no text-book, however good, will suffice in itself. The teacher must have actual experience of business.

The *French and German* must also begin to take a special bias. The commercial condition of foreign countries (what Mr. Hewins calls "Descriptive Economics")² should be taught in the foreign language. The language itself must be used as the vehicle of teaching; a complete series of letters should from time to time be written completing a transaction between an English and a foreign firm; and the composition should be what is called "free composition" rather than literary translation.

In *History* I give the first year to the history of the world (a subject usually left to shift for itself in our insular schools), and then in the second year work over the same ground again, studying it from the special economic point of view.

Geography must also now become a world-subject, and no longer an affair of separate countries. It will begin with examining the world-distributions of temperature, pressure, wind and rainfall, with the causes that produce them; the sea currents as they affect climate. This opens up the question of economic vegetation and the distribution of animals. Next come minerals and coal. And then as the resultant of all these circumstances comes the population. For all this work special maps are required; the Geographical Teaching Association provides some excellent slides. After this comes

regional geography of the geographical areas.¹ The region is first defined by emphasising the relief of the area under treatment with rough accounts of structure, climate and vegetation, and population as before, with the special reasons which have caused the growth of certain towns. Then comes the question of routes within the area, as based on relief and water system, and last of all trade routes and trade relationships with other countries, transit, cable routes, and all communications.

This leads at once to the question of commercial products, vegetable and animal (German *Waarenkunde*). Prof. Ashley condemns this, and many others I find are suspicious of it. It needs careful handling. I find it is necessary to have an introductory course of botany, and to have a school museum ready at hand to illustrate the main products and processes to which they are subjected. If these are supplemented with frequent visits to such museums such as the Imperial Institute or Bethnal Green Museum, and also to various large commercial warehouses and societies, I do not find there is any unreality about it, and, I believe, it does as much to widen the outlook and stimulate interest as any subject on the programme.

Economics should not come till the second year, and they should be commonsense and practical thinking about the most obvious phenomena of our social life. The object of them is to produce not so much a moneymaking merchant as a good citizen. What are Capital and Labour? What are supply and demand, and what do prices mean? How division of labour aids efficiency; the question of exports and imports, and the banking system—these are all things which a boy can think about, and thinking about them will open his eyes, and lead him to read on his account, and read more fruitfully. All over the country to-day Chambers of Commerce are being asked to vote on the question of Protection. A boy's school work ought, at any rate, to put him in the way of forming an intelligent opinion.

I have said nothing about *Mathematics and Science*. I would insist on a high mathematical standard for entry to the department. The arithmetic cannot be done without it. What proportion of time these subjects should occupy afterwards it is difficult to say. In London commerce means finance and exchange of goods; the manufactures we have are few. The stress, therefore, in a London school falls on mathematics and modern languages. In a great manufacturing centre like Bradford or Manchester, far more attention should be paid to science. In any case, a boy should have, before going into business, some knowledge of the chemistry of common life and merchantable objects, of the mechanics and the main motor powers used in manufacture. In this respect I think it would be hard to improve on the new syllabus for London Matriculation.

The *English* should be as little as possible formal or philological. The great aim should be to enlist a boy's taste on the side of good literature. If it includes some essays of Bacon, or Arthur Helps, it will be none the worse for the future business man. The composition should arise out of the teaching, but it will not be by any means confined to the English class. The history, geography and economics will all involve essay writing. The composition should not be all written, every commercial course should include practice in speaking, but this can hardly be a class subject, it should find its free and spontaneous scope in the school debating society, where such topics as the Imperial Zollverein, the Bounty System, the Merchandise Marks Act, the Half-timers Bill, or, perhaps, some great current strike would find naturally a place among the subjects discussed.

Such is the curriculum which for the last three years we have been endeavouring to carry out at University College School. What the Greeks feared in connexion with trade was that it was illiberal; they dreaded the crabbed and narrow "retail-

¹ "Technical Education for Commerce." By C. H. Oldham. Dublin, (1902.)

² Useful books are: Emile de Laveleye's "Economie Politique"; G. François, "Le Commerce" and other books. (Flammariion, Paris.) "Deutsches Lesebuch für Handelsschule." Raydt u. Ruzsger. (Voigtlander, 1902.)

¹ E.g., the monsoonal area of Asia. Prof. Mackinder's series.

dealer" type of mind. This curriculum at any rate aims at being liberal, it aims at training the reason and strengthening it, at widening the outlook and sympathies, and fostering that finer tact which comes from knowing what is in man. A commercial education worthy of the name should not only be liberal in programme, but liberal in tone. There are passages in the recent history of commerce which show how necessary it is to raise the tone on our English markets and exchanges. The highest standard of honour that we have in our English Public Schools is the standard our boys should carry with them uncompromised and unstained into their commercial life, for without it there is no sure confidence, and "confidence," as Chalmers said, "is the soul of commerce." Apart from this higher motive, all curricula are built on rottenness, the helpmeets of villany, and a danger to the State.

By Prof. MICHAEL E. SADLER, M.A., LL.D.

I.—SOME PRINCIPLES TO BE CONSIDERED.

BEFORE entering upon the details of the subject, I will briefly touch, by way of preface, on some of the wider aspects of the question which specially deserve consideration at the present time.

(a) *Study of Curricula.*—The importance of the study and comparison of school curricula has been somewhat overlooked in this country. I remember that, when the Royal Commission on Secondary Education began its sittings in 1894, it was decided at the beginning of the proceedings that a systematic investigation of secondary school curricula would lie outside the scope of the Commission's enquiry. Yet may it not be said that the study of curricula is as important in the science of education as the study of diet is in the science of medicine? As soon as we definitely ask ourselves what is the social or intellectual aim of a particular school, we find ourselves compelled to ascertain what the school in question professes to teach or ought to teach. But too many of our schools have drifted on with no definite aim. Yet a school without an aim is like a ship without a chart. The study of curricula is therefore an indispensable part of the educational revival now taking place in this country, and the decision of the Organising Committee to devote two days to the discussion of this subject is a cause for much satisfaction.

(b) *Methods of Teaching.*—The study of curricula and of the balance of subjects in school programmes is necessarily connected with the study of methods of teaching. We need to ascertain how long it takes a competent teacher to impart an accurate and well-set knowledge of each stage of every subject which we propose to introduce into the curriculum. This in turn raises a still more difficult and fundamental question, viz., how far the intellectual results of some skilfully devised modern systems of teaching are sufficiently permanent in the mind of the pupil. There seems to underlie some modern theories about school curricula an assumption that what a pupil has once learnt he does not subsequently forget. But is there not more need for hammering-in knowledge by persistent repetition, and by much more strenuous labour and individual work on the part of the pupil himself, than it has recently been fashionable to admit? It is possible to get a high and attractive finish, so to speak, upon a pupil's knowledge without its being really fixed in his mind for permanent use. Ought we not to guard against methods of teaching which result in this evanescent kind of knowledge, and to prefer those which teach much less but teach it more thoroughly?

(c) *Intellectual Interest and Accuracy of Work.*—Closely connected with this point is the difficult question how far it is expedient to make pupils dependent on the oral instruction of

a teacher. Our old grammar-school methods, relics of an ancient tradition, fell sadly short in their power of stimulating the general interest of the scholars. They missed great opportunities of widening the pupil's outlook, and of preparing him to take an intelligent interest in the wider bearings of his life's work. At the same time, they had the great advantage of teaching the boy how to work for himself, and how to dig out knowledge by his own labour, and then to bring the results of that labour to be tested and appraised by a competent critic. But I fear that in some schools for little children there is a danger at the present time lest the teaching should be too full of interest and lest there should be too little steady drill of the mind in habits of accuracy, and in the power of doing that drudgery which is a necessary part of all human work.

(d) *Effective Teaching.*—Skilfully devised curricula are as needful to the economy of school work as good organisation of correspondence and business is to the economy of an office. But it will be admitted that the best curricula in the world are of small intellectual value unless they are applied by teachers who are themselves keenly interested in the work of teaching and gifted with the mental and moral power which impresses the mind and character of the pupil. Curricula matter very little as compared with the teachers behind the curricula. A school with an ill-arranged curriculum but with strong teachers may be educationally far more effective than a school with weak teachers and a pattern curriculum.

(e) *The Desire to Learn more.*—One aim of school education is to produce people who want to go on learning more. May we not rightly measure the value and success of an educational system by the keenness and persistence of the intellectual and other interests which it has kindled in the minds of its pupils, and which they continue to manifest through their later life? Pestalozzi used to say, "Let us leave our children a great deal to discover for themselves." Would it not be a blunder to try to compress within the limits of a school curriculum a general survey of knowledge, as if the pupil's period of learning had to cease at the end of his school career? Was not this the fallacy, though in a more ambitious and philosophical form, which underlay the German notion, that a secondary school should provide each and every pupil with "allgemeine Bildung," and, as it were, send them away from school with a completed halo of finished culture?

(f) *Encouragement of Distinctive Curricula.*—The attempt to teach too many subjects leads to smattering and to intellectual indigestion. Pupils who have suffered from the process seem to have very little real appetite for continuing their studies. Their interests are deadened instead of being quickened. Does it not follow from this that we should be very careful not to crowd into any one curriculum the various subjects which have a valid claim for recognition as possessing educational value? Ought we not to have many different curricula, even for schools of the same grade and type? And, as teaching is an artistic work, will it not be expedient to let each school have some marked speciality in its instruction? It would be much better if a school had a strong living tradition of mathematical excellence or of classical scholarship than that it should water down this special interest by the introduction of little bits of a number of other subjects, with the result of there being no opportunity for really thorough work in any one of them. Of course, I am not arguing for premature specialisation. It is all a question of balance and of degree, but I would urge that full scope should be given to the special aptitude of the teacher, and that the tradition of the school should be given free play.

(g) *Mental Attention.*—The fault of some of the continental curricula is that they concentrate attention upon that part of the school work which consists in the imparting of knowledge, and lay too much stress on the oral communication of knowledge in

the class room. This is an evil to be guarded against. Doing and making should be held in as high honour in our schools as writing or talking about things. One danger of much of our modern organised secondary education is that it produces a literary proletariat. It is apt to divert clever boys from craft work, and to attract them to literary occupations. Moreover, by patiently absorbing great masses of skilfully administered information, children are apt to lose their power of intellectual independence and of criticism.

(*k*) *Importance of Practical Work in Schools.*—I would urge that in planning curricula for English schools very great stress be laid on practical work of all kinds and also on out-of-door kinds of school activities (*i.e.*, on organised games in moderation, and various leisure-hour pursuits) by means of which boys and girls learn the power of working with other people and of subordinating selfish aims to collective interests. If we intend to make effective use of leisure in our English education, we must be extremely careful not to demand too much in the way of book learning and of classroom work. And as it is much more difficult to assess the value of a pupil's individual practical work than to measure the accuracy of the knowledge which he can produce on paper in examination, I feel somewhat alarmed lest the development of an elaborate system of school-leaving examinations should injure an important side of our secondary education under the appearance of a salutary reform.

2.—CURRICULUM OF PRIMARY AND PREPARATORY SCHOOLS.

Under this head I propose to refer (*a*) to those public elementary schools the curriculum of which ends about fourteen, (*b*) to schools which are preparatory to secondary schools (these again in turn are preceded by instruction given either in schools for little children or by governesses), and (*c*) to kindergarten and preparatory schools attached to secondary schools.

(*a*) *Nature and Scope of Early Studies.*—In this grade of education there is great advantage in educating boys and girls together. In many ways these early years are educationally the most critical years of a child's life. Great importance should be attached to the aptitude of the teachers, and to their sympathy with young children. Care should be taken to avoid (1) rigid separation of the subjects, and (2) on the other hand namby-pambyness. Children are not strengthened for the tasks of later years by being kept back too long from facing real difficulties. May we not, while revering the work of Froebel and while grateful for the devoted labours and refining influences of those who have carried on his work, feel at the same time some distrust of the narrow and, as it were, denominational atmosphere in which some kindergarten teachers seem to have learnt their art? Have we not some reason to feel distrust of the narrower traditions of the Froebelian faith? Again, the point of junction between the kindergarten and the lower school needs more attention educationally than it has generally received.

During the earlier years of the primary-school course the different subjects in the curriculum ought to run into one another at their edges, as different colours run into one another when put on paper side by side with a wet brush. I would urge that, in this stage of education, special importance be attached to training the powers of expression alike in the mother tongue, with the brush, with the fingers, and (through dancing and physical drill) with the body and limbs. The ideal course of education for little children is one which carefully combines *mousiké* and *gumnastiké*. At this stage, much can be done to lay a good foundation for the study of geometry, and I have heard of some boys who, in their later school-life, found in their mathematical studies the benefit of their kindergarten training. Stress may also be laid on the importance of the intelligent teaching of arithmetic. In the curriculum, at this stage, history-teaching best takes a biographical form, but different chil-

dren show remarkably different aptitudes for historical studies. However, it will be agreed that highly compressed summaries of political or constitutional development seem out of place at this stage of education. I would lay special stress on the need for good teaching of geography, and for the intelligent study of living things (particularly of plant life); on singing and physical exercises, and on well-organised and carefully supervised school-games. Many children need to learn the lesson of unselfishness through joint effort in games. So far as it can be arranged, group-work is to be recommended, *e.g.*, in connection with the teaching of history and literature, rough models can be made by a small class of children. But it seems to me a mistake not to stimulate individual effort as well. And I would venture to urge the importance of securing perfect accuracy in some parts of the work. Modelling, drawing, simple carpentering, painting, and other forms of expression through the hand are particularly valuable at this stage. Care should be taken to encourage children to ask questions instead of discouraging anything which interrupts a preconceived plan of lesson. If we encourage little children to become passive recipients of what they are told, we are doing much to prevent the growth of independence of mind and character. A good school combines discipline with the encouragement of individuality. But this involves a cultivated type of teacher who is not afraid of being asked questions, and who can, as need arises, follow the children's thought into fields which may lie far away from the track originally projected for the lesson. We need, in fact, some of our very best teachers in the classes for little children. Such teachers should not confine themselves to preparing themselves out of mere text-books, but should make a practice of reading as widely as possible standard works outside the subject. The benefit of this will show itself not in the amount of information which they give the children, but in the effects of a certain freshness and increased richness of mind upon the intelligence of the pupils. The subconscious influence of a well-stored and keenly interested mind upon the intelligence of little children is a matter which deserves close attention.

Those who sympathise with the drift of these remarks will probably share with me a strong feeling that, for the teaching of little children, large classes of forty, fifty, or sixty are educationally mischievous and not unlikely to deaden much of the intellectual activity of the children. The Herbartians, and not least the universally beloved Professor Rein of Jena, have performed a useful service in suggesting a cycle of culture-studies as an appropriate curriculum for the eight years of elementary school-life. For my own part, however, I feel misgivings as to the wisdom of treating this theory as anything more than a fruitful suggestion. While it is doubtless true that every human mind passes rapidly through a number of stages of development, much of this process is necessarily unconscious, and we are by no means right in attempting to give it too conscious an application in our school studies. Still less expedient is it to assume that the unfolding of the panorama of human development must necessarily coincide with the somewhat arbitrary period of eight years fixed by study for German elementary education.

(*b*) *Effect of Scholarship Examinations on the Curricula of Preparatory Schools.*—From the point of view suggested in this paper, the education of this primary or preparatory grade should include both literary and practical instruction, but the subjects should be intermixed, and the practical instruction should be kept closely connected with the literary.

The powers of different children vary so greatly in degree and in rapidity of development that it is very difficult to mention a point up to which a common course of instruction should be carried. To some extent the course of instruction should depend on the probable life-work of the children concerned;

e.g., it is expedient to transfer a boy or girl to a secondary school never later than twelve years of age, while in some cases it is expedient to make the transference at ten. Again, teachers are compelled by the social and administrative arrangements of the country in which they live to differentiate between the course of instruction given to different pupils at a comparatively early age. The effect of this is sometimes to be deplored. For example, have we not reason to regret the numbing effect of our public-school scholarship and entrance examinations on the education of little boys? Thousands of boys from cultivated families in England are at the present time being shut out from the education which would be most appropriate to their tender years, because their teachers are forced prematurely to specialise them in one or more classical languages. The grip of the classical tradition is nowhere more mischievous than in the control of the education of little boys up to the age of twelve. In our preparatory schools (admirable as they are in tone and in their individual care of the character of the boys), we fail properly to teach them the use of their mother tongue; we fail as regards the teaching of history and the creation of a love for literature; we fail to make proper use of geography as a school subject; we have far too little manual training and drawing; and there is little leisure for the intelligent study of nature. And the root of all the trouble is the artificially high standard of attainment in Latin and Greek which is required at the public schools at their entrance examinations. How long will it be before public opinion insists on making an end of this crippling of the intellectual interests of so many English boys? Yet I say this with reverence for our great teachers of classics, and with hearty recognition of their success in training boys in a certain kind of accuracy of work.

(c) *Improvement desirable in Classical Teaching.*—In order to facilitate the transference of promising pupils from the elementary schools to the secondary schools at twelve years of age, much is to be said for the "reformed curricula" which are now being adopted in an increasing number of German classical schools. I subjoin two illustrative types of curricula as showing what is being skilfully attempted in this regard. It will be noticed that the key of the situation lies in the large number of lessons given per week to a new foreign language when it is reached in the curricula. Some of the best teaching in the school ought to be concentrated on this first year of a new language. It is to be hoped that more attention will be given to the possibility of improving our methods of classical teaching in its early stages. (See Tables, p. 19.)

3.—CURRICULUM OF VARIOUS TYPES OF SECONDARY SCHOOLS.

At the risk of seeming rather reactionary, I would protest against the assumption being made that boys and girls of secondary school age ought to go through the same course of studies. I doubt whether it is at all wise to give, in ordinary cases, to girls between the age of thirteen and sixteen as heavy a burden of work as can be borne by many boys of the same age, though even among boys there are great differences of strength and in the rate of physical and mental development. At the same time, I would strongly urge the importance of thoroughness and accuracy and searching discipline in girls' education. But it is possible to provide this while at the same time giving much larger scope than is at present usual to mathematical training and to that kind of study of history and literature which aims at implanting an interest in these subjects and not at examination results. Again, might not much more be done to make a thorough study of home arts and science a more characteristic feature of many girls' schools?

Turning to the case of boys (and of those girls who for one reason or another have to assimilate their course of education to that planned for boys), there are three types of secondary edu-

cation which seem to call for separate treatment. By separate treatment I mean the assignment of a special curriculum. Whether or not it is desirable to have two-barrelled or three-barrelled schools, each comprising two or three different types of curricula, is a matter of administration about which much can be said on both sides. I would, however, take this opportunity of suggesting for consideration the question whether we have not already gone too far in the direction of making our headmasters organisers, and whether in some cases great advantage might not be derived from having a smaller school with a single curriculum, inspired by a headmaster who should take a leading part in the *teaching* of the school, and have at the same time sufficient leisure for carrying forward his own private studies to a high point.

The three types of curricula referred to above would be as follows:—

(a) *Engineering and other professions depending on Applied Science.*—A secondary school leading up to the engineering professions (mechanical, electrical, civil and mining) and to other callings connected with applied science. The aim of such a curriculum should be to equip a boy at sixteen with the following attainments; command over his mother tongue, interest in history and good literature, sound knowledge of geography, thorough grounding in mathematics, skill in speaking and writing one modern foreign language, fair acquaintance with the requirements of physical science, and skill in using the pencil and brush.

(b) *Commercial Professions.*—For commercial professions, the time assigned to mathematics and to laboratory work in science might be somewhat reduced in order to make room for a second modern language. As another form of this curriculum, many experienced men of business would recommend a combination of Latin and one modern language.

(c) *Literary Professions.*—For the more literary professions, a curriculum providing for instruction in French, Latin, and then Greek or German, (in the order stated) would naturally follow to some extent the lines of the Frankfort curriculum, quoted above.

4.—DESIRABLE REFORMS.

In conclusion, I would briefly touch on a few points in regard to which early action seems to be needed.

(a) We ought to have in our English schools far better teaching of the mother tongue and more skilful training in expression and composition in English. In this regard we have much to learn from the French schools, and a good deal from the German. But of the two the French methods seem to me much the most artistic. The German methods are rather prosy for English children.

(b) In the early years' secondary education for boys we are suffering from premature Latin and Greek. The scholarship system at the public schools is fast becoming an educational curse.

(c) Far more prominence should be given throughout our primary and secondary education to manual and practical work of all kinds.

(d) Much of our education is sterilised by cramming up for examinations.

(e) Though history (except in its biographical forms) is by no means an appropriate subject for immature minds, much more can be done to stimulate historical interest by means of the better teaching of history in our schools and by giving the pupils a wider outlook over the development of nations upon the earth.

(f) Much more should be done to introduce improved methods of geographical teaching into schools.

(g) We are sadly behindhand in our standards and methods of modern-language teaching. There is likely to be a shortage of well-educated young English teachers competent, by residence and training abroad, to teach French and German on the best

A.—THE FRANKFORT CURRICULA.

Weekly number of lessons in each class in each subject.

	Common Foundation of Non-Classical Education. 9 to 12 years of age.		Alternatives.													
			The Classical School. (Gymnasium.)						The Semi-Classical School. (Real Gymnasium.)							
			VI	V	IV	III B	III A	II B	II A	IB	IA	III B	III A	II B	II A	IB	IA
Religion	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mother Tongue and Historical Narration	5	4	4	3	3	3	3	3	3	3	3	3	3	3	3	3
Latin	—	—	—	10	10	8	8	8	8	8	8	8	6	6	6	6
Greek	—	—	—	—	—	8	8	8	8	—	—	—	—	—	—	—
French	6	6	6	2	2	2	2	2	2	4	4	3	3	3	3	3
English	—	—	—	—	—	—	—	—	—	—	—	6	4	4	4	4
History and Geography	2	2	5	3	3	2	2	2	3	3	3	3	3	3	3	3
Mathematics	5	5	5	4	4	3	4	4	3	4	4	4	5	5	5	5
Natural History	2	2	2	2	2	—	—	—	—	2	2	—	—	—	—	—
Physics	—	—	—	—	—	2	2	2	2	—	—	3	2	2	2	2
Chemistry	—	—	—	—	—	—	—	—	—	—	—	—	2	2	2	2
Writing	2	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Drawing	—	2	2	2	2	—	—	—	—	2	2	2	2	2	2	2
Total number of lessons per week	25	25	26	28	28	30	31	31	31	28	28	32	32	32	32	32

Physical Training, three lessons weekly in all classes.
Singing, various.
Optional instruction in Drawing (Gymnasium) in II and I (two lessons a week).
Optional instruction in English (Gymnasium) in II A and II B (two lessons a week).

Optional instruction in Hebrew (Gymnasium) in II A and II B (two lessons a week).
The Arabic figures in the above table show the number of weekly lessons in school in each subject. Each lesson lasts fifty minutes. The classes rise from VI to IA.
The table does not include home work.

B.—TIME TABLE OF THE OBERREALSCHULE WITH REFORM-REAL-GYMNASIUM AT KIEL (1901).

(Weekly number of lessons in each subject in each class.)

	Common Foundation of Non-Classical Education. (9 to 12 years of age.)		Alternatives.													
			The Non-Classical School. (Oberrealschule).						The Semi-Classical School. (Reform Realgymnasium).							
			VI	V	IV	III B	III A	II B	II A	IB	IA	III B	III A	II B	II A	IB	IA
Religion	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Mother Tongue	5	4	4	3	3	3	4	4	4	3	3	3	3	3	3	3
Latin	—	—	—	—	—	—	—	—	—	8	8	6	6	6	6	6
French	6	6	6	6	6	5	4	4	4	4	4	3	3	3	3	3
English	—	—	—	5	4	4	4	4	—	—	—	6	4	4	4	4
History and Geography	2	2	5	4	4	3	4	4	4	4	3	3	3	3	3	3
Mathematics	5	5	6	6	5	5	5	5	5	4	4	4	5	5	5	5
Natural History	2	2	2	2	2	2	—	—	—	3	2	—	—	—	—	—
Physics	—	—	—	—	2	2	3	3	3	—	2	2	2	2	2	2
Chemistry and Mineralogy	—	—	—	—	—	2	3	3	3	—	—	—	2	2	2	2
Writing	2	2	2	—	—	—	—	—	—	—	—	—	—	—	—	—
Drawing (Freehand)	—	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Total	25	25	29	30	30	30	31	31	31	30	30	31	32	32	32	32
Physical Training	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Singing	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2

Optional:—Linear Drawing (two lessons weekly) in III A upwards, both in Oberrealschule and Realgymnasium.
The classes rise from VI to IA.
The table does not include home work.

The Arabic figures show the number of weekly lessons in school in each subject.
In III B and III A scholars whose handwriting is bad have writing lessons.

new methods, while at the same time able to link those subjects to the other parts of the school curricula. It would pay us as a nation if we were to offer £100 a year for two years to 200 well-educated young men and women who would undertake to go to France and Germany for a two years' course of training at the close of their own university course, with the purpose of returning as class teachers in secondary schools. In order to introduce effectively the new methods of modern-language teaching, the change of method should be throughout out of school. When the advantages of the new method are fully recognised, the supply of teachers will fail to satisfy the demand. We ought to look ahead two years and now set to work to train the staff of teachers who will be so soon wanted. This seems to me as much a matter of national concern as training officers for the army and navy. The time has gone by when we could safely leave our educational organisation to haphazard. It is well worth our while as a nation to spend £20,000 a year for two years now on furnishing ourselves with the needed staff of highly trained English modern-language teachers.

(h) Let us avoid over-teaching English pupils. We do not want to produce a passive generation. It is far better that our boys and girls should learn a little thoroughly than get a smattering of a number of subjects. When we leave school, we ought only to be beginning to learn.

(i) It is to be desired that every school should state its intellectual aim; publish (according to some approved form) a statistical summary of the hours and work given weekly in each form to each subject in the curriculum; and issue an outline of its course (or courses) of study, showing the standard which it proposes to reach at each stage in each class. If every school issued such a statement together with other particulars of its work, parents would have a better knowledge of the schools. I would also suggest that in each city there should be published, under the authority of the Education Committee, an Educational Directory containing these particulars about every school, public or private, which is annually inspected and found to be efficient.

(j) Behind all our consideration of curricula, there must lie an ideal of character and of the kind of intellectual power which we desire the rising generation of English men and English women to reach. The worst muddle comes from being uncertain in our minds as to the social and moral ideal towards which we are working. That is the point about which we need to clear up our thoughts. Is it not expedient that, as far as possible, we should aim at producing among the pupils perceptiveness, exactitude, pleasure in thoroughness of work, good-humour, and above all, truthfulness of mind? Cannot our schools do much to preserve, and to adjust to the new needs of modern life, what Burke called "the ancient and inbred integrity, piety, good-nature, and good-humour of the English people?"

SUMMARY OF CHIEF CONTENTS AND SOME QUESTIONS SUGGESTED BY THE PAPERS.

I.—GENERAL PRELIMINARY CONSIDERATIONS.

- (i.) What general principles must be borne in mind? (Fletcher, 1.)
- (ii.) Meaning and scope of education. (Page, 1 and 2.)
- (iii.) The basis of a rational curriculum. (Armstrong, 2.)
- (iv.) Cultivation of the individuality of the pupil and of the school. (Armstrong, 3 and 5, Sadler, 1c. and f.)
- (v.) Faculties to be developed. (Fletcher, 3.)
- (vi.) Considerations of culture. (Adams, 6, and Sadler, 1g.)
- (vii.) Acquirement of knowledge for its own sake. (Fletcher, 2, and Sadler, 1e.)
- (viii.) Tradition as a factor of the curriculum. (Sadler, 2b.)
- (ix.) Practical value of an exchange of views. (Daniell, 9.)

II.—ELEMENTARY EDUCATION. (Primary Schools, Preparatory Schools and Preparatory Departments.)

- (i.) At what age should the course begin and end?
- (ii.) What are the essential subjects for all children during this course. (Adams, 1; Armstrong, 3 and 4; Burstall, 2; Daniell, 3; Fletcher, 8; Page, 3 and 4; Paton, 4; Sadler, 2.)
- (iii.) Should this course be modified in any way for children who will later prepare for particular professions? (See "School Preparation for Professions.")
- (iv.) Hours per week to be devoted to study and how these should be divided among the essential subjects.
- (v.) The relative importance, at this stage, of "literary" and "practical" subjects. (Adams, 2; Fletcher, 6; and Paton, 3.)

III.—GENERAL SECONDARY EDUCATION.

- (i.) At what age should this course begin and end? (Page, 7.)
- (ii.) Should it be the same for all, or should it be varied for boys intended for different professions? (Adams, 5; Armstrong, 6 and 7; Burstall, 3 and 8; Daniell, 6; Page, 6; Paton, 2; Sadler, 3.)
- (iii.) What number of hours per week should be given to study, and what number of subjects can properly be studied in this time?
 - (a) What proportion of the time should be given to "practical" instruction—science, drawing, manual and physical training? (Fletcher, 6 and 7; Page, 5; Paton, 3; Sadler, 1h.)
 - (b) Should any subject be included in the curriculum to which only one lesson per week can be devoted?
 - (c) What should be the influence of the head teacher's training on the curriculum of the school?
 - (iv.) If different parallel courses of secondary education are desirable, should these be provided in special schools, or should they be "sides" of one large school? (Paton, 2.)
 - (v.) How should the leaving-age modify the secondary-school course? (Page, 7; Adams, 4.)
 - (vi.) Should the curriculum be imposed by an outside authority or left to the headmaster or headmistress to decide?
 - (vii.) At what age is it desirable that children should pass from the primary school to the secondary school under the present scholarship system? (Adams, 3, and Fletcher, 10.)

IV.—SCHOOL PREPARATION FOR THE PROFESSIONS.

- (i.) Is all professional training undesirable in schools? (Daniell, 6; Page, 2; Paton, 2.)
- (ii.) School preparation for commercial professions. (Adams, 5a.; Burstall, 4; Paton, 1, 2 and 5; Sadler, 3b.)
- (iii.) School preparation for domestic professions. (Adams, 5b.; Armstrong, 8; Burstall, 6.)
- (iv.) School preparation for engineering and applied science professions. (Adams, 5c.; Armstrong, 7; Burstall, 5; Sadler, 3c.)
- (v.) School preparation for literary professions. (Adams, 5d.; Burstall, 7; Sadler, 3c.)

V.—METHODS OF TEACHING AND DESIRABLE REFORMS.

- (i.) Methods of effective teaching. (Sadler, 1b and d.)
- (ii.) Need for reform. (Armstrong, 1.)
- (iii.) Desirable reforms. (Daniell, 5.)
- (iv.) Improvement desirable in classical teaching. (Sadler, 2c.)
- (v.) Aims of scientific instruction. (Armstrong, 1.)
- (vi.) The discipline of scientific studies. (Fletcher, 7; Page, 5.)
- (vii.) Influence of examinations and teaching. (Page, 8.)
- (viii.) Suggestive opinions and undecided questions. (Daniell, 4 and 5.)

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SIXPENCE.

RECENT CHANGES IN THE ORDER FOR THE REGISTRATION OF TEACHERS.

THE latest changes in the Order for the Registration of Teachers have without doubt gone very far towards removing most of the objections to the Order which have been made by teachers in secondary schools. The main objects of Column B of the Schedule being to determine what schools may appropriately be regarded as secondary schools, and what teachers may fitly be considered as secondary school teachers, we propose to point out in what manner the changes promulgated by the Board of Education in July help to accomplish these objects.

From the Report of the Teachers' Registration Council for 1902, presented to the Board of Education in January last, we learn that the Council found itself considerably hampered by the terms of the original Order. Although responsible for the registration of individual teachers, it possessed no discretionary power to modify regulations which in many cases produced hardship, and in effect defeated the very object for which the Order was made. On the Board of Education being satisfied with the Council's statement of the case, a Conference was arranged and held in October between the Council and the Consultative Committee. The outcome of the Conference is seen in the changes referred to, which at once temper the rigidity of the original Order and concede to the Council very considerable discretionary power.

It should be borne in mind that as regards secondary school teachers the Order both contemplates and arranges for two distinct sets of qualifications, differentiated in the main by the inclusion or non-inclusion of training. Up to March, 1906, Clause 4 is to remain in force, under which, training not being obligatory, applicants are admitted who possess certain specified academic qualifications and have had experience in teaching "other than teaching in an elementary school or teaching of a purely elementary character" for a specified period of three years.

Clause 3 makes training in some form or other compulsory; it requires a higher academic qualification, viz., a degree or its recognised equivalent, together with the pass certificate of some approved examination in the theory of teaching, and at least

one year's probation at a recognised school. These ideal conditions become compulsory, unless some further modification of the Order takes place, after March, 1906. We need, however, for the present only concern ourselves with Clause 4, which deals with existing teachers.

As regards such teachers, there were up to July two requirements, viz., an approved examination equivalent in general to the Intermediate Arts or Intermediate Science standard of the University of London, and an experience of three years in a recognised, *i.e.*, secondary, school. Although about 3,000 teachers are already registered under these conditions, abundant evidence has been forthcoming to show that many excellent teachers, and indeed sections of teachers, would be excluded if both these conditions were insisted upon. For instance, the academic qualification bears with special hardship on experienced women teachers, inasmuch as the universities have not provided equal facilities for women as for men. After 1906 this difficulty can be reasonably provided for by scheduling the certificates approved for this purpose. The second condition presses with hardship upon teachers in private schools, since these schools having been hitherto exempt, both in theory and practice, from inspection, find it difficult all at once to fulfil the conditions for recognition. By 1906 these conditions will be sufficiently well known, and this difficulty also will have been reduced to very small proportions.

Of another class of teachers to whom registration will be specially valuable, viz., governesses and teachers of private students, it is not too much to say that the original regulations ignored their existence. The Order had too exclusive a regard to the qualifications held desirable for boys' schools of a public type, aided or aidable by grants from local authorities.

The latest amendments change all this, and it is hardly too much to say that the modifications revolutionise the regulations in a sense favourable to existing teachers, and it cannot be doubted that full advantage will be taken of the two main concessions before, having served their purpose, they are withdrawn in 1905 and 1906 respectively.

It will be convenient to deal with the modifications in the Order of the two clauses most concerned. In Clause 4 the requirement of three

years' continuous experience of a recognised, *i.e.*, secondary, school remains, with this alternative—

"or for periods amounting altogether to not less than three years under circumstances which, in the opinion of the registration authority, render the periods equivalent to a period of three years next preceding application."

Here the Registration Council, referred to above as the registration authority, has discretion to sanction breaks in continuity of teaching, owing to such circumstances as illness, absence for study, change of school, &c. Thus each case as regards the three years' experience will be taken on its merits. The flexibility of this regulation is thus greatly increased by a change which at first sight seems almost unimportant, but which in practice proved an absolute bar to many applicants.

The principal concession, however, is to be found in sub-section (*b*) to Clause 5, a section originally framed to admit to the register men and women of rare and exceptional merit as teachers who had for some reason omitted to acquire the necessary qualifications. This power remains, but a new sub-section empowers the registration authority, until March, 1905, to admit any person to the register who does not fulfil all the conditions of registration, but

"has had experience, extending over a period of not less than ten years, of teaching (other than teaching in an elementary school or teaching of a purely elementary character), and has in their opinion shown ability to teach."

This sub-section gives the Registration Council a very free hand indeed, but it is to be noted that their discretion is limited in two important particulars: in the first place, it has a very short time limit, *viz.*, to March 31st, 1905, not 1906 as might have been expected; and secondly, the applicant must be able to prove not less than ten years of secondary experience, that is, either in a secondary school or in secondary teaching. It will be obvious enough that the determination of what in individual cases is to be considered secondary, as distinct from elementary, experience will not be an easy matter, and if the Registration Council had preferred their own ease to professional and other considerations, they have been badly advised to seek the wide discretion conferred by this change.

It may be hoped, however, that the means which the Council is taking to discharge faithfully its new obligation will commend themselves to those for whose benefit the new sub-section has been framed. The Council has drawn up a special Application Form for Registration under the new sub-section. Following its previous practice, the Form is numbered as in the Order itself. It is therefore called Form 5 (2) (*b*), and teachers who are qualified under this clause and not under one of the previous Clauses 3 or 4 are recommended to apply for this Form without delay to the Registrar, 49 and 50, Parliament Street, London, S.W. When they receive it they will find that this Form differs from the other Forms in its providing

a Statutory Declaration for use in certain cases. If the ten years' service has been held at a school recognised *for the purpose of registration of teachers* by the Board of Education (and, in cases of doubt whether a certain school has or has not been recognised, enquiry should be made of Secretary, Board of Education, South Kensington) there will be no need to use the Declaration. But in cases where certificates of service are not forthcoming by reason of death of the principal, of closing of the school, &c., the applicant himself is required to state on oath before a Justice of the Peace or a Commissioner for Oaths that the statements made by the applicant are correct. It may be noted that if the Declaration be made before a J.P. no charge is made, if before a Commissioner the charge is 1s. 6d.; in addition the stamp costs 2s. 6d. Some teachers may perhaps feel objection to the Statutory Declaration, but it is not easy to work out any simpler plan by which a body like the Registration Council, with this duty to perform, can satisfy the profession and the public that the function has been discharged adequately and impartially. It is possible that the difficulty in some cases caused by the requirement to produce evidence satisfactory to the Council "of ability to teach" may lead to the appointment of Inspectors for the purpose. In such cases, however, a special additional fee would probably have to be charged, for the present fees are by no means adequate to meet the current expenses for salaries, rent, publication of the register, and ordinary printing.

With regard to Column A, it may be noted that no question about the registration on this Column comes before the Council, all such questions being determined solely by the Board of Education, which sends to the Council the names. There are many teachers who, though teaching in public elementary schools, claim to be admitted to Column B. Hitherto non-recognition by the Board of the school has proved an effective bar to admission. The Board itself, however, accords its recognition to each School of Science, as, for instance, that contained in the Leeds Higher Grade School, and every teacher in all such schools is qualified to go on Column B. It is certain that under the re-organisation which the Education Acts, 1902 and 1903, render necessary, many schools lately under School Boards will become recognised as secondary schools. We have before us a Report made to the Education Committee on the Secondary and Higher Education of the City of Sheffield, by Prof. M. E. Sadler (*Eyre and Spottiswoode, 1s.*), in which occurs the following sentence:—

"By reason of its convenient situation and close connection with the public elementary schools of the city, the present Central School should, in my opinion, be converted into a secondary school of the kind described in the foregoing paragraphs. As part of their general scheme for the improvement of secondary education in Sheffield, I think that the City Education Committee should approach the Board of Education for recognition of the Central School, which is at present carried on under the Higher Elementary School Minute as a secondary school" (p. 30).

If this be done, and if this policy be in general adopted, the Register by its Columns A and B will find itself in complete administrative accordance with the new Education Act, which differentiates the form of administration of elementary from that of higher education.

One word in conclusion is necessary with regard to the "supplemental registers for teachers of music, drawing, physical training, manual instruction, cookery, needlework" [Clause 6. For these the regulations are not completed, but it cannot be doubted that the Consultative Committee, which in the first instance has the matter in hand, will endeavour to apply to these subjects the main principles which have commended themselves to them in the formation of Columns A and B. These principles are two: first, that the applicant for registration in each subject must possess adequate knowledge, training and experience in teaching; and secondly, that for a limited period the requirement of training will not be compulsory and the minimum attainments test will probably be of an easier standard than that for admission after the expiration of the allotted term of grace.

PASS GEOMETRY AT OXFORD AND CAMBRIDGE.

By EDWARD M. LANGLEY, M.A.
Bedford Modern School.

SO long as the changes sanctioned by the universities affected only their non-gremial examinations, the success of reformers, though considerable, was still partial, in its range. It was considerable, for the many secondary schools whose curriculum is based on the regulations for "the Locals" have come under the new influence at once, but it was partial, because those trained in the great Public Schools who did not look forward to enter the services, might still be taught to regard the reproduction of Euclid's text as the ultimate aim of geometrical teaching. The adoption of the report of the Syndicate appointed at Cambridge to consider "what changes, if any, are desirable in the regulations that affect the mathematical portions of the Pass Examinations" (see THE SCHOOL WORLD for June, 1903), following the announcement of the corresponding changes in the examination for Responsions, so nearly completes the success of the movement for reform, so far as alterations in regulations are concerned, as to afford a favourable opportunity for taking a general view of the position created by the changes made, and for considering the way in which teachers should carry on their work, if the full possible advantage is to be gained from the concessions made by the authorities.

It is important that they should be guided, not merely by the letter, but by the spirit of these regulations. The mere fact that certain useless or mischievous propositions of Book I. may now be omitted, while certain others not in the

"Elements" have to be looked upon as part of the ordinary book-work, is of small importance compared with the recognition by the highest authority of the opinion "strongly held by experienced teachers, that this study (*i.e.*, of formal demonstrative geometry) would be rendered more effective by some *preliminary and concurrent* work in practical geometry." Personally, I hold the *preliminary* to be of even greater importance than the *concurrent*. The preliminary work will be to a great extent *work by the teachers of the lower forms with their pupils*; it will consist very little of *work set by them to their pupils*; and cannot be done by putting a text-book in the hands of the pupils and telling them to do this or that exercise. It cannot even be done by getting up a lesson from a text-book for reproduction to a class, though some admirable text-books exist, which should be carefully studied.

It will be convenient here to notice the two-fold nature of this preliminary work. It is sometimes spoken of as *experimental*, sometimes as *practical*. These are not two different names for the same thing, but the names of two different things, both of which should precede courses of formal demonstration. The "experimental" is that begun in the kindergarten. At this stage the child is made to handle the simpler solids, and to observe some of their more obvious properties; to notice the simpler plane geometrical figures, not only of specially shaped cards and papers, but also of the common objects of the class room and the street; to see that *il y a de géométrie partout*, to get some ideas of measurement, to use technical terms correctly. The term *practical* seems to imply the actual use of instruments for definite geometrical constructions by the pupil himself. Using the terms thus, we see that the *experimental* should precede and accompany the *practical*, just as both should precede and accompany *formal demonstrative* geometry. They are to be regarded as intended to lead up to the demonstrative course, and should be arranged with that object in view. Hence a great deal of informal demonstration should accompany both; the teacher should lose no opportunity of getting his pupils to deduce consequences from principles already known. The course should be looked upon as preliminary not merely to *mathematical* training, but to any *scientific* training worthy of the name.

It is true that the regulations can only enforce the *concurrent* study of practical geometry, but I believe they will be found to lead, in many cases directly, in more indirectly, to the systematic institution of *preliminary* work. Those responsible for the preparation of classes for examination will not be slow to perceive that a great deal may and should be done to prepare their pupils for profiting by the demonstrative course, and they will use their influence (if they are wise they will try also to use that of their science colleagues) in trying to get much of the experimental and practical work done beforehand. They will desire this preparation, not to save themselves work, but to render their

work more effective; it should be their task only to revise and complete it, and to join it on to the deductive work. But while we may fairly expect that in a not very distant future it will be the rule rather than the exception, that the lower forms should be taken through courses of practical and experimental geometry before they are allowed to attempt any formal course of deduction, it is, unfortunately, certain, that for some time to come many will be found whose training in this respect has been very faulty, or completely neglected. Hence the teacher must lose no opportunity of illustrating his theoretical work by practice and experiment.

Coming to the demonstrative course, I would urge the importance of not delaying long over the earlier theorems. Much harm is done to beginners by keeping them too long over these, under an entirely erroneous notion of the importance of thoroughness. Sound ideas of the nature of geometrical deduction, and ability to perform it, are much more likely to arise from a rapid course through the essential theorems of Book I., followed by a closer and more careful one, than by tedious and deadening iteration of propositions 4 and 5. The best plan, I believe, is to get on as quickly as possible to the propositions on equality of areas, for the reasoning in these seems more readily appreciated than that in the earlier ones. If the subject matter of Book I. is to be taken as a year's work, at least one half of it should be traversed in the first term, the other half, with repetition of the first, should be taken the second term; the third term should be occupied by revision of the whole. In the first term there should be very little writing out but much questioning, short trains of unprepared deduction should be started and followed, both directly and inversely. The time devoted to writing out must be greater in the second term, and must be used for riders as well as for book work; in the third term writing out will play a still more important part.

I suggest the following scheme of work as one that may be more or less closely adopted under present conditions. It will be seen that, though it goes beyond the limits of Responsions and the Previous, it is about that for the highest papers in the Locals. The Books of the "Elements" are named for convenience: it is to be understood that those propositions are to be omitted which the authorities no longer require.

The following table will probably appear ambitious to some, and too narrowly conceived to others. That with a staff of zealous and enlightened teachers for all the forms it is now possible, I am convinced. But its possibility depends on good work in the very lowest forms, and on each master doing what he can to meet new requirements, in spite of all discouragements. Too much must not be expected at first. The teachers of the lower forms have to deal with a great variety of subjects; in many cases they have only received a faulty geometrical training themselves, and have had neither time, opportunity, inclination, nor inducement to fit themselves for the work now required

of them, if the scientific and mathematical work in the upper forms is to be as efficient as it ought to be. Those schools will succeed best whose headmasters and governors are enlightened enough to offer such salaries as will enable them to engage trained teachers for the very lowest work.

Age.	Demonstrative Course.	Concurrent Practical Course.
12 to 13	Book I.	Repetition of preliminary work. Numerical work on angles, lengths, and areas. Applications of I. 47 to solutions of numerical problems on triangles and circles.
13 to 14	Book II. treated algebraically. Books III. and IV.	Problems on similarity and its connection with equality of area. Easy graphs.
14 to 15	Proportion of commensurable magnitudes.	Sines, cosines and tangents, with their application to heights and distances. Graphs.
15 to 16	Trigonometry and elementary solids.	Construction of conics, especially by methods of transformation from circle, e.g., Boscovich's.
16 to 17	Spherical geometry and mensuration. Easy analytical geometry and conic sections.	Curve tracing; exercises in projective and descriptive geometry.
17 to 18	Further developments of the above. Easy calculus.	

As to text-books, my own opinion is that up to the time of beginning his formal demonstrative course the pupil need have no text-book, though the teacher will probably find it best to use the course of some particular book in order to make his work systematic. But he should not be a man of one book; he should be ready to seize upon and fit into his class work any good idea which he comes across in his reading. Among current text-books that can be recommended for the experimental and practical course are Sundara Row's "Exercises in Paper Folding;" Spencer's "Inventional Geometry;" Mault's "Natural Geometry;" Paul Bert's "Experimental Geometry;" Eggar's "Practical Exercises in Geometry;" Warren's "Experimental and Theoretical Course of Geometry;" Barnard and Child's "New Geometry for Schools;" Godfrey and Siddons' "Elementary Geometry;" Pickel's "Geometrie der Volksschule;" Pressland's "Geometrical Drawing;" Harrison's "Practical Plane and Solid Geometry." Some older works, now out of print, and to be picked up occasionally for a few pence, are worth having, e.g., Dupin's "Geometry of the Arts" and Pasley's "Complete Course of Practical Geometry."

As soon, however, as a boy is fit to begin a course of formal demonstration, he is fit to begin to use a text-book, or at any rate to begin to learn how

to use it. However excellent oral instruction may be, there can, for older pupils, easily be too much of it. As they grow older they should be learning more and more how to find out their own way; otherwise they will be helpless when they have no longer the teacher to rely on. To make his pupils able to use a text-book intelligently is an aim always to be kept in view by a good teacher. The text-book should not only contain the course of book work necessary for the particular examination in view, but also suggestive notes and searching questions. Above all, it should point the way to the higher developments of its subject. Any good edition of the "Elements" may, with judicious excisions and additions, be used as a text-book for the courses laid down by the universities, and it is probable that many teachers will prefer a book to which they have been accustomed, and in which they know whereabouts to go for special exercises and important addenda. Even those who are anxious to change will in many cases wait till the copious issue of text-books adapted to the new conditions has somewhat slackened, and will only make their choice after careful comparison of the many proposed substitutes for Euclid. Of these it is not intended to speak here otherwise than generally. Several of them seem excellent. Most of them, with a good teacher, would be found serviceable. Which is the best for any given teacher for his classes to use must be determined, to a great extent, by the aim he has in view. The time has, perhaps, hardly come for a final decision; but it seems fairly obvious that the disappearance of the "Elements," though likely to be gradual and delayed for some years, is now only a matter of time.

So far, only the more immediate and direct effects on class work of the changes in examination have been considered; and those for Pass Geometry at the Universities have been treated as merely extending an influence already in operation. But it should be noted that they are certain to have effects on mathematical education more remote than those hitherto considered, but ultimately very far-reaching. For the pass men of Oxford and Cambridge supply to a great extent the teaching staff of the secondary schools. That examinations in geometry have been so limited in range, and so inadequate in treatment, was to be deplored, on account of their direct effect on the candidates for degrees. It was, however, still more to be deplored, on account of their indirect effects on the classes unfortunate enough to be under the charge of men whose range of vision had been limited by such a despicable modicum of requirements. As these had learnt, so it was only natural they should teach, without interest in the subject and therefore without the power of inspiring it in their pupils. We may now feel assured that this cause of geometrical stagnation has been removed. We may even hope that the scheme of work which I have ventured to sketch out may, in a not very distant future, seem as antiquated and cramped as it now too probably seems to many teachers revolutionary and ambitious.

COPY-BOOKS AND PENMANSHIP IN THE SCHOOL.

By J. W. JARVIS.

St. Mark's College, Chelsea, S.W.

Ambidextrous Writing—Should boys and girls be taught different styles?—Mulhauser and Jacotot's Methods—The connection between Drawing and Writing—Writing in the Modern Secondary School.

MR. JOHN JACKSON, who established the system of vertical writing in 1886, has devised a remarkable method of writing in which arrangements are made for practice with the left hand as well as the right. As facility is acquired both hands are expected to write at the same time. The next most natural step is that the matter written by each hand shall be different, and thus we may have the right hand copying out phrases in English while the left is writing a series of notes in history. This is probably the most startling development of penmanship yet proposed, but though it is very desirable—highly desirable, in fact—that the power of using the left hand should be more cultivated, yet the value to a learner of doing two things at once has to be most carefully assessed. That never-ceasing activity which we are told is the soul of business is possibly not the best motto for the temple of learning, and it is still a true maxim for the schoolroom that "La gradation et la répétition, sagement entendues, sont l'âme de l'enseignement."

Questions have been asked as to whether boys and girls should be taught separate styles of writing. In the past they have been, and the old-fashioned ladies' hands and angular hands, products of the finishing school, used to be very familiar to those who had the privilege of corresponding with their grandmothers. This was not originally the case. Boys and girls were taught alike in 1800, and we are reverting to this again. There is no physiological reason for any difference, and, as far as can be seen, there is only one series of copy-books, "Lennox's Newnham Copy-books," published by Allman and Son, which is designed for this purpose, and a pen specially made for this style of writing is also sold. In schools where both sexes are taught together no distinction is made, and the boys and girls use the same copy-book or follow the same copy from the blackboard. Some very clear writing is sent up by the female candidates for Civil Service appointments, and the modern young woman rather prides herself on writing a masculine hand. Careless women sprawl and spread out their words, but this is probably due to the fact that they write, what they think without thinking of what they write, and no amount of early training in penmanship will cure this.

Many methods of teaching writing have been proposed, but two stand out prominently under the names of their authors, Mulhauser and Jacotot.

In 1829 M. Mulhauser¹ was appointed Inspector of Writing by the Primary Schools Commission of Geneva. He found the writing very bad and the teaching unmethodical, and he at once determined to place the teaching of writing in the schools under his control upon a rational basis. He reduced the written letters into four elementary parts: (1) the *straight line* made by upward or downward motion; (2) the *curve line* either single as in the letter *c*, or double, as in the letter *o*; (3) the *loop* turned upwards, as in the letters *e*, *f*, and downwards as in *g*, *j*; (4) the *crotchet*, as in the last part of the letters *r*, *b*, *w*, *v*. Two other terms were also used: the *link*, a fine curve descending from the right line and continued upwards to the half height, as in the curved portions of the letter *u*, and the *hook*, another fine curve, commencing at the half height and curving round into a descending right line, as in the commencement of the letters *n* and *m*. The letters were then arranged according

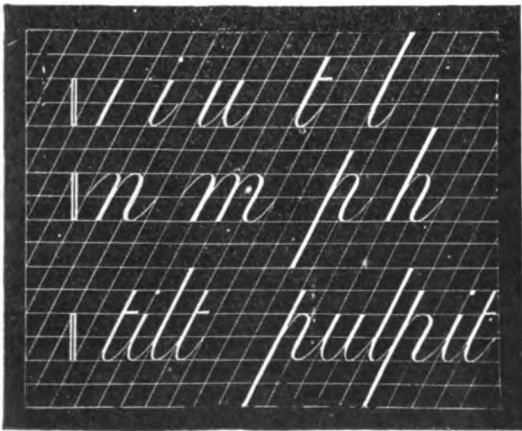


FIG. 1.—Mulhauser's Rhomboids.

to their construction, beginning with the simplest and proceeding in regular series to the most complex, thus:—

- Right line and link letters—*i*, *u*, *t*, *l*.
- Hook, right line and link letters—*n*, *m*, *h*, *p*.
- Curve letters—*c*, *o*, *e*.
- Double curve and right line letters—*a*, *d*, *q*.
- Loop letters—*j*, *g*, *y*.
- Crotchet letters—*b*, *f*, *v*, *r*, *w*.
- Complex letters—*k*, *s*, *x*, *z*.

In order to secure uniformity, Mulhauser devised a series of rhomboids by which the exact shape of each letter could be determined and the slightest error discovered and corrected.

In these rhomboids the horizontal lines determine the height, and the oblique lines the slope of each letter, whilst the middle horizontal lines fix the position of most of the joinings. The slope is about 60° from the horizontal, but it may be

¹ M. Mulhauser must not be confused with Richard Mulcaster (1530?-1611), the first Headmaster of Merchant Taylors' School and High Master of St. Paul's School, 1566. In his "Elementaire or First Steps in Education," he sketched an excellent all-round education for body and mind and anticipated many of the newest ideas of our own day.

made more upright, according to the wish of the writer.

Each lesson consisted of two parts, theoretical and practical. In the former, or "study at the circles," the pupils learnt the terms used in describing the letters and the instructions respecting heights, spaces, &c. These were explained and illustrated on a blackboard. In the practical, or "study at the desks," the children were called upon to write according to a dictation of the elements of the letters, thus: double curve, straight line two heights, link (*d*) straight line, link (*i*) curve, link (*c*) straight line height and a half, link, bar (*t*), double curve, straight line, link (*a*), straight line height and a half, link, bar (*t*) loop, curve, link (*e*), the whole forming the word *dictate*. Afterwards words were written from the models.

Mulhauser's mode is an excellent one so far as an analysis of form and as a definite style of making, spacing and joining letters. It should be thoroughly known by every teacher, but it is not necessarily the scheme every teacher should adopt. For a further description of this method, Mr. J. Cowham's manual on this subject, published by the Westminster School Book Depot, Horseferry Road, S.W., 1s., is strongly recommended.

At the opposite pole stands Jacotot's¹ method. He placed immediately before the beginner a complete sentence either written by the master or engraved in small hand, and required him to copy this. Such a sentence was generally selected from the pupil's reading lesson, the two exercises being made to assist each other. When a word was finished the pupil was instructed to compare in detail his performance with the copy, and the principle insisted upon was that the pupil always corrects himself. The whole word is then written over again, and subjected to the same rigid investigation until the pupil learns to correct in a greater or less degree every fault as previously noticed by himself. He then goes on to the second word, and so on with regard to the rest of the sentence. When a sentence or two has been transcribed tolerably well he is required to write from memory, and afterwards note his faults by comparison with the original copy. After some considerable practice in writing small-hand he is carried on to exercises in the bolder styles of writing, and the further principle is impressed upon him that he can never perform anything so well but that with more pains he may perform it better.

This method demands too much from young children, and it fails to cultivate that particular kind of intelligence which a good writing method should cultivate, viz., the intelligence of form. It is now very rarely used by teachers, but children if left to themselves will occasionally adopt it because of the interest they naturally take in the endeavour to write down their own thoughts, or at least something which they understand. It has for many children the same charm as drawing, and

¹ Jacotot, 1770-1840, was Professor of the Method of Sciences at Dijon, and afterwards Professor of the French Language and Literature at the University of Louvain, Belgium.

practically for the same mental reasons. This connection, however, between drawing and writing, though pointed out by Mulcaster as "cousins germain" and by modern teachers, is not quite so close, and too much is probably made of the value of drawing as an assistance to writing. As a training of the eye, drawing is an aid, but not in the training of the hand. In drawing the touch is firm, the pressure uniform, and the movements comparatively slow. In writing the touch is elastic, the pressure variable, and the movements rapid. Boys, and even men, who draw well sometimes find it a difficulty to write well.

The teacher in a modern secondary school is in a most difficult position with regard to the art of writing. The pupils who enter have learnt to write by all sorts of methods, and there are as many styles of writing in an average Form I. as there are pupils. Probably the best thing to do is

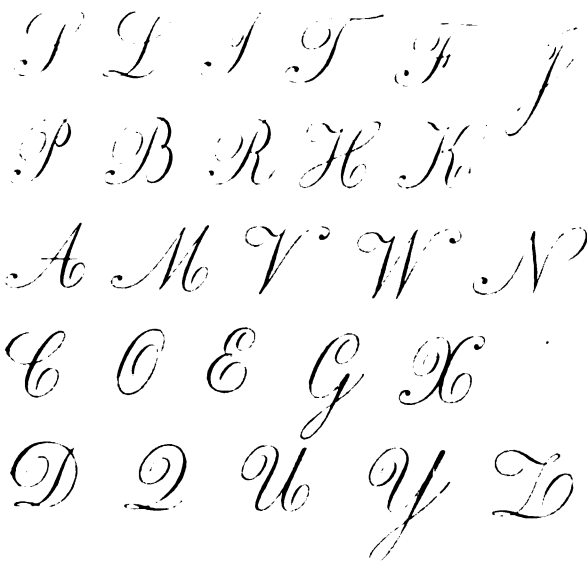


FIG. 2.—Capital Letters (from Allman's Public School Writing-book.)

to have a course of writing lessons in text-hand during the whole year. Text-hand is roughly three-eighths of an inch in height, or about the space between the lines on a sheet of foolscap. This brings the class together, and is large enough for the teacher to detect false joinings, irregular and ragged strokes and badly formed curves. Copies should be written on the blackboard (writing charts are not recommended), and, following Jacotot's plan, simple sentences are to be preferred to uninteresting and unmeaning words. [Note: The use of long and out-of-the-way words, merely because they begin with a certain letter, and will fill up a line, is absurd. "Zumiologist," "opinionist" and "inodochium" are instances.] Moral truisms and doubtful maxims are also much best abandoned.

In Form II. the practice of small-hand may be adopted, care being taken that it is not too small. Between two and three-sixteenths of an inch is a suitable size. Here attention should be paid to

the correct formation of all the capital letters in large hand, and, following Mulcaster's system, these should be classified. Mr. J. Cowham has arranged them for teaching purposes as in Fig. 2.

Transcription, that is, writing from printed letters, should be taken regularly, and this may occasionally be interrupted for lessons given in copying from good models.

In Form III. the same plan may be adopted. The number of lessons from copies should be reduced, and writing from memory should be substituted for transcription. And here may it be pointed out that I trust no teacher will vex himself or his pupils over the question of handwriting. Insist upon a real effort being made each time the pen is used, tolerate no scribble, mark the faults carefully—those which are common explain by exaggerated examples on the blackboard, and encourage each pupil to do his best. A few complimentary words to those who are taking pains will do more to raise the level of writing in the whole form than any number of formal lessons and theoretical instruction. It should always be borne in mind that progress in writing is a personal thing, and that some children require more attention than others. Above all, do not insist on elaborate instructions about holding the pen. In one of the most recent text-books on "School Management for Elementary Teachers" it is stated that every lesson should begin with penholding drill until the children have acquired the habit of doing it automatically, and for this end no less than fourteen commands are suggested. The first directs the pen to be taken up by the left hand, which is not removed until the sixth command, and the last and final one is "heads up." These excessively trivial orders are most fortunately forgotten, and the late Sir Joshua Fitch has said with truth that *gaucherie* and bad attitude may be pointed out in special cases, but there is no harm in allowing different modes of handling a pen or pencil so long as the writing produced is good.

No formal writing-lessons are necessary in Forms IV., V. or VI., and as a subject it may very rightly disappear from the time table. But it should not disappear from the cognisance of the teacher. Carefully written exercises in every subject should be demanded, and scribble should never be accepted. Excessive note-taking and written impositions should be prohibited, and the master should take care not to dictate at a greater speed than a fluent penman can acquire. Parents complain that writing is not taught in our secondary schools. It is taught in the lower forms, but the mischief is done in the higher part of the school, where written examinations are much in vogue. It should be our aim to turn our pupils out writing a firm hand, easy to read, pleasant to look at, and, if possible, betraying some of the characteristics of the writer.

In my first article in the September issue, there is an ambiguity which may lead readers to think that Messrs. Sampson Low, Marston and Co. contemplate publishing a series of semi-vertical

copy books. They have no intention whatever of issuing a semi-vertical or other sloping-writing copy books, and I regret that the error inadvertently crept in.

SCIENCE IN A LIBERAL EDUCATION.

By the Rev. A. H. FISH, B.A., B.Sc.
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IN drawing up, or choosing, a scheme for science-teaching, the teacher has to consider not only what is best from a scientific, or educational, point of view, but also what is best suited to the conditions, under which, and to the object for which, the teaching is given. The scheme briefly described in this article has grown up to meet conditions which have faced the writer for the last fifteen years. It is possible that some of these may be peculiar, but others must be fairly common in good secondary schools.

Such are the following:—(1) The time given to science—say physics—cannot be more for the particular form than two hours per week. (2) The pupils taught, boys or girls, are not wholly, or even mainly, dependent upon their science lessons for mental training or culture. (3) The teaching in science is to harmonise as far as possible with the teaching in other subjects. (4) The majority of the class will cease their liberal education at 17 years of age or less, and then pass to their special training for professional or business life.

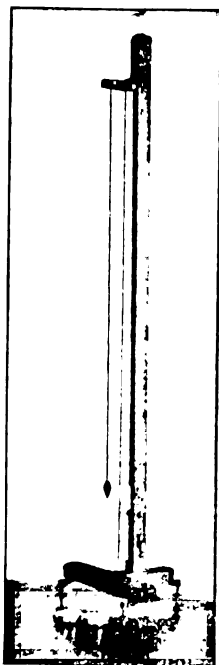
Now under these conditions we do not want, even if we had the time to give it, the sort of training in science that is given in a South Kensington "school of science," or on a modern side, in which several hours a week can be devoted to the subject. On the other hand, we want our science teaching to be, so far as it goes, as good as it can be made. We want it to give a real insight into the methods of science, as well as some knowledge of its most important results. We do not need a logical and text-book-like coherence, nor a Euclidean completeness. We can trust our pupils to fill up minor gaps for themselves. We want a real bird's-eye view, in which great results and methods stand out clearly and boldly, and are not blurred by a mass of detail. After all, the balance and the burette, the finding of volumes and densities, have played a very small part in the history of physics, and much exercise in them helps very little to a clear understanding of modern discoveries in optics and electricity. The writer has a very high opinion of what is called the "heuristic" method—it would be better to call it the "natural" method—but it is at present too closely associated with an instrument and processes of no very great importance in physics. But in any case, this method is out of court in the case supposed. It takes too much time. In these circumstances it

may be partly set aside in favour of another method hardly less natural. For many years the writer has been in the habit of giving to middle forms lessons, which have followed fairly closely the history of physical science, and have been accompanied by a good deal of biographical and descriptive matter. He has found these very successful, and out of them has gradually grown up a set, or series of sets of lessons, of one of which a syllabus is given below. The twelve lessons in that set have been given (1) to pupils who have done little or no systematic science, but have some knowledge of mathematics, languages, and history; (2) to others who have had about a year's laboratory work, but no systematic descriptive lessons in science. The lessons are illustrated by lantern slides (places and portraits, as well as diagrams), and by experiments. Great pains are taken with the latter, that they may be clear, interesting and impressive. Each lesson is grouped round one or two of these experiments, and they are surrounded, so far as may be, with the historic conditions under which they were originally performed. If an instance—perhaps an extreme one—may be given, it was not thought too much trouble, or too pedantic, in explaining the principle of Archimedes to make a crown of lead alloyed with a little zinc or tin, and to balance it in air and water against an ingot of lead of the same mass. Each lesson occupies about three-quarters of an hour, and is followed either at once, or on the next day, by a laboratory exercise. Each pair of students is supplied with an apparatus *complete in itself*, with a printed card of directions. A printed syllabus of each lesson is given out at its commencement. These are intended to indicate the order of thought followed in the lesson, and to furnish the pupil with a skeleton, which in writing out his notes and essays he may clothe with detail. Description of experiments and titles of lantern-slides are purposely omitted, as these should be remembered. Both syllabuses of lessons and practice involve rather more than can be done in the time. But the pupils have access to Miss Buckley's "History of Natural Science," Lodge's "Pioneers of Science," and Cajori's "History of Physics," and it is generally found that pupils will give up some of their own time to finish the experiments. With a slow class one or more of the lessons may be divided, and a revision lesson is intercalated from time to time, in which proofs, formulae, and problems are dealt with. For the lessons on Galileo, slides may be obtained from Messrs. Wilson, of Aberdeen, including a portrait, and a photograph of the famous swinging chandelier.

For information in the case of these two lessons the writer has used the article "Galileo" in the "Encyclopaedia Britannica," Mach's "Principles of Mechanics," and above all the invaluable translation of Galileo's "Dialogues," Nos. 11, 24, 25, in Ostwald's "Klassiker der exakten Wissenschaften." The illustration given is of a cathetometer-stand, made and used by these classes for measuring and suspending pendulums, extension

springs, barometers, Boyle's Law tubes, &c. The set-square slides along the measure, and gives measurements to tenth mm. without parallax.

TWELVE LESSONS IN ELEMENTARY PHYSICAL SCIENCE—HISTORICAL AND DESCRIPTIVE.—(i.) Galileo and the swinging lamp. (ii.) Galileo and the Tower of Pisa. (iii.) Sir Isaac Newton and the apple. (iv.) Archimedes and Hiero's crown. (v.) Galileo and the well-sinkers—Torricelli's and Pascal's experiments. (vi.) Guericke and the air pump. (vii.) The spring of the air. (viii.) Telescopes and microscopes. (ix.) Newton's prism, and what it showed him. (x.) Black and the melting of ice. (xi.) The beginnings of electricity—Gilbert, Franklin, Galvani, Volta. (xii.) The conservation of energy.



LESSON I.—GALILEO AND THE SWINGING LAMP IN THE CATHEDRAL OF PISA.

Beginnings of Natural Science about 300 Years ago.—Reasons why it was so late in the history of the world before men began to study nature, and why progress since has been so rapid.

(i.) Men's attention occupied with themselves, their own minds and their own creations. Thus—Art, Literature, Philosophy, Architecture, precede Science.

(ii.) The maze of Nature. Necessity for some clue or clues before any progress could be made. First of the clues not discovered till about 17th century. Order of the sciences:—astronomy, mechanics, physics, chemistry, biology.

Fundamental Ideas of Physics.—Space, time, motion, mass, force, energy. First clues found in correct understanding and measurement of the simplest of these.

Hence Galileo the founder of Modern Physical Science.

Galileo Galilei—(1564-1642).—World in Galileo's day. Italy, England, Pisa, Florence. Galileo's youth. University of Pisa. Cathedral of Pisa, the swinging lamp, 1583. The pendulum. Law of equal periods. Experimental illustrations. Nature of time. Ancient methods of measuring time. Modern methods. Application of pendulum to clocks. Other bodies oscillating in the same way. Relation between seconds pendulum and mean solar day. Further study of laws of pendulum. Length proportional to square of time. Period independent of mass if length constant.

Experimental Work on Simple Pendulum. Directions.

(i.) Level apparatus so that support is vertical and plumb-line same distance from scale at top and bottom.

(ii.) Arrange pendulum to beat seconds—the point will just not touch the card; set it swinging in oscillations of about 2 in. and following as nearly as possible a straight line ruled on the card. Count with stop-watch number of oscillations in a minute and time of 100 oscillations. Measure length with set-square provided.

(iii.) Shorten pendulum to one-fourth previous length and count in same way.

(iv.) Repeat observations for four lengths between these two.

(v.) Arrange the six results thus:—

I.

No. of Swings (<i>n</i>) per min.	<i>n</i> ²	Length of Pendulum (<i>l</i>)	<i>n</i> ² <i>l</i>

II.

Time = <i>t</i> "	<i>t</i> × <i>t</i> = <i>t</i> ²	Length in <i>mm.</i>	$\frac{1}{t^2}$

(vi.) Plot results on curve-paper provided, taking number of swings in 10", or time of 10 swings.

IRISH EDUCATIONAL ASSOCIATIONS.

THE number of associations specially concerned with intermediate and secondary education in Ireland at the present time is a good sign of the growing interest in educational problems. Ireland has much leeway to make up in the organization and development of her education, and the more varied the minds brought to bear upon the problems involved, and the more diverse the points of view, the more likely the ultimate solution is to be complete and satisfactory. Some of the associations are almost new, and some of the older ones have found it proper to renew their youth by striking out in fresh directions. The fact is, educational reform is in the air, and teachers and others specially concerned feel it more and more incumbent definitely to formulate their views. It is further of some account to observe that the aims of the various associations are not necessarily divergent, and that on more than one occasion they have shown a decided tendency to work together. In truth, although in the past there may have been an inclination to look askance at one another, they are beginning to see that teachers of all denominations and classes have more objects in common than at variance, and that it is best, in the immediate present and future at all events, to strive for what is mutually beneficial.

The oldest of the bodies we are here concerned with is the "Schoolmasters' Association," which is now carried on under the amended rules of 1883. Its avowed objects are: (1) To advance the interests of upper-class schools in Ireland, and (2)

¹ Gregory and Simmons's, "Exercises in Practical Physics. Part I.

To afford its members the advantage of mutual counsel and support. Whether or no it was ever intended to include Roman Catholic schoolmasters, it is now a distinctly Protestant association, and consists almost entirely of Protestant headmasters. Assistant-masters are admitted, but their membership is fenced round with strange conditions: not more than *nine* assistant-masters shall at any one time be members; an assistant-master shall have been engaged in some one school at least one year before his election, shall be proposed by his headmaster, shall be a member of some University, and shall *ipso facto* cease to be a member on leaving the post he holds at the time of his election. It has been the custom of the Schoolmasters' Association to meet only once a year, in the last week of December, in Dublin, and, after the reading of an address by the president for the year and a discus-



The Very Rev. W. DELANY, S.J., LL.D.
Chairman of the Catholic Headmasters' Association.

sion thereupon and upon other matters that may arise, to dine together in the evening. The rules provide for special meetings if necessary, but these have hardly ever been held, any necessary business being transacted by correspondence between the various members of the Committee. Under the past President, Mr. R. M. Jones, M.A., the Headmaster of the Academical Institution, Belfast (who read one of the most interesting papers in the Educational section, last year, at the meeting of the British Association, in Belfast), and the new Secretary, elected last December, Mr. H. M'Intosh, M.A., the Headmaster of the Methodist College, Belfast, reforms have been introduced, intended to make the Association more useful and better adapted to impress its views upon public opinion. It has been found that the last week in December is not a convenient time for most of the members

to meet, and it is therefore proposed to add at least one other meeting, in October, and to make a special point of holding a well-advertised conference at which various points of immediate educational interest and importance will be discussed. In this way public attention, it is hoped, will be focused on the aims and policy of the Association and of schoolmasters generally, and it is greatly to be desired that this new movement, under the guidance of the president and secretary, who are so intimate with intermediate problems, will be a decided success.

The body corresponding to the Schoolmasters' Association on the Roman Catholic side is the "Catholic Headmasters' Association;" it is much younger, but at the same time very energetic and flourishing, and, outside the Christian Brothers, is representative of all classes of Roman Catholic intermediate schools. Its chairman is the president of the University College, Stephen's Green, Dublin, the Very Rev. W. Delany, S.J., LL.D., and it is fortunate in possessing an able secretary in the Very Rev. A. Murphy, St. Munchin's College, Limerick. On the University question it has taken up a very decided position in favour of a college or university with a Roman Catholic atmosphere in which it would expect many of the teachers in Roman Catholic schools to be educated, and it has gone so far as to maintain that no system of registration of teachers in secondary schools should be introduced into Ireland until such a college or university is established, as in the meantime there is no proper institution where Roman Catholic teachers can obtain degrees. The Association has naturally given a great deal of attention to criticisms and suggestions on the revised rules and programme of the Intermediate Board, and has done good service in pointing out the unsatisfactory relations between the Commissioners and the schools; to it belongs the credit of putting forward a suggestion which, intended to meet the difficulty, was backed up by other associations and has met with a partial success; it was that the Intermediate Board should establish a small consultative committee representative of various classes of schools, Roman Catholic and Protestant, to confer with the Commissioners as to the effect of suggested reforms. This proposal was rejected by the Board, but accepted by the Department of Agriculture and Technical Instruction, which is responsible for the rules and programme relating to practical science and drawing. Representatives of the schools have met the Department on two occasions, and the results have been considered very satisfactory. Working in connection with the Catholic Headmasters' Association is a small committee representative of a large number of convent schools throughout the country, so that the Association speaks not only for the boys', but also for girls' schools.

The chief educational association of women in Ireland is, however, the "Association of Irish Schoolmistresses, and other ladies interested in education." It was founded in the year 1880, and was

formed with the object of promoting the higher education of women in Ireland, of affording means of communication and co-operation between schoolmistresses and other ladies interested in education, and of watching over the interests of girls, especially with regard to intermediate education and the Royal University. The work of the Association has radiated mainly from the Alexandra College and School in Dublin, the president being Mrs. Jellett, the widow of the late Provost of Trinity College; the Vice-President, Miss H. White, the Lady Principal of Alexandra College; and the Honorary Secretaries, Miss A. Oldham, B.A., of the Alexandra College, and Miss M. Scarlett, M.A., of the Alexandra School. The Ulster Association of Schoolmistresses is also affiliated with it, the Ulster correspondent being Mrs. Byers, of Victoria College, Belfast. Although including a certain number of Roman Catholics, the aims of this Association certainly correspond to the Protestant ideals of higher education for women, as held not only in Ireland, but in the United Kingdom generally, and it is a matter of notoriety that the success which has attended its efforts is very largely due to the unremitting zeal and energy of Miss Oldham. It is not possible in this short sketch to give its work in any detail, but attention may be called to one or two points. It is very plain to any intelligent observer that a decided change came over the recent University Commission in its relation to the women's point of view; at first more or less ignored, in the end women came out triumphant, and every one of the objects they set themselves to obtain was, in the final report, completely achieved. This result was due to the Committee of the Association of Irish Schoolmistresses, who appointed a representative sub-committee of Royal University lady graduates, the outcome of which was a well-organised association of women graduates of the Royal University, whose deliberately considered views were too powerful to be ignored. At the same time the Association has been knocking at the gates of Trinity College, with a view to the admission of women to the degrees and other benefits of Dublin University, and this long-desired object has this year at last been gained; all that remains now is to devise a feasible scheme for its working. The Association has, besides, given much time to intermediate work and to registration; it has borrowed from the Teachers' Guild a scheme for medical assistance for its professional members; and early this year was successful in persuading the various educational associations to send representatives to a conference to consider the possibility of obtaining part of the latest development grant for intermediate schools. Although the conference did not go so far as the Association might have desired in the resolutions it adopted, and although Mr. Wyndham has for the present refused any of the money to education at all, yet the fact of the conference was a decided gain; it helped to show the different associations how far they might act in unison, and that in many points they have a common platform. The Association has, lastly, from time to time organised lectures and courses

of lectures on educational subjects, the most successful perhaps being the conference on science teaching, held last autumn, at which Prof. Armstrong, F.R.S., presided over the opening meeting.

The Dublin and Central Irish Branch of the Teachers' Guild of Great Britain and Ireland is the only branch of the Guild in Ireland, and was founded early in the year 1890. Like the parent Guild in England, it is open to both sexes, to all religions, and to teachers of all classes, as well as to persons who are not teachers, but who are anxious to promote the objects of the Guild. The branch has always included some teachers concerned with university work, like the late Prof. Fitzgerald, and others connected with primary education, like the Rev. H. Kingsmill Moore, D.D., the Principal of the Church of Ireland



Mr. R. M. JONES, M.A.

Past-president of the Schoolmasters' Association.

Training College, who has in several years been elected as its chairman. Yet its work has been mainly to do with intermediate education, its membership, in spite of its name, being drawn from all parts of Ireland. The chairman for the present year is Mr. W. W. Haslett, M.A., Headmaster of St. Andrew's College, Dublin; the vice-chairman, Mr. J. Moore, B.A., Headmaster of the Masonic School, Clonskeagh; and the Secretaries, Mr. J. Thompson, M.A., of the High School, and Miss E. Webb, of the Alexandra School. It is managed by a council of twenty members. Although only a branch, it is in its nature almost an independent body; it derives, it is true, great advantages from being in touch with the much larger and more influential association in England, not only from

the distribution of the Guild literature, but by association with the progress of educational reforms and reformers across the water; yet so many of the problems of Irish teachers differ from those in England that they must be looked at and treated from different standpoints. The chief ambition of the Guild—the creation of a true teaching profession, brought much nearer in England by the recent Education Act—is apparently as far off as ever. While in England, the Secondary Education Commission took much evidence on the position and training of teachers, the Intermediate Education Commission in Ireland heard evidence on these questions with reluctance, and dismissed them in their report in a single sentence. The work, therefore, of the Irish branch of the Guild has been to press the importance of the registration and organisation of teachers in Ireland: it has at the same time made many suggestions for reform to the Intermediate Board; introduced a system of medical assistance for members who are teachers; distributed literature on educational problems, as well as the "Guild's Holiday Guides" and *Quarterly*, and by means of evening meetings endeavoured to spread information on the progress of education, especially secondary education, in other countries, to impress on the teacher the necessity of studying his art as befits an expert, and to promote discussions on all useful subjects relating to education. It has been till quite recently the only association where teachers of both sexes have met together for these purposes.

Some years ago an association was started, the headquarters of which were in Cork, to advance in particular the interests of assistant teachers; it was called the "Association of University and Intermediate Teachers"; several branches were formed and a congress was held in Dublin, but the only branch of which anything has been heard during the last year or two is that in Dublin, the president of which is Mr. Condon, an assistant-master at St. Vincent's College, Castleknock, and the secretary, Mr. P. J. Dempsey, an assistant-master at Belvidere College, Dublin. The Association is open to all assistant teachers in schools preparing for university and intermediate examinations in Ireland, without distinction of religion. Its immediate object is to improve the position, tenure, salaries and prospects of assistants, and it is naturally greatly in favour of registration. There is no doubt that an improvement in the status of the assistant teacher is the key to solve many difficulties in Ireland, and if the Association can effectually work public opinion up to this point it will have conferred a lasting service upon Irish secondary education.

The last association that calls for any notice is the "Dublin Education Society," which was inaugurated last winter. The organiser was Mr. W. M. Heller, who is the Recorder of the Educational Science section of the British Association, and helped to organise the conference on the teaching of practical science which was held at Alexandra College in September of last year. Desiring to commemorate and render permanent,

if possible, the work of that conference, he moved a resolution on the last afternoon that it was desirable that a society should be formed including all grades of teachers, primary and secondary, Protestants and Roman Catholics, whose object would be to discuss all kinds of educational problems relative to the present day. The resolution was carried and a committee appointed which subsequently developed into the Dublin Educational Society. It held some meetings early in the spring in the Royal University, and in the lecture theatre of the Royal Dublin Society, which were fairly successful, but as it is of so recent origin, it is too early to speak of any definitely accomplished work.

It will be seen, from this short description of the educational associations of Ireland, that Dublin is plentifully, if not too plentifully, supplied with opportunities for discussion and interchange of ideas on current educational problems. What is needed in Ireland is that there should be more facilities of a similar kind in the provincial towns whereby local teachers should be kept abreast of the march of the times and of the important developments in education not only in Ireland but in England, on the Continent and in America. It is to be desired that the existing associations should devote themselves to this end, and should also seize every opportunity that offers for working together and discovering some common policy for the good of intermediate education. For, in the last resort, in matters educational the country must depend on the teacher.

WOMEN GYMNASTS AT THE NÜRNBERG GYMNASTIC FESTIVAL, 1903.

BY AN ENGLISH DELEGATE.

ENGLAND, for the first time, sent women exponents of educational gymnastics to the great Gymnastic Festival held this year in July, at Nürnberg.

The thousands of gymnasts gathered together in this beautiful old German town from all parts of the world were very curious to see what English women were capable of gymnastically, and the little band of English representatives, both when viewing the festival or quietly enjoying the beauties of Nürnberg, were regarded by thousands of curious eyes, which no sooner read the printed badge of "London" than their owners doffed their caps, and shouted, with great enthusiasm, "Gut heil!" which, it is hardly necessary to explain, is the German greeting between gymnasts. The "Gut heil!" from the visiting ladies was no less enthusiastic than that of the Germans. The English women were equally curious on their part, and were just as interested in discovering what amount of skill the German women could show in educational gymnastics.

When the command "fall in!" was given to the German women, to the surprise of the English

visitors, they saw a squad of lady gymnasts in floppy sailor-blouses drawn in at the waist by elastic, and with skirts reaching to the ankles, the costume, in fact, looking anything but neat. The whole dress, in most cases made of cotton material, was unfit for gymnastics, and the figures of the women were anything but smart, their whole appearance being somewhat like a bundle tied up in the middle. The first surprise caused by the German women's appearance was quickly followed by a second, which their gymnastic work provided. The music started and the marching began; but what marching it seemed to the English women, who consider marching as a special form of exercise never to be lightly regarded!

The representative German women gymnasts were drawn up in ranks of fours, and leisurely, arm-in-arm, the whole squad moved on, ambling along regardless of the music, and beginning "left-right" or "right-left" according to individual caprice. After the squad had opened out the exercises started, and a third surprise was in store. Not one of the German women was allowed to stretch her arms straight above her head; the "arms-upward-stretch" position was with them a movement in which the elbows were well bent, and the finger-tips touched just above the head, the theory being, that it is too much of an internal strain for women to stretch their arms overhead. This, of course, astonished the English women, who find "arms upward stretch" such a splendid movement for bringing large groups of muscles into play.

Now to contrast this with the work of the English women. On the afternoon appointed, crowds of curious spectators gathered round the raised platform on which the English girls were to perform, until, at last, not much else than a sea of upturned faces could be seen, the number of spectators being estimated at 100,000.

As the English women appeared, a great stir was seen in the crowd, and every eye was fixed on the platform. Mounting the steps of the platform, each performer looked very important in a flowing navy-blue gown, which covered the gymnastic costume itself. Another stir in the crowd, and the people that flocked round the platform made way right and left as a figure clad in scarlet from head to foot ascended to the platform. Cheers were then heard, as it needed no further announcement that here was the head of the English women's college. At the order "fall in," the crowd was breathless as each navy-blue gown was opened, and out stepped lithe well-made women, in smart blue-serge costumes, with neatly fitting bodices and white belts and ties; and the skirts! what did the Germans think of them? They reached just to the knees, showing well-made knees and legs, the whole costume finishing with white shoes. What did the Germans think? Why, they were too breathless to express in words any thoughts, for the sight of twenty girls in such costume, who had fallen into line as quick as lightning, was a sight that a good many had never seen before. The accurate marching was followed

by a set of free exercises, each of the four groups bringing into play the muscles of all parts of the body, and it was evident that the English women were not afraid of stretching their arms above their heads, for indeed they stretched from their toes to their finger-tips. Each group finished with a good, graceful, marching exercise, and the thousands of onlookers watched with interest the movements, which were all performed with exact precision.

After a display of step-marching the squad, at a command from their head, formed a flank line at the back of the platform, and in perfect line marched to the front, where "halt" was sounded; and at another command the whole line saluted and shouted in unison three lusty "Gut heils" to the people, who now broke out into a storm of applause, and waved hats, sticks, and umbrellas, to show how they appreciated the work done by the English women.

The English girls had taught them a lesson, as hundreds were heard to confess, showing the Germans what educational gymnastics for women ought to be. It seems strange that gymnastics as practised by the German men should have reached so advanced a stage while their women-folk have to be content with a far less perfect state of development. The English women, by the way, had the unusual honour shown them of being asked to perform again in the evening, and the crowd that then gathered showed how their fame had spread.

The work of the German men was splendid, as also was the work of the men from all over the world. One very striking scene was that of 14,000 men from all parts of the world (England included) who worked together some groups of iron-wand exercises. It was simply marvellous! A sight once seen not easily forgotten, for as each exercise was performed it looked almost like a field of white grass being blown by the wind, first one way and then the other. The director on a high platform gave the commands by means of a flag, and an ingenious method was adopted for keeping time—a band for 14,000 was of course out of the question. All over the ground, at equal distances, were placed poles with bells upon them, and these bells were connected by electric wires to the platform. An electrician, who sat immediately behind the director, worked these bells, and, as the director counted, so at the same second the electrician rang the bells all over the ground, the first of each exercise being especially marked by a deeper sounding bell than the others.

Another very interesting spectacle was the squad of 180 old men, ranging up to 84 years of age. They gave a good display of iron dumb-bells, and finished up with some simple apparatus work, which was exceedingly well done for such aged gymnasts.

It is true that the English women taught the Germans a lesson, but it is also true that the German men set the English an example in their keenness for gymnastics, for in Germany nearly all the men and boys go to a gymnasium, no

matter what their station in life. Another thing; would 100,000 people collect in England to see a gymnastic festival? However, gymnastics is making rapid strides in England, and it is to be hoped that in a few years England will be able to hold a gymnastic festival equalling those held in Germany. The English women who created this favourable impression in Nürnberg were from "The Gymnastic Teachers' Training College," held at the South-Western Polytechnic, London, and the lady in scarlet was Fraülein Wilke, who is the able head of the college.

There is a great opening for girls who take up gymnastics, the demand for competent teachers being far greater than the supply. The two or three years' training which is necessary is enjoyable and not very expensive. The principal studies of the neophyte are—gymnastics on German, Swedish, and English systems, physiology, hygiene, anatomy, massage and medical gymnastics, fencing, dancing, singing, voice production, elocution, hockey, tennis, cricket and swimming. Any girl, whether she wishes to practise professionally or not afterwards, would do well to go through the training, which will improve her health, add to her happiness, and may perchance result in the honour of representing England in a future German gymnastic festival.

OXFORD LOCAL EXAMINATIONS, 1903.

Hints from the Examiners' Reports.

MANY of the criticisms contained in the reports of the examiners of the papers in the Oxford local examinations of July last deserve careful consideration by teachers preparing candidates for the examinations of next year. The various divisions of the examination are dealt with separately in the following selection of extracts:

SENIOR CANDIDATES.—Though the pass paper in *English grammar* was on the whole very creditable, the examiners report that the advanced papers frequently revealed the need of more practice in the construction of sentences to illustrate points of syntax; the examples sent in were often incomplete and meaningless, or else so ambiguous as to be of little value. The chief weaknesses to be noted in the English essays were lack of arrangement, lack of a sense of proportion, and a tendency to repetition. It is of the utmost importance, in teaching essay writing, to impress upon the learner the necessity of thinking out carefully the plan of his essay before he begins to write it.

The great majority of the senior candidates had a competent knowledge of the facts of *ancient history*, but for the most part failed to use their knowledge to the best advantage. The geographical aspect of the history appeared to be neglected. The papers in *European history* on this

subject were mostly poor. The candidates showed very little knowledge of specific facts like dates, terms of a treaty, locality of a campaign, though many of them wrote fairly well on questions that could be treated in general language without much use of facts.

The prepared *Latin* books were, generally speaking, translated very correctly, and into good and appropriate English, but too little knowledge was shown of their general contents; the comments, though usually intelligent, often revealed absurd misunderstandings of the book, owing to the absence of such a general outline knowledge of Roman history as is a necessary background to the understanding of any Latin writer. It is a matter of surprise in the *higher Latin* paper, the examiners report, that the allusions should not have been better known.

The questions on syntax in the *pass French* paper were not well answered as a rule. The efforts made in the last few years to improve the practice in sentence-analysis have not yet produced the results which were expected. Most of the candidates have simply learnt by heart rules which they do not understand and cannot apply. The composition was poor. Bad mistakes occurred with a frequency which was evidence, the examiners say, of inexcusable carelessness. Some candidates taking the advanced papers conjugated the French reflexive verb with *avoir*. The *German* composition in the pass papers was done with great inaccuracy, and in a large number of cases fundamental syntactical notions seemed to be unknown; and in the advanced papers great inaccuracy as to tenses, moods, numbers, and genders was shown. The answers to questions of syntax in these papers, too, were unsatisfactory, and more care ought to be given to the study of idiomatic expressions and of word-formation.

The prevailing fault in the *arithmetic* papers was inaccuracy. Very few showed any knowledge of the contracted method of multiplication of decimals. On the other hand, approximations were frequently made in the middle of a question when an exact answer was required. The mistake of interpreting "of" in the case of fractions as "divided by" occurred with noticeable frequency.

It should be remembered, says the examiner of the *heat* papers, that in an account of an experiment a mere description of the apparatus is not sufficient—a satisfactory answer must state clearly what is measured, how the measurements are made, and how the value of the physical quantity is deduced. In many cases time was lost over details, whilst it was left quite doubtful whether the theory of the experiment was understood.

JUNIOR CANDIDATES.—In the pass *Shakespeare* papers the passage set from "Macbeth" for paraphrasing was not satisfactorily done; very few indeed of the candidates appeared to grasp the full meaning. The examiner of the papers on "Henry V." reports that the one chief danger before teachers and pupils would appear to be the habit of putting before pupils ready-made para-

phrases of passages, or essays on subjects arising out of the play, which the pupils learn by heart and yet do not assimilate.

The punctuation of the *English essay* was in many cases very faulty, when not absolutely wanting. Pupils should be encouraged to write a little more freely, to follow the train of their own thoughts rather more, and not to sacrifice all the life of their essay to the idea that it is necessary to leave no point untouched, an idea which generally results in compilation and not composition.

The examiners of the pass papers in *English history* report that candidates are evidently not sufficiently taught to think. There is therefore a tendency to rush at an answer without carefully reading over the question first—for instance, a mere catalogue of events is given where the results or causes of those events are really asked for.

A very large number of candidates who took the pass *Latin* papers, who had stated grammatical rules correctly, constructed sentences in illustration which violated the very rules they had just quoted. It would be a good thing to make pupils habitually construct easy sentences instead of learning stock examples by heart. The unseen and prepared-books papers, as a test of the candidates' grasp of Latin construction, were disappointing. The grammatical notes on the shorter passages for translation were extremely poor; the translation being often correct, while the attempted explanation showed that the candidate had not the slightest idea of the case or mood-usage which justified the translation.

In *arithmetic* the knowledge of square root proved to be less general than might have been expected, many candidates failing even to attempt an easy example of this nature. Long reductions which led to laborious work were frequently made when the introduction of simple fractions would have saved much trouble. There was an improvement in the manner in which the answers were written out, the statement of the units employed being in general correctly made, and the working was, on the whole, neat and well arranged.

Under the new regulations there has been a greater display of intelligence in the answers to the pass *geometry* paper. This was especially noticeable in the proof of Euc. I. 32 and in the working of a special case of Euc. I. 45. Once there was considerable confusion over the definition of a parallelogram and Euc. I. 34, the quality of the opposite sides being frequently asserted in the proof of the proposition. A simple question involving the rotation of a triangle about its sides was but little attempted. The work of candidates taking the advanced paper as a whole was very fair. Two dangers beset candidates in the present transitional stage of geometrical teaching:—(1) Many candidates in the course of proving a proposition *A* wrote the result of another proposition *B*, which can only be proved by assuming the truth of proposition *A*; (2) in the problem of construction, proof of the validity of the construction was often omitted. It would be well if teachers would endeavour to guard against both these dangers.

· PRELIMINARY CANDIDATES.—Commenting on the answers to the questions on the second period of *English history* the examiner says:—There is a marked tendency to repeat catch phrases from notes or textbooks often in an almost meaningless way, and as a whole the answers show an attention to irrelevant detail which is out of proportion.

The general work of the candidates was fairly good in *geometry*. The points to which attention should be directed are:—(1) a greater accuracy of language in geographical definitions; (2) a greater care in the spelling of the names which occur in the countries studied. There is evidence that too much of the teaching is purely oral, and similarity of sound has led to many blunders in the papers.

In the *geometry* papers only a few candidates succeeded in stating in a short and really clear manner the reasoning involved when a proof by actual measurement or folding was attempted. In many cases the clearness of the proof given might have been enhanced if the principle had been followed of starting every fresh statement on a fresh line, and if plain printed lettering of figures had been more general. A word might be added on the unfamiliarity shown by many candidates with the spelling of the names of even the most common geometrical terms and figures.

RICHARD MULCASTER—REDIVIVUS.¹

ELIZABETHAN education is a subject which deserves a very special study. It is, however, one that is likely to be overlooked, since everyone thinks he knows enough about it. Have we not all read the life of Sir Thomas More? and the charming family life and education in his home at Chelsea? Are we not familiar with Roger Ascham's description of the tutoring of Lady Jane Grey and of Queen Elizabeth? We likely enough know that Sir Philip Sidney was educated at Shrewsbury, and we are content to suppose that the reformed schools of the foundation of Edward VI., and of Elizabeth herself made the country a busy hive of education. Still, if we ask, what was the state of university education in the Elizabethan era, many even of our educationists would pause and stumble in their answer. And if we ask, what was the nature of the school education of the time and how far did all classes participate in it, only few would interest themselves in the inquiry, and would there be any who could give a reasonably authenticated reply?

The number is probably very small of those who have read any Elizabethan writer on education other than Roger Ascham, and he, of course is read for his interesting position in the development of English style rather than for his views on education. And, indeed, probably these educa-

¹ "The Educational Writings of Richard Mulcaster (1532-1611)." Abri'ged and arranged, with a critical estimate. By James Oliphant. viii. + 245 pp. (Glasgow: James Maclehose.) 3s. 6d. net.

tional views are more essentially those of John Sturm, the Strassburg schoolmaster, rather than his own. However, there is an idea abroad since R. H. Quick wrote on Mulcaster, that Mulcaster ought to count for far more in the history of English education than Ascham or even John Brinsley. This is probably correct. But, then, most educationists are quite satisfied with the fact that Mr. Quick held the view. A few, perhaps, have looked at Dr. Theodor Klähr's "Leben und Werke Richard Mulcaster's," and feel fortified thereby to accept Mr. Quick's high opinion of Mulcaster. But there must surely be a sense of amazement that a foreigner who edits the "Pädagogische Studien" of present-day Germany should concern himself with the spacious times of Elizabethan England—at any rate, over a writer on education—and that writer Richard Mulcaster. For he might have been reading Shakespeare instead, or even Edmund Spenser. By the way, Mulcaster was Edmund Spenser's schoolmaster. Doubtless, Mr. Quick and Dr. Klähr would have been interested in finding out the views on education of Shakespeare's schoolmaster, could they have been found, and even in considering whether the school education of Shakespeare affected his after life. But such historical inquiries amaze the English mind. And possibly Dr. Klähr's learned investigation on Mulcaster has not been read by as many Englishmen as Germans.

So, too, probably most English people interested in education think that Mr. Quick's reverential tribute to Mulcaster by reprinting the "Positions" was a sad loss of time, trouble and expense. One wonders how many, or rather how few, copies were sold, and of these, whether more were not sold in America than in Richard Mulcaster's own country of England. We in England are supposed now to have such a keen interest in education. Well, that being so, there are so many things we have to do and to read as teachers we have no time for old writers and out-worn thinkers, however good in their own day. It is said, Mulcaster must wait. So, too, must Plato, Aristotle, and Quintilian. We have not time for thought. We have to teach.

In the meantime, in our haste, we want to know who this Mulcaster was; at any rate, those who are going in for examinations ought to have the means of knowing. And so, we ought to have an abridged and paraphrased Mulcaster. This has come in due course. And, if we ever make up our minds we want a condensed Mulcaster, as undoubtedly most would agree that we do, unless indeed we decide that it is absurd to read old writers on education, then the present book, edited by Mr. Oliphant, as named in the footnote, may at once be said to be excellent. There has been great trouble taken in the selections. They have been put into fairly intelligible garb for the reader, with still some of the interest of Mulcaster's old phrasing left. There is a biographical sketch of Mulcaster, and a critical estimate, and, though there is no index, there is a table of contents, which will enable a reader to pick out a section which

deals with any subject on which he thinks it worth a glance to see what Mulcaster's views may be.

No selection can be expected to suit all readers. Mr. Oliphant has given the gist of Mulcaster's teachings, and largely in Mulcaster's words. For this we ought to rest and be thankful. We may regret that he does not include a most incisive passage in which Mulcaster argues that the Protestant Church needed in his day to restrict learning to a few. The passage is little known, but it contains the interesting view of old pre-Reformation England: "While the Church was an harbour for all men to ride in which knew any letter, there needed no restraint [*i.e.*, limitation of those who should be educated] the better for that state, which encroached still on, and by clasping all persons would have grasped all livings. . . Will ye let the fry increase, where the feeding fails? Will ye have the multitude wax [in learning] where the maintenance wanes?" No one can doubt Mulcaster's testimony to the *wider extension* of education before than after the Reformation. And the passage is, therefore, important. On the other hand, Mr. Oliphant includes in brackets an important reference to Schmidt's "Geschichte der Erziehung," where it is noticed that Mulcaster's treatment of physical exercise closely follows the "De Arte Gymnastica" of Girolamo Mercuriale, an Italian physician. This will not finally settle Mulcaster's indebtedness, but it is a great gain to have the inquiry started as to Mulcaster's sources. And this in a book published in England—or rather, let us be accurate, in Scotland.

In a sentence, let us say, we welcome Mr. Oliphant's book and that we hope he will have a full reward in strengthening an interest in Richard Mulcaster.

PHYSICAL TRAINING IN SCOTLAND.¹

By CECIL HAWKINS, M.A.
Haileybury College.

THE terms of reference of this important Commission covered a very wide range, including all state-aided schools and other educational institutions of Scotland, and inviting suggestions as to the possible extension of physical education by means of continuation classes or otherwise.

Wide as is the scope of enquiry indicated, the Commission have been most thorough in carrying it out, and, though their report deals mainly with the elementary schools, no class of school or

¹ "Report of the Royal Commission on Physical Training (Scotland)" Vol. 1. Report and Appendix. Presented to both Houses of Parliament by Command of His Majesty. To be purchased from Oliver and Boyd, Edinburgh; or Eyre and Spottiswoode, East Harding St., Fleet St., E.C.4; and 32, Abingdon St., Westminster or E. Ponsonby, 179, Grafton St., Dublin. 219 pp. 1s. 6d.

college appears to have escaped them. Perhaps the most interesting passage in the report describes the unhygienic mode of life of many students of Glasgow University, who are so fully occupied in preparing for some kind of examination that they not only have no time for physical exercise, but are unable to get their meals properly, or at reasonable hours. We cannot feel surprised when we are told that many, who have taken very high places in the University, have left it worn out physically and mentally, and fit for nothing strenuous in the battle of life.

But it is not only in the universities that want of time is advanced as an excuse for neglecting physical culture. In all classes of schools and colleges, except the best secondary schools, the industrial schools, and the reformatories, the same oft-told tale is as a rule repeated. The Code requires that an adequate amount of physical training should be given in elementary schools, but the general opinion of those who arrange the timetable appears to be that half an hour a week is adequate, considering the opportunities. It is not stated whether this half-hour is taken all at once or distributed. If the former, it is of little use, if any; but much may be done under a competent instructor if five minutes daily are devoted to judiciously selected exercises.

The Commission are convinced that the time given is as a rule inadequate. They consider physical culture, including games, of so high a value in producing good results, "physical, mental, and moral," that they suggest that schools, which are outgrowing the accommodation provided for them, should build gymnasia and recreation halls instead of additional class-rooms. By a system of relays, one-third of the children may then be employed in improving their physique while the remainder are at work in the class-rooms, the present overcrowded curriculum being suitably modified. The drastic nature of the reform suggested can be best realised by considering the fact that, in eight typical elementary schools selected for special examination, the area of playground provided varies from 4.27 to 1.08 square yards per pupil. The proposal requires strong evidence to support it, and direct evidence of the great educational value of games and properly organised physical training is abundantly supplied from industrial schools and reformatories. Evidence to the same effect, of a less direct but highly valuable character, was given by many headmasters and other educational experts.

The high value of properly organised games is insisted on, but it is felt that no system of games is sufficient in itself. To produce the best results these require supplementing by a course of systematic physical training. The systems in general use are shortly discussed, and it is recommended that a committee should be appointed to prepare a model course. The general principles laid down for the guidance of this committee are well worth studying in detail by all who are interested in the subject of physical training, and we are glad to see that the advantage of a more

advanced course of gymnastics for the older pupils is recognised.

The Appendix to the Report is devoted to statistics. The most interesting of these were prepared especially for the Commission by Prof. Matthew Hay and Dr. W. Leslie Mackenzie. By carefully selecting the schools to be inspected they have been able to compare the physique of the children of the very poor, and those of the higher grade of working men, the children of the slums and the children of the suburbs. The high value of the schemes of classification adopted cannot be overestimated; but the number of cases examined—1,200 in all—is too small for any exact reliance to be placed upon the figures given. When we find the average weight, &c., of a group of three children worked out to three significant figures, it brings home to us how very far the series of observations falls short of the data really required to make sure of the ground which these statistics endeavour to cover. Nevertheless, the story told by the statistics is coherent and full of interest. At all points the better nurtured, better clothed, and better housed children are the superiors of those brought up under less favourable conditions. The observations were taken in November; had they been taken in March there is little doubt that the differences observed would have been even more striking.

The medical reports of these children establish clearly the supreme need of a regular medical inspection of all school children, especially with a view to the discovery of cases likely to prove a source of danger to those with whom they are associated, and of cases in which some modification of the physical training given is desirable. The valuable nature of the statistics shows how much could be learnt by means of a properly organised system of measurements, carried out on the same lines, but extending over a longer period, taking in a much larger number of observations, and collated upon a more scientific system than the rough and ready method of averages. It is hard to understand why all our efforts in this direction should be spasmodic. The value of such statistics is sufficiently apparent to all; but the absolute necessity for collecting them upon the widest possible basis is habitually ignored.

GEOLOGY IN SCHOOLS.—There is no science in which the materials for elementary teaching are so common, so cheap, and everywhere so accessible. Nor is there any science which touches so quickly the earliest and most elementary interests. Hills, plains, valleys, crags, quarries, cuttings, are attractive to every boy and girl, and always rouse intelligent curiosity and frequent inquiry; and although the questions asked are difficult to answer in full, a keen teacher can soon set his children to hunt for fossils or structures which will give them part of the information they seek. Of course the teaching cannot go very far without simple laboratory and museum accommodation, and without a small expenditure on maps and sections; but the former of these requirements can soon be supplied from the chemical laboratory and by the collection of the students themselves, while the latter are every day becoming cheaper and more accessible and useful.

Prof. W. W. WATTS.

BRUSH DRAWING.

MR. J. W. NICOL, who some years ago brought out a book entitled "Brush Drawing, a Handbook for Teachers and Students," and who is certainly one of the best exponents of brushwork as at present taught in schools, has recently issued, through Messrs. Blackie and Son, three sets of "Brush-drawing Sheets" of a size (28 in. x 20 in.) suitable for class teaching. Mr. Nicol is no lover of the loose, slovenly style which seems so attractive to some students and teachers, and his examples are clear, clean and precise, and the earlier of them, at least, are well within the capacity of the children for whom they are intended. He has also avoided the ugliness of form which is so characteristic a feature of many brushwork copies, and his sheet of lettering is unusually good, but his publication is not free from defects. That the drawings are so often not peculiarly suggestive of the brush is probably due to their having been originally executed on a small scale and then enlarged by a lithographic draughtsman out of sympathy with brush drawing, but even this supposition does not seem entirely to account for the want.

This important publication impels us to pause and consider the state of brushwork teaching generally, its aims and its achievements. There are few subjects which have sprung so rapidly into prominence. Only a few years ago it was all but unknown, to-day it is one of the studies which nearly every child has to take up in some degree. It is perhaps due to the rapid way in which the subject has come to the front that there is a certain want both of method and even of understanding in the way in which it is handled. This is not to be wondered at, seeing that many of those who have to teach it have not themselves been thoroughly, if at all, trained in it, and moreover utterly fail to appreciate what can and should be done with the brush. But it has, none the less, materially impaired the educational value of the study. We have, it is true, during the last two or three years been inundated with brushwork copies, brushwork cards, and books about brushwork. There can hardly be an educational publisher of standing who has not issued something of the kind, but the books themselves—even when, as is usually the case, they are addressed to teachers—show a want of taste and knowledge, and sometimes even a want of common care, which is really lamentable.

There seems generally to be a lack of aim in brushwork teaching as at present practised. Those who write about it do not as a rule make any distinction between the two very different uses of the study: (1) the development of the brush natural strokes as an exercise in ornament and as a means of learning the use of the tool, and (2) the use of the brush as a means of developing the faculty of seeing "and putting in" things in mass instead of in outline. When the subject first came to the fore much was hoped from it. Both

teachers and pupils were tired of the ceaseless free-hand copies executed in fine pencil-lines which formed the staple exercise in school drawing, and brushwork was eagerly hailed as a means of teaching children to appreciate the value of mass and to put things in solid without an undue expenditure of labour. So far, of course, it was all to the good. But there is surely much more real educational value in the study than is conveyed in these rather rudimentary ideas.

In the first place, the child should be taught, gradually of course, and almost without being aware of it, the kind of forms which naturally grow out of the use of the brush; and this cannot be done, as is sometimes attempted, by allowing it to lay its brush on the paper and make a blot with it. It cannot in that way learn to appreciate and use the spring of the brush properly. Again, the drawing lessons should be certainly taken as an opportunity for cultivating the child's sense of beauty, and there are no lack of beautiful brushwork forms, as exemplified both by the simple, straightforward work of the Greeks and the more graphic work of the Japanese, but the examples put before the student to-day are too often downright ugly, and have not gained in adaptability to brush drawing what they have lost in beauty of form. School drawing, especially in the elementary stages in which brushwork is more largely taught, is in great measure a gymnastic exercise, useful in training not merely the hand but also the eye and the power of observation, and for this reason it is imperative that a certain accuracy and precision of execution should be insisted upon. If the student is allowed to make loose and inaccurate renderings of what is put before him, or if he is encouraged, as judging from many of the copies lately issued he too often is, to paraphrase natural form in such a way as entirely to lose its characteristic features, the exercise not only ceases to be of much use, but becomes positively harmful. In going through the work of quite advanced students one constantly comes across designs spoiled by the recurrence of forms which resemble nothing in heaven or earth but brushwork copies, and resemble these so closely as to preclude the idea that the student has some imagination of his own, even though it be of a rather ugly sort.

In short, although the educational possibilities of brushwork are great, they seem hardly until now to have been taken advantage of. The desire to teach the child rapidly to produce something which looks pretty has caused to be rather left out of account the necessity of teaching it to work in such a way as will in time give it complete control of the brush; the ease with which a vague resemblance to the object to be copied can be obtained has encouraged too often a loose, inaccurate kind of work which is very bad training for the child; and the adoption of copies which, while trying to be original are "in truth" convention of by no means the best type, has not tended to strengthen the sense of beauty. On the other hand, the study seems to have done good work in making teachers realise that the most highly finished drawings are

not necessarily the best, in encouraging a certain freedom of style, and in awakening interest in a part of school work which was too often looked upon as dull and uninteresting.

THE ODYSSEY IN ENGLISH VERSE.¹

MR. MACKAIL has attempted a difficult task in turning the *Odyssey* into four-line stanzas of the type of Fitzgerald's "Omar Khayyam." Any kind of stanza is very unsuitable for rendering the hexameter; the hexameter rhythm is continuous, and one of its beauties, as Matthew Arnold long ago pointed out, is its speed, while the recurrent breaks at the end of stanzas completely change the effect. The same objection applies to the heroic couplet, used by Chapman and Pope, and in a less degree to the long-line ballad metre of Chapman's "Iliad." It would seem that blank verse, or some unrimed metre, is necessary if we are to get as close to the original as our language permits. But the choice at best is difficult, the genius of Greek and English being in respect of rhythm so diverse. Fitzgerald's stanza seems an unfortunate choice from its shortness, which emphasises the recurrent breaks overmuch. It hardly helps matters to run on the sense and construction from stanza to stanza. From what we have said, it follows that Mr. Mackail's "Odyssey" is a long way from Homer. Still it is quite pleasing to read, if the pleasure is of a different kind from that given by Homer. The translation is elegant and scholarly, and keeps very close to the original. It is a strange "Odyssey" that we have here, dreamy, deliberate, rather suggesting a minuet than a galop, Homer at sunset (to modify Longinus's famous criticism), full of years and peace, imbued with something of the spirit of the speakers in the "Earthly Paradise." The translation grows on our affections, and we are grateful to Mr. Mackail for his boldness. We may perhaps add a few stanzas by way of example. Ulysses is telling of Calypso:—

But when the eighth revolving year came on,
She sent me thence, and bade me to be gone
(Whether that Zeus a message sent to her,
Or her own mind at last was wrought upon),

And on a raft compact with bolt and band,
With bread and sweet wine laden, from her land
She sped me, in immortal raiment clad,
Forth of the isle, a gentle wind and bland

Sending behind me. Then across the sea
Seventeen days I voyaged ceaselessly,
And on the eighteenth morning through the mist,
The mountains of your land loomed up to me.

And glad was I, ill fated! for not so
Might I part company from all the woe
Wherewith Poseidon, Shaker of the Earth,
Pursued me, letting loose a gale to blow

That stopt my way; and o'er the seas uleapt;
And me a monstrous billow sobbing swept
From off the raft, and the squall shattered it.
But I, still swimming, through the great gulf crept,

Till to your coast with wind and tide I wore.
There had the billow as it swept ashore
Upon a joyless place of mighty rocks
Hurled me to land; but turning back once more

I swam, till where the river meets the sea,
I chose what seemed the likeliest place to be,
Being smooth of rocks, and sheltered from the wind;
And reeled ashore with no breath left in me.

The weakness of the style is shown in descriptions of action and passion. The angry suitors who pick and choose their words so carefully make the impression of simulated feeling rather than natural hate and wrath.

THE TEACHING OF ENGLISH¹

THE volume is one of a series called "The American Teachers Series," the aim of which is to "review the principal subjects of the secondary school curriculum." It is a methodical survey of the main problems that gather round the teaching of the mother tongue, not only in secondary, but also in elementary schools. The book is not a manual of method. Although in places the writers descend to details of class-management, especially in the supplementary essays at the end of the book, their main purpose is to offer "a succinct statement of issues and a careful summary of the most sound opinions" on the debatable points they discuss. The book, in consequence, like most books in which reasons are arrayed against and in favour of a proposition, strikes one as being a little laborious; and one wishes for the less complete but more brilliant and suggestive occasional papers that constitute a large proportion of English contributions to the subject. It is also deficient, though it is not totally lacking, in that kind of illustration from practice which would brighten and enliven the argument. On the other hand, it is very thorough, and where the writers do decide between the conflicting opinions they marshal so well, they display discrimination and sound judgment. Their whole attitude towards the thorny question of teaching English literature in schools is admirable; they are free alike from the pedantry of the grammarian and from the cloudy theorising of too many American writers on education. One lapse from the habitually clear and practical treatment of questions which lend themselves to vague generalisation may be noted because it illustrates what must be regarded as the writers' comparative unfamiliarity with English schools and teaching.

¹ "The Odyssey." Translated into English verse by J. W. Mackail. Books I.-VIII. 223 pp. (Murray.) 5s. net.

¹ "The Teaching of English in the Elementary and the Secondary School." By Geo. R. Carpenter, A.B., Franklin T. Baker, A.M., Professors in Columbia University; Fred. N. Scott, Ph.D., Professor in the University of Michigan. American Teachers Series. viii. 430 pp. (Longmans.) 6s. net.

A harmless paper enough on "As You Like It" set in an Oxford Junior Local Examination, taken as typical of English method, is held up to scorn because it does not provide for "real knowledge, training, or cultivation of mind." Though the questions are not above criticism, we cannot detect in the paper any vital inconsistency with the ideal of study held up for pupils of the same age in a later passage of the book. The authors, however, will not admit that English ideas on teaching the vernacular are worthy of consideration. Relying perhaps too much on the jeremiads which almost alone find expression in print, they do not give us in England credit for the genuine interest in the teaching of our language and literature, or the thought that is bestowed upon the subject in many English schools.

The reference in the book under review is naturally to the schools in the United States. But most of what is said is directly applicable to English conditions, and even such a strictly American problem as that of "Uniform College Entrance Requirements" has a distinct bearing upon the parallel question of a Leaving Certificate in English schools. In reading the chapters on the elementary schools, one should remember that the leaving age contemplated is fourteen, and that for many of the children a "high school" course follows. It must also be borne in mind that the excessive amount of attention devoted to the "rhetorical" side of composition is foreign to English ideas and practice; and, it may be added, the perusal of the pages upon "rhetoric" will not induce the English teacher to modify his present attitude towards composition. As is usual in American books on education, a very full bibliography is provided.

EDUCATION AT THE BRITISH ASSOCIATION.

THOUGH the Education Section has not swallowed up the rest of the British Association, as some predicted it would, yet its influence has this year been more pervasive than ever. Sir Norman Lockyer's presidential address was an eloquent plea for the creation of more universities, — the "battleships of the modern State," and for the more generous endowment of scientific research. In the Geological Section Prof. Watts has been demanding a place in the curriculum for Geology, on the ground that observational science is being ousted from the schools in favour of the experimental sciences. Prof. Boys has ridden a tilt against the teaching of Euclid in the public schools; an attack which most teachers will consider a little belated. Finally, Sir Robert Giffen, in his paper on the nation's wealth, told us that a hundred millions ought to be spent upon education, instead of the paltry thirty millions now allotted to it.

Sir William Abney's address as President of the Educational Science Section was a historical

sketch of what the State has done to promote science teaching in England since the formation of the Science and Art Department in 1853. The subject is one upon which Sir William speaks with indisputable authority. Since 1876, in which year, as he reminds us, he became one of the first Inspectors under the Department, he has been ever more and more responsible for its work. As we read this, his "*apologia pro vita sua*," with its splendid record of achievement, it is impossible not to agree with Prof. Armstrong in deploring "the action which has deprived us, at one of the most critical periods in the history of English education, of the services of a man of such unique experience."

In accordance with the practice of former years, the work of the Section proper has been confined to one or two broad subjects; a prolonged debate upon Curriculum occupied the morning and afternoon sessions on Thursday and Friday, and was nominally based on the eight papers printed as a supplement to last month's SCHOOL WORLD. It would have been better had the writers of papers each been limited to a specific part of the subject; as it was, with the exception of Mr. Paton, each writer travelled over the whole field, in a manner which would have baffled discussion if the papers had been read to the meeting.

The first day was devoted to "General Principles," and speakers were asked to discuss the following propositions, about which the writers of papers seemed to be in agreement:—

(1) It is desirable that specialisation should be deferred to as late a period as possible in the school career, and that the early curriculum should be so arranged as to lay a good foundation in English subjects, with, say, drawing and elementary science.

(2) It is to be regretted that the influence of public-school entrance and scholarship examinations encourages the premature devotion of too much time to classics; it would be desirable that the study of Latin should not be taken before, say, twelve years of age, and that the language teaching up to that time should be confined to the mother tongue and one modern language.

(3) That a large measure of practical instruction should be included in the school course, and that both literary and practical instruction should be given throughout and made interdependent.

The field, as thus defined, was wide, but apparently not wide enough for some of the speakers. Over and over again the limits were transgressed, and, regarded as a debate, the discussion, in spite of some brilliant speeches, was hardly a success. For the teacher, however, it was well worth while to hear the question treated from such differing stand-points as those of the Professors of Education—Mr. Adams and Mr. Sadler; the public schoolmasters—Mr. Eve, Mr. Page, and Mr. Swallow; the university women—Miss Cooper and Miss Maitland; the secondary schoolmasters—Mr. Daniell and Mr. W. L. Fletcher; the elementary schoolmasters—Mr. Gray and Mr. Yoxall.

Mr. Sadler opened the discussion with a plea for a wider interest in education. "We do not want experts governing a tame nation." What is neces-

sary is that the people generally should come to believe in the value of education. He was in favour of deferring specialisation until after the secondary school course is completed. Practical manual work was certainly going to be more important in the future than in the past. Why shouldn't boys, for example, build and decorate their cricket pavilion? After all, however, it is the teacher that matters. The ideal which the teacher must satisfy is not an ideal of erudition; some of the best teachers don't know much. What we look for in a teacher are: "(1) Sympathy, (2) a hot temper, (3) a sunny disposition, (4) a sharp tongue to be used when necessary, (5) a young spirit under grey hairs."

Prof. Adams, who followed, saw at the present time that there was a distinct danger lest we should produce a generation of teachers "lopsided on the side of science." Only nine per cent. of his own students in the London Day Training College were reading for an Arts degree, and yet the ex-pupil teacher sorely needs the influence of humanistic studies. The type of mind they were producing was too scientific, and in London the University was not a little to blame. It encourages the study of Greek by examining Intermediate Arts Students in Sophocles, though they have not taken Greek for matriculation, and do not need it in their final examination.

Mr. Page, of Charterhouse, challenged the supporters of science to explain exactly what they wanted taught. Scientific training was, no doubt, the road to wealth; was it the best means of forming the mind? He found one of the papers headed with the quotation: "Man is a tool-using animal." Let them beware of training their boys to be tool-using animals and nothing more. It was easy to teach a boy to use his fingers, it was hard to teach him to use his mind. He was afraid that modern educationists were taking the easier and the lower way.

The fourth opener, Mr. Daniell, representing the Teachers' Guild, explained the views of that body as set out in his paper which appeared last month.

The discussion was continued by Miss Maitland, who considered the salaries now paid to teachers were "degrading to the profession;" other speakers were Mr. H. W. Eve, the Rev. R. D. Swallow, Mr. W. L. Fletcher, and Prof. R. S. Conway. Mr. Yoxall, M.P., the secretary of the National Union of Teachers, was of opinion that we should soon see specialised schools established, each with a distinctive curriculum; the general trend of the discussion, however, was certainly away from specialisation of any sort in the secondary school. Mr. Ernest Gray, M.P., pointed out the danger there is that the business men, who are in the majority on the new Education Committees, will look for immediate practical results, and that this will lead to premature preparation for particular trades, unless teachers bestir themselves to prevent it.

The subject of the second day's discussion was "The Teaching of Girls," and was opened by Miss Burstall. Her first point was that, up to the age

of ten, at least half the school time should be given up to manual and physical training. Not until a girl is twelve years of age should the literary training predominate. From twelve to eighteen one-third of the time should be spent on science, one-third on languages, one-third on the humanities and English. Between the ages of twelve and sixteen there is a marked difference between a boy and a girl, and there must therefore be divergence in curricula. A girl between her twelfth and her sixteenth year cannot work hard and continuously without injury to her present and future well-being. "This is a point," said Miss Burstall, "which I will stand to to the last gasp." It was also the most interesting point which emerged during the debate. Its bearing upon the question of co-education is evident, and when appeals for a direct pronouncement which were made by Dr. Lloyd Snape, Mr. Ernest Gray, and others, went unheeded, one could not avoid the conviction that women teachers of high position and wide experience, such as Miss Maitland, Miss Cooper, and Miss Burstall, are not prepared to advocate co-education for girls and boys of secondary school age, save when financial conditions and considerations of numbers render the separate education of the sexes impossible.

Prof. Armstrong, in a speech which Mr. Yoxall subsequently described as a reversion to the ideas of a hundred years ago, attacked the modern attitude towards women's education. "Woman is not female man," he said; "she is a different animal. That is not the ladies' opinion, I know; but if you look at the matter from the Darwinian point of view, and consider what the position of women in the world has been and is, it cannot be otherwise. It was only within recent years that woman has ceased to be a slave. It takes many generations to get rid of the incubus laid on her by nature."

Miss Maitland answered Prof. Armstrong's charge, that women's education was too academic and too literary, by saying that in her experience college-bred girls became healthy, sensible women, and were certainly good housewives and mothers. It was only by beating man on his own ground that woman had won her right to higher education at all.

The outcome of a most animated discussion was the following propositions, all of which were assented to by the section:—

(i.) It is desirable that in organising the curriculum there should be some differentiation, especially in science, between courses of study for boys and those for girls, more particularly between twelve to sixteen years of age.

(ii.) That for *all* girls literary and artistic instruction is of the highest importance; at some period of their school life practical instruction in the domestic arts should be provided, based on and correlated with elementary science teaching.

(iii.) With a view to obviate over-pressure, injury to health and superficiality, girls who intend to proceed to college, or enter a literary profession, should in general remain at school till eighteen years of age.

(iv.) It is desirable that County and Borough Councils and other authorities offering scholarships for girls to enable them to proceed to college should not expect them to take up their scholarships before they reach the age of eighteen.

In the afternoon there was to have been a discussion upon Commercial Education. Mr. Paton, of Manchester Grammar School, summarised his paper in an admirable and convincing speech, but the rest of the session was occupied with echoes of the previous day's debate. Sir Oliver Lodge expressed his surprise that, while teachers talked so much common-sense in their meetings, the output of the schools was so unsatisfactory. Mr. W. L. Fletcher restated the principles upon which it seemed to him we were in agreement; and Mr. C. J. Hamilton, Secretary of the Moseley Educational Commission, asked for suggestions on the work of the Commission from practical teachers.

On Sept. 14th the teaching of geography was considered at a joint meeting with the Geographical Section. Mr. Mackinder, who opened the discussion, advocated a regional treatment of the subject as opposed to a physical treatment under such categories as "volcanoes," "climate," "wind," and the like. Geography would never, he thought, take its proper place as an educational discipline until four conditions were simultaneously satisfied: (1) the encouragement of university schools of geography, (2) the appointment of specialists in geography on the staffs of secondary schools, (3) the general acceptance of a progressive method in the subject, (4) the setting of examinations by geographical teachers.

Of the dozen speakers who followed him, Mr. Hugh Richardson was the most interesting with his account of the way in which the boys of Bootham School are taught to rewrite their notebook records in the language of Ruskin.

Four valuable reports upon School Hygiene, the Teaching of Botany, Elementary Science Teaching, and the Influence of Examinations, have been presented and considered, and a committee has been appointed to consider "Courses of experimental, observational and practical instruction most desirable for elementary schools." In the discussion on the Examinations Report Sir William Abney said that there would be no difficulty in obtaining competent officers for the Army if the subalterns were paid a living wage. The Army entrance examinations were not to blame. At the same time the practice of assigning definite marks to the different subjects set in those examinations would shortly cease.

It will be seen from this brief account that a great deal of solid work has been accomplished. Perhaps, however, the most useful function that the Section performs is that of an educational "clearing house." The associations with which the educational world is honey-combed are all of them sectional, and all of them, therefore, narrow; and because it supplies a common ground upon which all classes of teachers may meet one another and exchange ideas, and meet also thoughtful people who are not teachers, the Education Section deserves well of the profession.

H.

THE IRISH TECHNICAL CONGRESS.

THE second Irish Technical Congress was held in Belfast on September 2nd and 3rd, under the presidency of Sir James Henderson, chairman of the Belfast Library and Technical Instruction Committee. Upwards of fifty delegates were present from various technical instruction committees in the four provinces of Ireland. The Rev. P. J. Dowling, of Cork, acted as hon. secretary. The agenda was a full one, consisting of twenty-eight points, of which seventeen were energetically discussed. Most of these subjects had direct bearing upon the efficient organisation and management of technical schools in Ireland, upon the attitude of the Department of Technical Instruction in regard to technical instruction committees, and upon the distribution of funds at the disposal of the Department.

A lengthy discussion ensued upon the reading of a paper by Mr. A. E. Easthope, of Dundalk, on the co-ordination of secondary schools with technical schools. After instancing some of the changes that had taken place in educational administration in Ireland consequent upon the report of the Vice-Regal Commission of 1898, Mr. Easthope advocated a better understanding between the National Commissioners and the Department of Technical Instruction, whereby manual training, science, and domestic economy instruction, now being given in primary schools, might be transferred to the technical school laboratory and workshop under properly trained teachers. There was at the present time too much overlapping between the various systems in Ireland, and a proper system of co-ordination of work was required. Mr. Quick (Limerick) stated that both Belfast and Limerick had decided upon the establishment of day technical schools as the best means of bridging the gap referred to. Eventually the following resolution was adopted unanimously: "That the Department be requested to draw up a scheme of co-ordination between the secondary schools and the technical schools, and that the same be submitted to and discussed by a joint conference of masters of secondary schools, the headmasters of technical schools, the representatives of associated county councils, and the representatives of the Department."

Considerable discussion took place relative to the attitude of some trades bodies in refusing to allow teachers of subjects connected with various trades to follow their work during the day. Mr. Quick, who introduced the subject, stated that his committee were somewhat hampered in their scheme by this action on the part of the local trades. The funds of the committee would not permit of their appointing expert men for all the trades subjects, but such men could be induced to come if work was available for them during the day. The trades unions, however, refused to agree to this, although the masters were willing to take the men. The Rev. Father Dowling remarked they were experiencing the same difficulty in Cork. This attitude was severely deprecated by Messrs. Richardson and Symonds, the president and secretary of the Dublin Trades Council, the former stating that the Trades Congress had been agitating for years past for the spread of technical education, and on no account would the committee he represented sanction or sympathise with such conditions as Father Dowling and Mr. Quick had referred to. The following resolutions were adopted: (i) "That this Congress deprecates the attitude adopted by trades bodies in some districts in Ireland in preventing teachers employed by technical committees following their trades during the day." (ii.) "That this Congress should call upon the master tradesmen to co-operate in extending technical education among their employees, particularly the apprentices."

On Wednesday, September 2nd, a meeting took place of the delegates of Associated Technical Committees, when the council of the association was elected, the name of the association changed to "The Irish Technical Association," and other business transacted.

THE NATIONAL VALUE OF HIGHER EDUCATION.¹

CHIEF among the causes which have brought us to the terrible condition of inferiority as compared with other nations in which we find ourselves are our carelessness in the matter of education and our false notions of the limitations of State functions in relation to the conditions of modern civilisation.

Time was when the Navy was largely a matter of private and local effort. William the Conqueror gave privileges to the Cinque Ports on the condition that they furnished fifty-two ships when wanted. In the time of Edward III., of 730 sail engaged in the siege of Calais, 705 were "people's ships." All this has passed away; for our first line of defence we no longer depend on private and local effort.

Time was when not a penny was spent by the State on elementary education. Again, we no longer depend upon private and local effort. The Navy and primary education are now recognised as properly calling upon the public for the necessary financial support. But when we pass from primary to university education, instead of State endowment we find State neglect; we are in a region where it is nobody's business to see that anything is done.

We, in Great Britain, have thirteen universities competing with 134 State and privately endowed in the United States and twenty-two State-endowed in Germany. I leave other countries out of consideration for lack of time, and I omit all reference to higher institutions for technical training, of which Germany alone possesses nine of university rank, because they are less important; they instruct rather than educate, and our want is education. The German State gives to one university more than the British Government allows to all the universities and university colleges in England, Ireland, Scotland, and Wales put together. These are the conditions which regulate the production of brain-power in the United States, Germany, and Britain respectively, and the excuse of the Government is that this a matter for private effort. Do not our Ministers of State know that other civilised countries grant efficient State aid, and, further, that private effort has provided in Great Britain less than ten per cent. of the sum thus furnished in the United States in addition to State aid? Are they content that we should go under in the great struggle of the modern world because the Ministries of other States are wiser, and because the individual citizens of another country are more generous than our own?

If we grant that there was some excuse for the State's neglect so long as the higher teaching dealt only with words, and books alone had to be provided (for the streets of London and Paris have been used as class-rooms at a pinch), it must not be forgotten that during the last hundred years not only has knowledge been enormously increased, but things have replaced words, and fully equipped laboratories must take the place of books and class-rooms if university training worthy of the name is to be provided. There is much more difference in size and kind between an old and a new university than there is between the old caravel and a modern battleship, and the endowments must follow suit.

What are the facts relating to private endowment in this country? In spite of the munificence displayed by a small number of individuals in some localities, the truth must be spoken. In depending in our country upon this form of endow-

ment we are trusting to a broken reed. If we take the twelve English University Colleges, the forerunners of universities, unless we are to perish from lack of knowledge, we find that private effort during sixty years has found less than £4,000,000; that is, £2,000,000 for buildings, and £40,000 a year income. This gives us an average of £166,000 for buildings, and £3,300 for yearly income.

What is the scale of private effort we have to compete with in regard to the American universities? In the United States, during the last few years, universities and colleges have received more than £40,000,000 from this source alone; private effort supplied nearly £7,000,000 in the years 1898-1900.

Next consider the amount of State aid to universities afforded in Germany. The buildings of the new University of Strassburg have already cost nearly a million; that is, about as much as has yet been found by private effort for buildings in Manchester, Liverpool, Birmingham, Bristol, Newcastle, and Sheffield. The Government annual endowment of the same German university is more than £49,000. This is what private endowment does for us in England, against State endowment in Germany. But our State does concede the principle of endowment; its present contribution to our universities and colleges amounts to £155,600 a year. No capital sum, however, is taken for buildings. The State endowment of the University of Berlin alone in 1891-2 amounted to £168,777.

When, then, we consider the large endowments of university education both in the United States and Germany, it is obvious that State aid only can make any valid competition possible with either. The more we study the facts, the more statistics are gone into, the more do we find that we, to a large extent, lack both of the sources of endowment upon one or other or both of which other nations depend. We are between two stools, and the prospect is hopeless without some drastic changes. And first among these, if we intend to get out of the present Slough of Despond, must be the giving up of the idea of relying upon private effort.

To compete on equal grounds with other nations we must have more universities. But this is not all: we want a far better endowment of all the existing ones, not forgetting better opportunities for research on the part of both professors and students. Another crying need is that of more professors and better pay. Another is the reduction of fees; they should be reduced to the level existing in those countries which are competing with us—to, say, one-fifth of their present rates—so as to enable more students in the secondary and technical schools to complete their education.

In all these ways facilities would be afforded for providing the highest instruction to a much greater number of students. At present there are almost as many *professors and instructors* in the universities and colleges of the United States as there are *day students* in the universities and colleges of the United Kingdom.

Men of science, our leaders of industry, and the chiefs of our political parties all agree that our present want of higher education—in other words, properly equipped universities—is heavily handicapping us in the present race for commercial supremacy, because it provides a relatively inferior brain-power, which is leading to a relatively reduced national income.

The facts show that in this country we cannot depend upon private effort to put matters right. How about local effort? Anyone who studies the statistics of modern municipalities will see that it is impossible for them to raise rates for the building and upkeep of universities. The buildings of the most modern University in Germany have cost a million. For upkeep the yearly sums found, chiefly by the State, for German universities of different grades, taking the incomes of seven out of the twenty-two universities as examples, are:—

¹ From the Presidential Address to the British Association delivered at Southport, on September 9th, by Sir Norman Lockyer, K.C.B., LL.D., F.R.S.

		£
First Class . . .	Berlin . . .	130,000
Second Class . . .	{ Bonn } . . .	56,000
	{ Göttingen } . . .	
Third Class . . .	{ Königsberg } . . .	48,000
	{ Strassburg } . . .	
Fourth Class . . .	{ Heidelberg } . . .	37,000
	{ Marburg } . . .	

Thus, if Leeds, which is to have a university, is content with the fourth-class German standard, a rate must be levied of 7d. in the pound for yearly expenses, independent of all buildings. But the facts are that our towns are already at the breaking strain. During the last fifty years, in spite of enormous increases in ratable values, the rates have gone up from about 2s. to about 7s. in the pound for real local purposes. But no university can be a merely local institution.

THE GROWTH OF THE TEACHING OF SCIENCE IN ENGLISH SCHOOLS.¹

THE first science examinations conducted by the State took place in May, 1861, and, the system of grants being made on the results of examination having been authorised, the sum of £1,300 was spent on this occasion on the instruction of 650 candidates, that number having been examined. Thus early was the system of examination commenced, and the method of payments on the results of these examinations stereotyped for many years to come. There is reason to believe that the educational experts of that day considered that both were essential and of educational value, a value which has since been seriously discounted. Employers of labour in this country were not too quick in discerning the advantages that must ultimately ensue from this class of education if properly carried out and encouraged. Theoretically they gave encouragement, but practically very little, and this survives to some extent even to the present day.

No country but this, for very many years, considered that instruction in science for the artisan was a large factor in maintaining and developing industry. The educational interests of the employer and the foremen were, in some countries, well provided for, but the mechanic was merely a hand, and a "hand" trained in merely practical work he was to remain. He could not aspire to rise beyond. We may congratulate ourselves that such a "caste" system does not exist amongst ourselves.

For the first twenty-five years of the Department of Science and Art the grants given by Parliament for science instruction were distributed almost entirely amongst those who were officially supposed to belong to the industrial classes, and no encouragement was offered to any higher class in the social scale.

It would take me too long to show that at first the industrial classes were very shy of seizing on the advantages offered them. Suffice it to say that they had to be bribed by the offer of prizes and certificates of success to attend instruction, and it was not for several years that the evening classes got acclimatised and became popular.

Much of the science that was taught in state-supported classes was largely book work and cram, and the theoretical instruction, as a rule, was unillustrated by experiment. This was undoubtedly

due to the system of payments being based on success at the examinations. I must here say that there were honourable exceptions to this procedure. There were teachers, then as now, who knew the subjects they taught, and who were inspired by a genuine love of their calling.

I am not one of those who think, as some do, that cramming is entirely pernicious. A good deal of what used to be taught at public schools in my days was cram. It served its purpose at the time in sharpening the memory, and was a useful exercise, and it did not much matter if in after years much of it was forgotten. If the cramming is in science, a few facts called back to mind in after life are better than never having had the chance at all. In fact, as the faded beauty replied to the born plain friend, it is better to be one of the "have beens" than a "never wasn't."

The first grants for practical teaching were paid for chemistry. The practical work had to be carried out in properly fitted laboratories. There were not half-a-dozen at the time which really answered our purpose, and one of the earliest pieces of work on which I was engaged was in assisting to get out plans for laboratory fittings. Thanks to the Education Act of 1870 (I speak thankfully of the work that some of the important school boards have done in the past in taking an enlightened view of science instruction), there were some localities where the idea of fitting up laboratories was received with favour, and it was not long before several old ones were refitted, in which instruction to adults was given, and new ones established in board schools for the benefit of the sixth standard children. At that time an inspector's, like the policeman's, lot was not a happy one. We had to refuse to pass laboratories which did not fulfil conditions, though we left very few "hard cases."

Till after the passing of the Technical Instruction Act in 1887 the Department aided schools in the purchase of the fittings of laboratories (both chemical and others), and year after year this help, which stimulated local effort, caused large numbers of new laboratories to be added to the recognised list.

The half-dozen chemical laboratories which existed in 1887 have now expanded to 349 physical and 774 chemical laboratories. These are spread over all parts of England. I leave out Scotland and Ireland, as the science teaching is no longer under the English Board of Education. It is only fair to say that many of this large number of laboratories are at present in secondary schools, regarding which I shall have to speak more at length. But the fact remains that in twenty-seven years there has been such a growth of practical science-teaching that some 1,120 laboratories have come into being.

A reference must now be made to the removal of what anyone will see was a great bar to the spread of sound instruction in every class of school where science was taught. So long as the student's success in examination was the test which regulated the amount of the grant paid by the State, so long was it impossible to insist on all-round practical instruction. It was impracticable to hold practical examinations for tens of thousands of students in some twenty different subjects of science. The practical examination in chemistry told its tale of difficulties. It was only when the Duke of Devonshire and Sir John Gorst in 1898 substituted payment for attendance for the old scheme of payments, and in a large measure substituted inspection for examination, that the Department could still further press for practical instruction. For all elementary instruction the test of outside examination does more harm than good, and any examination in the work done by elementary students should be carried out by the teacher, and should be made on the absolute course that has been given. It seems to be useless or worse that an examination should cover more than this. Instruction in a set syllabus which for an outside examination has to be covered spoils the teaching and takes away the liberty of method which

¹ Abridged from the Address to the Educational Science Section of the British Association delivered by Sir William de W. Abney, K.C.B., D.C.L., D.Sc., F.R.S., President of the Section, on September 10th.

a good teacher should enjoy. The literary work involved of answering questions, for an outside examiner, is also against the elementary student's success, and cannot be equal to that which may properly be expected from him a couple of years later.

Advanced instruction appears to be on a different footing. The student in advanced science must have gradually obtained a knowledge of the elementary portions of the subject, and it is not too much to ask him beyond the inspection of his work to express himself in decent English and submit to examination from the outside; but even here the payment for such instruction should be by an attendance grant tempered in some degree by the results of examination, since examiners are not always to be trusted.

Instruction given in so-called organised science-schools was originally aided by the Department by means of a small capitation grant. These schools were supposed to give an organised course of science instruction, and the successes at examination determined the payment. There was no doubt, however, that the conditions under which they existed were most unfavourable for a sound education, which ought not only to include science but also literary instruction. The latter was, in many schools, wholly neglected, owing to the fact that the grants earned depended on the results of examination, and so all the school time was devoted to grant earning.

Mr. Acland, at this time Minister for Education, was made aware of this neglect to give a good general education, and as I was at that time responsible for science instruction I was directed to draw up a scheme for reorganising these schools and forcing a general as well as scientific education to be carried out. Baldly the scheme abolished almost entirely² payments on results of examination, and the rate of grant depended on inspection and attendance. Further, a certain minimum number of hours had to be given to literary subjects, and another minimum to science instruction, a great deal of it being practical and having to be carried out in the "workshop." The payments for science instruction were to be withheld unless the inspector was satisfied that the literary part of the education was given satisfactorily.

Needless to say, the scheme was not received with favour on all sides, more especially by those who thought that serious damage would be done to secondary schools by the competition from this new development of secondary education. At first it was principally the higher-grade board schools that came under the scheme, and in the first year there were twenty-four of them at work. This type of school gradually increased until about seventy of them, and chiefly of a most efficient character, were recognised in 1900. Their further increase was only arrested by the Cockerton judgment, now so well known that I need only name it. But here we come to a most interesting development. State aid, as already said, was at first limited to the instruction of the industrial classes, but no limitation as to the status of the pupil was made in this new scheme for the schools of science, and logically this freedom was extended in 1897 to all instruction aided by the Department—the date when all limitation as to the status of the pupil was abolished, the only limitation being the status of the school itself. Thus, if a flourishing public school, charging high fees for tuition, were to apply to participate in the grant voted by Parliament, it may be presumed, it would have to be refused. The abolition of the restriction as to the status of the pupils left it open to poorly endowed secondary grammar-schools to come under the new scheme. To a good many the additional income to be derived from the grant meant continuing their existence as efficient, and for this reason, and often, I fear, for this reason alone, some claimed recognition as eligible.

Such is an outline history of the invasion of science instruction

into certain secondary schools—an invasion which ought to be of great national service. In my view, no general education is complete without a knowledge of those simple truths of science which speak to everyone, but usually pass unheeded day by day. The expansion of the reasoning and observational powers of every child is as material to sound education as is the exercise of the memory or the acquisition of some smattering of a language. I am not going into the question of curricula in schools, as I hope, regarding them, we shall have a full discussion. But of this I am sure, that no curriculum will be adequate which does not include practical instruction in the elementary truths of science. The President of the Royal Society, in his last Annual Address, alluded to the mediæval education that was being given in a vast number of secondary schools. Those who planned the system of education of those times deserve infinite credit for including all that it was possible to include. Had there been a development of science in those days, one must believe that with the far-seeing wisdom they then displayed they would have included that which it is the desire of all modern educationists to include. Observational and experimental science would have assuredly found a place in the system.

One, however, cannot help being struck by the broadening of views in regard to modern education that has taken place in the minds of many who were certainly not friendly to its development. Perhaps in the Bishop of Hereford, when headmaster of Clifton, we have the most remarkable early example of breadth of view, which he carried out in a practical manner, surrounding himself with many of the ablest teachers of science of the day. There are other headmasters who, though trained on the classical side, have had the prescience to follow in his footsteps, and of free will; but others there are who have neither the desire nor the intention, if not compelled to do so, to move in the direction which modern necessities indicate is essential for national progress. I am inclined to think that the movement in favour of modernising education has been very largely quickened by the establishment of schools of science in connection with endowed schools and the desire for their foundation by the Technical Instruction Committees, who had the whisky money at their disposal, and who often more than supplemented the parliamentary grants which these schools were able to earn. It was the circumstance that the new scheme was issued when many endowed schools were in low water that made it as successful as it has been.

Though it is said that there is nothing in a name, I am a little doubtful as to whether the earmarking of science education as distinct from secondary education is not somewhat of a mistake at the present day. For my own part, I should like to think that the days have passed when such an earmarking was necessary or advisable. The science to be taught in secondary schools should be part and parcel of the secondary education, and it would be just as proper to talk of Latin and Greek instruction apart from secondary education as it is to talk of science instruction. At the same time, it would be most unwise at the present time, when the new Education Committees are learning their work and looking to the central authority for a lead, for the State to alter the conditions on which it makes its grants to these schools. It will require at least a generation to pass before modernised education will be free from assault. If science instruction is not safeguarded for some time to come, it runs a good chance of disappearing or being neglected in a good many schools. As to the schools which have no financial difficulties, it is hard to say what lines they may follow. Tradition may be too strong in them to allow any material change in their courses of study. If it be true that the modern side of many a public school is made a refuge for the "incapables," and is considered inferior to the classical side, as

² Within the next four years they will entirely cease.

some say is the case, such a side is practically useless in representing modern education in its proper light. Again, one at least of the ancient universities has not shown much sympathy with modern ideas, and, so long as she is content to receive her students ignorant of all else but what has been called mediæval lore, so long will the schools which feed her have no great inclination to change their educational schemes.

If we would only make the universities set the fashion the public schools would be bound to follow. The universities say that it is for the public schools to say what they want, and *vice versa*, and so neither one nor the other change. It appears to me that we must look to the modern universities to lead the movement in favour of that kind of education which is best fitted for the after life of the large majority of the people of this country. If for no other reason, we must for this one hail the creation of two more universities where the localities will be able to impress on the authorities their needs. The large majority of those whose views I share in this matter are not opposed to or distrust the good effects of those parts of education which date from ancient times. The great-men who have come under their sway are living proofs that they can be effective now as they have been in times past, but we look to the production of greater men by the removal of the limitations which tradition sets.

Before concluding, there is one subject that I must lightly touch upon, and that is the supply of teachers other than science teachers. The Education Act of 1870 gave the power to elementary schools to train pupil-teachers, who in the process of time would become teachers, either by entering into a training college by means of a King's scholarship or, less satisfactorily, by examination. In large towns the need of a proper training for pupil-teachers has been felt, and gradually pupil-teacher centres were established, principally by school boards, where the training could be carried out more or less completely; but in the rural districts and smaller towns the pupil-teacher has had to be more or less self-taught, and except in rare cases "self-taught" means badly taught. The Training College authorities make no secret of the fact that one of the two years during which the training of the teacher is carried out has to be devoted more or less to instructing the pupils in subjects they ought to have been taught before they entered the college. Thus all the essential and special instruction which is given has to be practically shortened, and the teacher leaves the college with less training than he should have.

The new Education Act has put it in the power of the educational authorities to rectify the defects in the training of pupil-teachers. It is much to be hoped that councils will separately or in combination either form special centres for the training of all pupil-teachers, or else give scholarships (perhaps aided by the State) to them, to be held at some secondary school receiving the grant for science and recognised by the Board of Education as efficient. The latter plan is one which commends itself, as it ensures that the student shall associate with others who are not preparing for the same calling in life, and will prevent that narrowness of mind which is inevitable where years are spent in the one atmosphere of pedagogy. The non-residential training college, where the training of the teacher is carried on at some university college, is an attempt to give breadth of view to him, but if attempted in the earliest years of a teacher's career it will be even more successful. All teaching requires to be improved, and the first step to take in this direction is to educate the pupil-teacher from his earliest day's appointment, for his influence in after years will not only be felt in that elementary, but will also penetrate into secondary education. In regard to the additions required in elementary education, which require the proper training of the pupil-teacher, I must refer you to a report which will be presented to the

Section. The task of training pupil-teachers is one which requires the earnest and undivided thought of the new Education Committees.

We must be content to see advances made in the directions on which the majority of men and women educational experts are agreed. Great strides have already been made in educating the public both in methods and subjects, but a good deal more remains to be done.

It may be expected, for instance, that the registration of teachers will lead to increased efficiency in secondary schools, and that the would-be teacher, fresh from college, will not get his training by practising on the unfortunate children he may be told off to teach. It may also be expected that such increased efficiency will have to be vouched for by the thorough inspection which is now made, under the Board of Education Act, by the Board, by a university, or by some such recognised body. It, again, may be expected that parents will gradually waken up to the meaning of the teacher's register and the value of inspection, and that those schools will flourish best which can show that they, too, appreciate the advantages of each.

RECENT EDUCATIONAL REPORTS.

SCHOOLMASTERS are not, as a rule, great readers of Blue-books; yet many of these official publications contain suggestions and plans not only of interest to practical teachers, but likely to prove very useful to them. The following extracts from two recent reports,¹ published by the Board of Education, will perhaps lead some schoolmasters and schoolmistresses to examine the Blue-books themselves.

HIGHER ELEMENTARY SCHOOLS.

Dr. H. H. Hoffert in his report on secondary schools and science classes in the eastern division of England says: Schools of the higher elementary type might very profitably be distributed at suitable intervals over London. They appear destined to fill an important place in any future organised scheme of elementary and secondary education, and to form the natural completion of the elementary system. They should not, and in my opinion do not, enter into rivalry with secondary schools, but provide for the needs of pupils who will complete their education at the age of fifteen and then go out into active industrial or commercial occupations. The age at which the choice of entering a higher elementary school has to be exercised is also the age at which pupils should be transferred from the elementary to the secondary schools, if the transfer is to be of real and lasting benefit. The natural continuation of the higher elementary schools is to be found in the evening schools and polytechnics, to which it may be hoped they will in time bring a very desirable and well-grounded class of students, better able to profit by the advanced instruction there given than are, unfortunately, so many of those who now attend the evening schools. If this is to be accomplished, however, the special character of these schools will need to be more fully recognised, and they must meet with more sympathetic treatment from the Local Education Authority. It is desirable that they should be organised as central schools to which are drafted from the surrounding elementary schools such pupils as show at the age of ten or eleven years the ability to profit by the special instruction given in them, and are able to stay at school three or four years beyond this age, but are not suitable for transference to secondary schools.

¹ "General Reports on Higher Education with Appendices for the year 1902." [Cd. 1735], and "General Reports of H.M. Inspectors on Elementary Schools and Training Colleges for the year 1902." [Cd. 1706], 15.

SCHOOL LIBRARIES.

In his report on the teaching of literary subjects in some secondary schools for boys, Mr. J. W. Headlam points out the value of school libraries in the following paragraph :—

In this connection it is necessary to draw attention to the question of school libraries. To teach history, language, or literature without books is as absurd as to teach science without apparatus. The latter course is now forbidden; the former is almost universal. In a large number of schools there are no libraries at all. In a considerable number there is a collection of story-books for the amusement of the boys. In scarcely a single school has an attempt been made to form a collection of books which the masters and boys can use in the illustration of school work. There will be a finely-built and well-equipped laboratory, an unlimited supply of expensive material for the teaching of chemistry and physics, but there will not be found a good atlas of modern times, much less an historical atlas. There will be no standard dictionary of the English or any other language. The master who is giving a lesson on English history will find no book to which he can refer for information where the text-book is defective, or for those illustrations and details without which no narrative is more than words. There are in the English language books of the greatest interest and merit dealing with those scientific studies in which so much time is passed; there are books on natural history and travels which would be of interest to many boys. Their existence is in many places entirely unknown to them. How can it be expected that they should acquire a love of reading or of study? The result is that it is no uncommon thing for a bright and intelligent boy to leave school at the age of 16 or 17, without ever having had an opportunity of becoming acquainted with any book except the text-books, written purely for school purposes.

MISVALUED NEATNESS.

There is a tendency in our elementary education, says Mr. Turnbull in his general report on the elementary schools of the north-eastern division of England, to value neatness more than rightness, as though the rule were, "Be neat first, right afterwards." Among the causes of this tendency may be the fear of the employer of labour, who likes to have his books kept neatly. Another cause may be the over-practice in time past of dictation, and the counting of corrections as errors (as now is the case in the King's Scholarship Examination). I would suggest that an experiment like the following be tried in the upper part of a few average schools. Write on the black-board :—

The capital of England is York.

The capital of England is (York) London.

The capital of England is $\frac{Y}{L}$ London.

Say :—"Suppose that these three sentences were written by three children in answer to the question, 'What city is the capital of England?' Of these three answers which is the best?" I am afraid that, if the votes are counted, the third answer, though it is the only right one, will not win.

METHODS OF TEACHING.

Mr. Legard in reporting on the elementary schools of Wales and Monmouthshire says: One of the great dangers that beset the teaching of the present day, and a more insidious one than any other, is to do too much for the children and to give them little or nothing to do for themselves. Professor Armstrong has incurred the displeasure of some experienced teachers by disparaging what he terms the old mechanical methods, and by insisting very strongly upon the advantages of the so-called heuristic methods. I venture to think that the principle which he advocates is perfectly sound though he has perhaps stated

his views in too trenchant a manner. Again and again I hear in schools lessons carefully prepared and admirably delivered, which fail in their object, because the children do not take an active part in the instruction. They are not required to make any mental effort and are told things which they ought to discover for themselves. Further, the precept is neglected that everything learnt should lead on to something done, and it is forgotten that unless knowledge is applied it is useless. As more enlightened views gain ground it is hoped that our elder scholars will be left much more to themselves than is the case at present, and that they will do work under the teacher's supervision without more help than is necessary.

CORRECT POSTURE OF THE PUPIL.

Quoting Mr. Boyd Carpenter, Mr. W. E. Currey in reporting on the elementary schools of the eastern division says: Correct posture in sitting and standing is much neglected. When sitting, scholars are frequently allowed to lounge on the desks with their folded arms thereon—a fitting preparation for a comfortable nap. In standing, their mission often seems to be to prop up some wall or to transfer its colouring to their own clothes. The general posture in writing is most injurious to the health of the children; the evil practice of "putting left arms round slates and books" is not only unchecked, but in many schools it is actually encouraged. Thus, twisted spines, high shoulders, contracted chests, and eyes of different focus are systematically developed. The unsuitable desks in many cases contribute to this injurious posture, but it cannot be an impossible task to devise plans by which the defects of desks may be minimised or removed. Apart from the hygienic result, correct posture tends to make the child's mind more receptive and the lessons consequently more effective.

EFFECT OF ABOLITION OF EXAMINATIONS.

Mr. J. G. Fitzmaurice in his report on the elementary schools of the north central division of England deals with the question of a possible falling off in accuracy since the yearly examination was abolished. He says: The general verdict is that since the abolition first of full and then of sample examinations there has been a falling off in accuracy in writing, spelling, and arithmetic. This is but natural. When the energy of the teacher was directed for a whole year to make the children as perfect as possible in the three "R's," accuracy might be expected. The formal written yearly examination has gone; as a rule every school has greatly added to its curriculum; the school is now tested twice a year at uncertain periods, the children are no longer presented to the inspector like horses trained to the last hair, ready for the race, but are more in the condition of horses seen by glimpses at exercise. It is therefore not surprising that there should be some falling off in accuracy, but many think that this is fully compensated for by the brighter condition both of teachers and scholars, the enlarged curriculum and corresponding intelligence.

Nothing is more common in the weary monotonous discussions on platforms and in newspapers on the vexed subject of education than the assertion that the elementary education of the country is rotten. I cannot help thinking that such a statement is a gross exaggeration and a most unfair charge against a splendid body—the elementary school teachers of this country. Of course the education now given is not perfect, yet, considering the difficulties that attend it—e.g., the tender age of children, their susceptibility to illness, home influences, short time—I maintain that the education now given in our schools is well chosen, intelligently treated, conscientiously given. I often wonder, when I read these sweeping condemnations, whether the critics have ever been within the walls of a public elementary school!

ITEMS OF INTEREST.

GENERAL.

In our last issue we asked headmasters and headmistresses kindly to send us copies of the form of school report in use by them. We have received some replies, but not enough for our purpose, so that we repeat our request. There is room for much improvement in the form of report sent to parents of the work done and progress made by boys and girls during a term. Many school reports in use at present are too elaborate and technical for the parent to understand, and we hope, if we receive a sufficient number of forms of report actually in use, that it may be possible, with varied expert assistance, to suggest some directions in which simplification and improvement is possible.

THE report of Prof. M. E. Sadler on secondary and higher education in the city of Sheffield has now been published, and should prove of value not only to the Education Committee of Sheffield but to similar authorities in every part of the country. Dr. Sadler, in stating the aims to be kept in view in framing a plan for the improvement of secondary and higher education in Sheffield, has provided an ideal towards which education committees in other centres may with advantage direct their efforts. The report states that the weakest spot in the educational arrangements of Sheffield is in the secondary education provided for boys. A parent, living in Sheffield, who wishes to give his son the best kind of higher secondary education cannot find it in the city, and, as Prof. Sadler says, it will pay Sheffield handsomely to bring its provision of secondary education for boys thoroughly up to date, as it is, for instance, in the progressive cities of Germany and the United States.

ANOTHER suggestion prominent among the many put forward by Prof. Sadler in his report is that concerned with what was originally known as the Higher Grade School, but which has more recently been called the Higher Elementary School of Sheffield. In addition to a higher secondary school there is need in Sheffield, says Dr. Sadler, for another secondary school with a different aim, and he goes on to propose that the character of the Central Higher Elementary School shall be changed, and that it should be converted into a secondary school specifically intended "to feed the Technical School with a steady stream of well-educated lads of sixteen years of age." The new school, it is said, should be a thoroughly good school of a purely modern type. It should be a school with low fees and be well staffed with highly competent and well-trained teachers, and no class should be allowed to contain more than thirty pupils. Such a school would be mainly recruited from the public elementary schools, and the pupils should be drafted to it from the elementary schools at, or near, their twelfth birthday. It is much to be hoped that this report of Prof. Sadler will be widely circulated and carefully studied in all our large towns, for the needs of most of our manufacturing centres are very similar.

THE Oxford Delegates for Local Examinations are persisting in their praiseworthy endeavour to encourage the study of European History in schools, though they have not yet been able to shake off the trammels of special periods. One of the alternative historical subjects for 1904 (a full list of which was given in our July issue) is "Outlines of European History, 987-1215," which is partly contemporary with one of the alternative periods in English History (1066-1399). Two years ago the period was 1095-1254, and most of the advice concerning text-books, &c., which was given in Mr. C. S. Fearensides's article dealing with that period (*THE SCHOOL WORLD*, October, 1901) will be found relevant to the period now in hand. The

manuals by Profs. Emerton and Tout, which were there singled out for special commendation, still remain the best text-books for advanced students or for the teacher's own use; but two admirable books of a somewhat more elementary type have appeared since the date of that article. These are both entitled "The Middle Ages," and are written by Prof. P. V. N. Myers and Prof. J. H. Robinson respectively. Both works contain excellent maps and sound guidance in supplementary reading; both have been warmly commended in these columns, and both are published by Messrs. Ginn and Co. (4s. 6d. each).

To encourage apprentices to gain a sound knowledge of the branches of technology connected with their work, the Great Western Railway Company offer facilities for a limited number of selected students to attend day classes at the Swindon Technical School. Candidates must be registered apprentices between seventeen and eighteen years of age. They must have spent at least one year in the factory, and must have regularly attended for at least one session in the preparatory group of evening classes at the Technical School. Candidates must produce evidence of good conduct and attention to their work in the factory, and only those who obtain a minimum qualification at the examinations will be successful. The course of study for each year will consist of: practical mathematics, practical mechanics, geometrical and machine drawing and heat, electricity and chemistry. The apprentices thus attending the classes will have their wages paid as if at work in the factory, and the Great Western Railway Company will pay their school fees. The students attending the day classes will be expected to give some time each evening to private study. Students who distinguish themselves will be allowed to spend part of their last year in the drawing office and chemical laboratory. The whole of the arrangements will at all times be under the direction of the Chief Mechanical Engineer.

THE report of the Board of Education for the year 1902-1903 has now been issued, and it deals very completely with the present condition of elementary and higher education in the country. Speaking of the Education Act of last year, the report states: "The enactment of the Education Act, 1902, is probably the most important event in the history of education in England since the full recognition of elementary education as a national duty in 1870. Many of the provisions of the Act have been and continue to be matter for controversy; but the Board are gratified to find that in the majority of localities there is much willingness to accept it as a step towards bringing education, co-ordinated in all its forms, into more intimate connection with other branches of local life, and to unite in administering it in a spirit of fairness and liberality. It will be the endeavour of the Board to do all within their power to encourage and assist such an attitude." In another place we find mentioned, as "a task which is occupying our most serious efforts," "the co-ordination of the work of elementary with that of secondary schools, and the correlation with both of the work of the evening schools, the pupil-teacher centres, and the training colleges is a matter of the first importance towards the establishment of a coherent system of national education."

AMONG many other subjects of interest contained in the Report of the Board of Education, the information as to the inspection of secondary schools will appeal in a particular manner to our readers. The number of schools inspected under the Board of Education Act, 1899, in the year 1902, was 95, as compared with 51 in the previous year. Of these, 52 were inspected on the application of the county authorities aiding them; 6 were proprietary schools; 8 were private schools; 19 were schools for girls; and 6 were mixed schools for boys and girls; 31 were schools receiving grants under the regulations of the Board for

secondary day schools, and in the case of 16 of these the inspection was required for compliance with the regulations. During the year the Universities of Birmingham and London were, on the advice of the Consultative Committee, added to those of Oxford and Cambridge and the Victoria University as organisations which the Board are prepared to employ for inspection under the Board of Education Act. All these Universities, however, concurred in the view that the administrative side of the inspection should be conducted by an officer of the Board. During the year one school was inspected under this arrangement by the Victoria University in conjunction with an officer of the Board.

THE return for this year showing the extent to which, and the manner in which, local authorities in England and Wales have applied funds to the purposes of technical education during the year 1901-2 has been received. The return shows that the total amount thus expended in England and Wales, was £1,957,399. This amount is exclusive of the sums allocated to intermediate and technical education under the Welsh Intermediate Education Act, 1889. The amount raised by loan on the security of the local rate under the Technical Instruction Acts was £206,426, the amount of loans so raised outstanding was £1,030,952, and the balance in hand of moneys received and allocated to technical instruction was £658,319.

THE Oxford School of Geography has published its arrangements for Michaelmas Term, 1903. The Reader in Geography (Mr. Mackinder) will lecture weekly on the historical geography of Europe. The Lecturer in Physical Geography (Mr. Dickson) will lecture weekly, (1) on topographical surveying, (2) on the atmospheric circulation, and (3) on map projections. The Lecturer in Regional Geography (Mr. Herbertson) will lecture, (1) weekly on the British Isles, (2) twice weekly on Africa and Australasia, and (3) weekly on types of land forms. The Lecturer in Ancient Geography (Dr. Grundy) will lecture weekly on the geography of Herodotus. The Lecturer in the History of Geography (Mr. Beazley) will lecture weekly on the history of discovery from Henry the Navigator to Columbus and Da Gama. An examination for one scholarship of the value of £60 will be held on October 14th, 1903. Candidates, who must have taken Honours in one of the Final Schools of the University, should send in their names to the Reader not later than October 1. The Scholar elected will be required to attend the full course of instruction at the School of Geography during the academic year 1903-1904, and to enter for the University Diploma in Geography in June, 1904.

ONE of the attractions of the Greater Cork International Exhibition of this year is a Nature Study Section initiated by Count Plunkett and organised by Mr. J. L. Copeman. The plan of this section of the Exhibition seems to have been inspired by the larger Nature Study Exhibition held at the Botanic Gardens in London last year, and many of the exhibits at Cork were on view on that occasion. The increasing popularity of the study of natural objects is well worthy of encouragement, and it is to be hoped that Count Plunkett's efforts will prove successful in persuading Irish teachers to encourage nature-study in their schools.

THE Governors of the Mary Datchelor Girls' School at Camberwell are again adding to the equipment of the school for science work by extending the school gardens for the study of botany, and forming an additional chemical laboratory for more advanced students. They have also appointed another science mistress and an additional drawing-mistress. The same Governors have just awarded the free studentship at their Train-

ing College, given annually to a graduate of some British university, to Miss Hilda Savage, of the Victoria University.

FOR the guidance of the doctors who will give the lectures, Dr. R. J. Collie, the medical superintendent of the hygiene, first-aid, and home-nursing classes in the evening continuation schools of the School Board for London, has drawn up a very complete syllabus of fifteen lectures on health. Each lecture is accompanied by notes of suitable practical work to illustrate the principles explained in the lecture. The hints given to lecturers are of a thoroughly practical kind, and if Dr. Collie's instructions are carried out, and the course of work suggested by him intelligently worked through, these classes should result in the dissemination of saner ideas as to physical conduct and well-being.

MESSRS. LYDDON ROBERTS and Denney, of the Normal Correspondence College, call our attention to the fact that Sir William Anson recently promised Mr. Norman, in reply to a question in the House of Commons, that allowances would be made in marking the papers on the theory of teaching at the recent Certificate Examination, since the questions set were not strictly in accordance with the regulations previously published as to the scope of the examination.

WE have received a copy of the report for 1902 of the Teachers' Registration Council. The subjects contained in the report are dealt with in an article in another part of our present issue (p. 357).

THE thirty-fourth "Matriculation Guide" published by the University Correspondence College shows with what skill the authorities of the college can adapt themselves to new conditions. The new guide provides the student who wishes to matriculate at the University of London under the new regulations with just the information of which he stands in need.

MESSRS. DURHAMS, LTD., of Leeds, have published a *souvenir* of the Leeds School Board, 1870-1903, which exhibits in a striking manner by means of excellent photographs the extent of the work accomplished by the successive School Boards since the passing of the Act in 1870 for the Education of Leeds.

A VERY full account of the summer meeting of the Oxford University Extension Delegacy, to which we have already made more than one reference, has been published from the office of the *Oxford Chronicle* in the form of two well-illustrated pamphlets. We have little doubt that all who attended the meeting at Oxford and many others interested in University Extension work will wish to possess copies of these interesting publications.

SCOTTISH.

SIR HENRY CRAIK'S report on Secondary Education in Scotland for the year 1903 is an extremely interesting and encouraging record of progress. The managers and governors of secondary schools are yearly taking a higher view of their duties and responsibilities, and are putting forth every effort to maintain the high traditions of Scottish education. School board members, who are inclined to show a certain timidity about the expenditure of the rates on secondary schools, are reminded that adequate provision for higher education is by no means a matter of interest to one class only, but is of the most vital importance to every section of the community. It is disappointing to learn from the report that fuller advantage is not taken of the liberal provision that has been made for every type of education. "It is matter for regret," Sir H. Craik says, "to find that, where ample 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. This is one of the most serious disadvantages secondary education in Scotland has to contend with." A table of statistics which is appended fully bears out this criticism, and the fact of the complete Leaving Certificate having been gained by only 417 pupils in the whole of Scotland is startling evidence in the same direction.

THE report deals with the question of over-pressure in higher schools which came so frequently and prominently before the Physical Education Commission. The charge of over-pressure in the upper classes of many of the secondary schools is held to be clearly established, as enquiries in different parts of the country show that it is no uncommon thing for boys, and even for girls, to spend five or six hours per night on home lessons. The nervous strain thus entailed is bound to be excessive, and cannot fail to react unfavourably on the intellectual no less than on the physical development of the pupils. Sir Henry Craik rightly seeks for the cause in the effort to attain a very high degree of excellence in too wide a range of subjects. The conditions for the university bursary competitions are held to be mainly responsible for the existing tension, and the report urges the university authorities to lessen their demands in regard to the number of subjects as speedily as possible.

A JUDGMENT likely to become as famous as that of Mr. Cockerton has just been given by a Scottish sheriff in an action raised by the School Board of Callander against one of the parish ratepayers for failure to pay his proportion of the school rate. The defender justified his refusal on the ground that the School Board had no warrant to levy school rates for the higher education of persons living outside the parish of Callander. The Sheriff has not only upheld this contention but holds that the Board has no powers to levy rates for higher education for anyone in the McLaren High School. Should this judgment be upheld by the Court of Session, higher education in many parts of Scotland will be seriously prejudiced. Possibly this case may bring home to the Government the necessity of bringing forward at the earliest possible moment the long-looked-for Education Bill for Scotland.

THE Education Committee of the Educational Institute of Scotland has issued the following report in regard to the supplementary courses recently instituted by the Education Department: (1) That, while the desire of the Department to provide suitable instruction for pupils between twelve and fourteen years of age is fully recognised, the institution of supplementary courses for such pupils is contrary to the recognised educational principle that specialised instruction to be really effective must rest on the solid basis of general education. (2) That further, parents cannot, as a rule, determine the future occupation of children only twelve years of age, because (a) that is determined in a large number of cases as much by opportunity as by choice, and (b) the inclinations and aptitudes of children are at that age not fully disclosed. (3) That in particular the adoption of the Rural Course in country schools will seriously prejudice the prospects in life of rural pupils by withholding from them the advantages of a sound general education which at present they possess in common with town children.

MR. ANDREW CARNEGIE, on the occasion of his visit to Kilmarnock for the purpose of laying the memorial stone of a new public school, was presented with the freedom of the burgh. Mr. Carnegie in the course of his address said that Scotland was entitled to the credit of having first among modern nations

carefully planted and nursed that indispensable agency, education, for the elevation of the masses of the people. The remarkable progress of America and the surprisingly virile and energetic character of its people was in large measure due to the importance they attached to education. America in its education system had paid Scotland the flattering tribute of imitation. Along with the church which the Pilgrim Fathers erected there always arose the village school. To-day there was no religious difficulty in America as there was none in Scotland, because the schools were under popular secular control. In England, where the Church still remained a social and political power, education was much retarded by its all-pervading influence, and the instruction given in England was consequently miserably inefficient compared with that of Scotland.

THE ceremony of laying the memorial stone of the Sutherland Technical School, Golspie, was performed on September 8th by Lord Balfour of Burleigh, Secretary for Scotland, in the presence of a distinguished company. The school is the result of a movement by the Duchess of Sutherland to provide better educational facilities for the children of crofters and others in the northern counties. The curriculum of the school is based on a study of the needs of the district in which agriculture and fishing were the chief industries. The fact that the school is a residential one gives it a unique place in Scottish education, where the principle has only been applied in schools for the wealthier classes. Provision has been made for a limited number of bursaries which will carry with them free board and education. Lord Balfour, after laying the stone, said that the new venture was not intended to be a copy, still less a rival, of existing educational agencies. It was a new attempt to solve an old problem, namely, whether they could, in regard to any given population living under conditions far from favourable, give an education calculated to ameliorate these conditions. This was essentially a matter for private enterprise, but his presence there was an earnest of the sympathy with which his Department would follow the experiment. He hoped their educational system would never be remodelled on lines so rigid as to leave no scope for private enterprise. Boards and departments were all very well in their way, but they were apt to be critical rather than constructive. Many advances in education had started outside the established system, and he hoped private institutions would always find a place in their midst to allow the freest play for individual action.

CAPTAIN C. MITCHELL-INNES has been appointed by the Scotch Education Department Inspector of Physical Instruction in connection with the inspection of higher schools and departments in Scotland. He will also inspect the classes in this subject in the training colleges, as well as those for the further instruction of teachers conducted under Article 91 (d) of the Code.

FOR some time past considerable friction has existed between the School Board of Glasgow and the members of the teaching staff. With a view to remedy a state of matters which cannot fail to have a prejudicial effect on the education of the pupils, the Board have arranged to receive a deputation from any grade of the teachers in their service on any matter of general educational concern or relating to the teachers' interests. This is a forward step of some moment which might with advantage be followed by other educational authorities. These bodies have hitherto been too much given to arranging even the minutest details of school organisation and of educational policy without any regard to the opinions of those who have practical knowledge and experience of the conditions of school work.

IRISH.

Now that the study of Irish has been so largely taken up—wisely or otherwise—in intermediate schools, it is well that steps should be taken to put it upon a sound basis of scholarship: it is therefore satisfactory to learn that a good start has been made in this direction during the past summer. Prof. Kuno Meyer, in an address in Dublin in the earlier part of the year, suggested the founding of a school of Irish studies, including Old, Middle, and Modern Irish, language and literature. A beginning has been made by a course of lectures by Prof. Strachan, of Owens College, Manchester, who in July lectured on Old Irish grammar in University College and Trinity College. Two further courses were given in the University College in September, one by Dr. Henry Sweet on phonetics, and the other by Dr. Kuno Meyer on palaeography. Dr. Sweet's is the first serious attempt in Ireland to lecture on the phonetics of Irish, while Dr. Meyer's lectures should be particularly helpful towards deciphering the large number of ancient Irish manuscripts in existence in Dublin and elsewhere. The movement will without doubt be a success, and this new school of Irish studies will, it is hoped, presently have permanent rooms of its own.

THE Intermediate Board in reviving music as a school subject are wisely attempting to make it much more practical than it was under the old system. The examination in music will include both theory and practice, and it is laid down as a first principle that no student who has not been certified by the examiners to have passed the practical examination will be admitted to the examination in theory. The scheme issued by the Board is drawn up for piano, violin, violoncello, or harp, and in all cases includes scales, arpeggios, studies, and pieces, together with sight reading, an ear test, and some knowledge of theory. The Board are also prepared to allow students to take up any other instrument in place of those mentioned. * They are further prepared to grant a special bonus to any school which shall present for examination a choir or orchestra which shall acquit itself to the satisfaction of the examiner. They will also award special prizes to school choirs or orchestras to be awarded after a special examination to be held in Dublin at a date which will be announced in due course.

MR. DAVID G. BARKLEY, who had been a member of the Intermediate Board for many years, having died in July, the Lord-Lieutenant has appointed his Honour Judge Craig to be one of the Commissioners.

THE report of the Queen's College, Belfast, for the year 1902-3 is extremely satisfactory. Perhaps the University Commission has in the North awakened renewed interest in the College. The number of students in the faculty of arts has exactly doubled, and, what is better, the quality of the freshmen is of an unusually high order. So high was the standard of work for the entrance scholarships both in mathematics and classics that three extra scholarships were awarded. Another interesting feature in the report is the increasing number of lady students, which now reaches to 43, an increasing proportion of whom have distinguished themselves in the open and equal competitions with the male students. First prizes were won by ladies in Greek, Latin, French, German, English, and experimental physics.

THERE were this year 48 candidates as opposed to 31 last year for the Science and Technological scholarships, tenable at the Royal College of Science. Five scholarships were awarded of the value of £50 per annum for three years in addition to free instruction at the Royal College of Science, and five teachers in training of about the same value.

THE Corporation of Dublin has decided to erect a new technical school on the north side of Dublin, the prominent features of which will be the attention given to the building and printing trades and their allied subjects, while the present school in Kevin Street will be reserved mainly for mechanical and electrical engineering. Mathematics, drawing and English will be taught in both schools, and plumbing, French and German, boot and shoemaking, bookkeeping and correspondence in one or other.

WELSH.

THE Cardiff Education Scheme Committee claims the right to select all the members of the local education authority from the County Council. They urge that the words in section 17 of the Act, "when it appears desirable," give them that option. The Board of Education contest the interpretation put upon those words by the Committee. The point in dispute is really whether the Committee are prepared to include in their scheme for the local Education Authority the explicit inclusion of "persons of experience in education." As to the importance of inclusion of such persons, surely there should not be two opinions. The Cardiff Committee apparently do not challenge this principle, and it is to be hoped that their action will not be interpreted in Wales as embodying an objection to having on their Education Authority those who have special knowledge of education.

THE Llanelly School Board are extremely indignant that the County Education Committee have adopted a scheme whereby pupil teachers are to be educated at the County School instead of at the Pupil Teacher Centre, as heretofore. Of course, it is difficult to make a change where a pupil-teacher centre has been working successfully. But it is going too far for the chairman to say that the curriculum at a county school is not a proper one for pupil teachers. A good sound secondary education is a proper education for a pupil teacher, of all persons. It is a matter of expediency whether that secondary education should be given in a county school or a pupil-teacher centre. But the School Board cannot but see that it would be a pity to continue two institutions—if one can do the work—if, indeed, it were only a question of rates.

THE Radnorshire County Governing Body has passed the following resolution: "That under the circumstances of an altered educational system this County Governing Body, whilst acknowledging the great work of organisation effected by the Central Welsh Board, is of opinion that it would be in the best interests, economically and otherwise, of the intermediate schools of Radnorshire and of Wales generally for the examination and instruction to be undertaken by arrangement with and under the superintendence of the Welsh University authorities, instead of, as heretofore, by the Central Welsh Board." Of course such a resolution is ill-timed. The Central Welsh Board is no longer to remain a separate body for intermediate education. The new proposal is a Joint Education Board, representing all the county education authorities for both intermediate and elementary education. It will be an important duty of that new body to determine the question of the method of examination and inspection of the intermediate schools. But we venture to say that it would at least be desirable to inquire whether the University of Wales has not already quite enough to do with the direction of under-graduate and post-graduate work, without setting its hand to school work. The Radnorshire scheme sounds plausible until we reflect that it does not necessarily follow that those who are most absorbed in university teaching have energy and insight to deal with the problems of school teaching.

THE general report on the Elementary Schools of Wales and Monmouthshire by Mr. A. G. Legard has been issued. It is

in many respects optimistic. Included in the general report are separate reports from district inspectors. The following extract from Mr. L. J. Roberts is very interesting: "It is pleasing to notice in how many schools plants are now grown for observation, and how the growth of plants is observed and recorded from day to day, so that the children gain something of the pleasures of original investigation, simple though it be as yet. . . . Nature diaries are kept by many scholars, and on the walls of many a rural school will be found recorded (this I have noticed now for many years at Pentrecelyn, near Ruthin) the most striking natural events observed by the scholars, the date, the name of the place, and the name of the scholar being mentioned. . . . Not long ago, on a fine afternoon, I met a band of happy girls on a hill-side near Llangollen collecting flowers, under the guidance of one of their teachers, who taught them to observe the characteristics of the flowers of which there was such a perfect wealth all around them. On the same afternoon I could descry another band from another school in the town climbing the heights of Dinas Brân, Wordsworth's 'Castle in Wales.'"

CURRENT HISTORY.

MR. BARTON, the Premier of Federated Australia, has been asked to repeal the recent legislation of "the Commonwealth" concerning employment of "black" labour on mail steamers. He replied that "it was useless to ask for repeal before the effect of the clause had been tried." Is there, then, a lack of political imagination in the Antipodes? Can they not forecast the result of legislation? If so, it is as "useless" to make laws as to repeal them. And there are precedents in English history for such wise confession of mistakes in legislation. We are all familiar with the Act of Settlement of 1701 under the authority of which King Edward reigns. That Whig settlement was coupled with several Tory limitations of the future sovereign's power which are interesting in many ways. Of the eight, three were repealed before they could come into effect, two of them in Queen Anne's time, and the other in George I.'s first Parliament at his request. This last would have prevented George from taking his holidays at home. The other two combined would have made a Cabinet impossible.

THE Imperial Tariff question is still being discussed. Among other utterances we have noted "An Appeal from Labour Representatives in the Imperial Parliament to Workmen in Canada, Australia and New Zealand," in which, *inter alia*, they say, "We lost half of our Colonial Empire in the eighteenth century because we claimed and tried to enforce a right to tax the Colonies for our benefit. . . . Our action in the eighteenth century was not just to our Colonies, and it brought to us its due penalty." With the moral drawn from this we do not concern ourselves, much less do we attempt to answer the hazardous question, "What would be the result if we yielded now to what we are told is your demand?" But is their history quite correct? It has long been the fashion for English writers to sit in sackcloth over the colonial policy of 1760-80, but it is not quite clear that that policy was so unrighteous or *obviously* unwise. The taxes imposed on the Colonies were intended to pay for a recent war waged for their benefit and to secure them against future dangers. If physical conditions had been different, especially if steam and electricity had been used then, what would have been the result of the war? and what would have been our verdict on the possibly different result?

IN August, the Marquis of Salisbury died after a brief period of retirement from public life. His personal career began so long ago that much of it has become part of recorded history,

and might fitly claim a place in this paragraph. But our newspapers have sufficiently reminded us of his words and deeds, and we will therefore add only a word by way of comparison and contrast with the career of the only two of his ancestors whose names have won a place in our ordinary text-books. Every one knows of William Cecil, Baron Burleigh, who was Queen Elizabeth's minister for forty years of her reign, and died in harness in August, 1598. He was followed in office by his son Robert, of whom little more is known popularly than his diplomatic introduction of James VI. of Scotland to his English subjects. He is scarcely remembered by his title of Earl of Salisbury, and though overshadowed by the greatness of his father, his death in 1612 is regarded by Dr. Gardiner as an important event in the Stuart Drama. It was he, by the bye, who exchanged Theobalds for Hatfield with his king. These two served princes, our Salisbury served a Parliament based on a voting democracy. Which had the easier task?

"LORD LANSDOWNE will be prepared to entertain favourably proposals for the establishment of a Jewish colony or settlement: on conditions which will enable the members to observe their national customs. . . . He would be prepared to discuss . . . the appointment of a Jewish official as the chief of the local administration," &c. "The Russian Government naturally could not in any way tolerate that new departure, of which the only result would be to create groups of individuals entirely alien and even hostile to the patriotic sentiments which form the strength of every State. . . . The Russian Government has never deviated from the great principles of morality and humanity." These two quotations are official statements of the British and Russian Governments respectively with reference to the same question, the existence of Jewish communities within their respective territories. How wide the contrast between their different points of view! Yet it is only two hundred years since Jews were allowed to return to England, and not a hundred since their citizenship was acknowledged. Is Russia where we were in the seventeenth century? Is she still a theocracy, where unity of race and religion is necessary to the safe existence of the State? Perhaps each Government is right, for the present.

RECENT SCHOOL BOOKS AND APPARATUS.

Modern Languages.

A Course of Commercial German. By E. E. Whitfield and Carl Kaiser. xiv. + 274 pp. (Longmans.) 3s. 6d.—The authors, both teachers in an important school of commerce, have succeeded in compiling a book containing a large amount of useful matter concerned with all grades of commerce. It contains a synopsis of the essential parts of the grammar which will be useful for revision to students who have already gone through the ordinary school course in German for a year or two. The vocabularies are numerous and comprehensive, though a little bewildering at first when used for reference with the help of the alphabetical indices at end of book. The arrangement, however, could not be otherwise without unduly extending the size of the book. The reading lessons, business dialogues, and commercial letters are all good, and those who conscientiously use the volume, with the help of a competent teacher, will be well equipped for whatever branch of commerce they may engage in. The book should have a wide use and should serve a useful purpose.

Das edle Blut. By Ernst von Willdenbruch, edited by Otto Siepmann. xviii. + 135 pp. 2s. *Word and Phrase Book. 6d. Key to Appendices.* (Macmillan.) 2s. 6d.—A valuable addition to a well-known series. It is a charming story, of a neat and simple style and easy vocabulary. The annotations by the general editor are admirable. Its study is highly to be recommended in all classes, not alone for its literary value but also as an interesting means of acquiring a useful vocabulary. The "Word and Phrase Book" and also the "Key to the Appendices" will be found very helpful.

Selections from the Nibelungenlied. Part I. Edited by H. B. Cotterill. 48 pp. (Blackie's Little German Classics.) 6d.—This is an experiment of doubtful value. The 120 strophes selected should at least have been given in a more satisfactory rendering; permission to use Kamp's could no doubt have been obtained. As it is, we hardly know for whom this volume is meant. The German is too archaic to make the book acceptable in schools; and more advanced students would naturally prefer the original text. The introduction deals with the discovery of the "Nibelungenlied," the age of its composition, and its subject, its story, and the metre. The notes are adequate. We trust that in the second edition a more modern rendering will be adopted, and the proof more carefully read.

Elementary Conversational French Reader. By B. Bué. 87 pp. (Livingtons.) 1s.—Madame Bué's book may prove of service if wisely used; it contains less than 100 pages of detached sentences, more especially suited for girls' schools.

Daudet, La Mule du Pape, etc. Edited by H. W. Preston. 40 pp. (Blackie's Little French Classics.) 4d.—A capital edition of extracts from the charming "Lettres de mon Moulin," first the "Installation," then "La Chèvre de M. Seguin," and lastly, the famous story that gives the title to the little volume. The notes are very good indeed; so is the biographical introduction.

Poems for Recitation. Edited by L. A. Barbé. 40 pp. (Blackie's Little French Classics.) 4d.—This convenient selection contains a note on French prosody, and twenty-four well-chosen poems, arranged according to their difficulty in four sections. The notes consist of renderings of the more difficult words and phrases. There is no information about the authors.

Classics.

The Helena of Euripides. Edited by A. C. Pearson. xxxii. + 239 pp. (Cambridge University Press.) 3s. 6d.—This book is well edited. The introduction, with a praiseworthy avoidance of platitudes, gives just the information which the student requires about the literary history of the play, the story of Helen in literature, the relation of the play to others by the same author, and to the *Thesmophoriazusæ* of Aristophanes, and the text. Critical notes are given at the foot of the page. The explanatory notes, although rather full for a book of this description, are good, and show evidence of independent study. We may cite as especially valuable the notes on lines 50, 58, with the Appendix (where the editor's independent judgment is seen), 91, 356, and 381. We suggest a few criticisms. The long note on 2-3 is obscure, and it is not easy to gather from it what is the editor's view as to the reading. On 91 a mere reference to Goodwin is not enough; it would have been to the point to quote one of Homer's numerous examples, and Herodotus's οὐτοὶ δ' ἄν εἴησαν κρήνες, which shows that the idiom is independent of time. The note on ἀγαλμα, 262, is not adequate;

the word has nothing to do with an "artist's handiwork," but means simply a "thing of joy," and is applied to objects offered for the beautification of the sanctuary, later specially to the statue of a god, not ἀνδριάς. Undoubtedly statues were regularly painted in Greece, and this seems to be the most likely reference. τὸ δεῖνόν προσπόλου (500) surely owes its article to the fact that δεῖνόν is an adjective. We do not believe in the view of οὐ μὴ + future suggested in Appendix II., p. 200; it is too philosophical to be convincing, and we prefer to suppose that it is the familiar μὴ with indicative turned as an indignant question. This use of μὴ is only denied by the precisian: it is exemplified in Homer, Sophocles, and (most important of all for our purpose) Aristophanes.

The University Tutorial Series, in view of the London Intermediate Arts Examination, 1904, has produced an edition of *Euripides, Iphigenia in Tauris*, by J. Thompson and H. F. Watt. 116 pp. 3s. 6d.—The play is edited in the manner usual in this series, with its summary treatment of difficulties and its elementary notes. The editors provide for those who know very little. Their introduction deals with the theatre, production of a play, scansion of the iambic line, and of one or two other kinds of verse, the peculiarities of the choral dialect, the life of Euripides, and the story of the play, but there is not a word about the text, and hardly anything about the strange mythology which underlies the play. It is impossible to criticise the notes seriously, as they deal largely with such points as the accentuation of ἔπο (3), antecedents to relatives (100), τ' ἀφ' for τὰ ἀπό (540), optative of wish (751). The editors should know that τίκτει (23) is not the historic present, but, like νικῶ and one or two other verbs, states a permanent condition: τίκτει "is a mother," like νικᾷ "is a victor."

The Iliad of Homer. XVIII. By Arthur Platt. With vocabulary and illustrations. xvi. + 101 pp. (Blackie.) 1s. 6d.—Mr. Platt has shown by his articles in the *Journal of Philology* an insight and sympathy in dealing with the Homeric poems in which no one has surpassed him; and this quality makes him an ideal editor for schools in respect of appreciation and enjoyment. There is something of it in these notes; we should not have grumbled if there had been more. The grammatical and explanatory part of the notes is aimed at beginners, and is for the most part clearly put, the grammar being given as the book proceeds a bit at a time. Mr. Platt has the advantage over most editors who work for schools, in a sound knowledge of linguistics, and we do not find him tripping. We do not think that this is the ideal school Homer yet, but it is good. The pictures are capital, and unhackneyed.

Latin Hexameter Verse. An Aid to its Composition. By S. E. Winbolt. xiv. + 259 pp. (Methuen.) 3s. 6d.—Teachers have long been wanting a book like the present. Latin hexameters, like Greek iambs, are too generally taught in a haphazard way. So long as the learner had ample time at his disposal, and could soak in the rules gradually, by a long process of assimilation, imitation, and repetition, the disadvantages were hardly felt. But now verse-writing is attacked on every hand; its time is encroached upon by studies popularly believed to be better fitted to bring in a return in cash, and it is condemned on its own ground as involving too great a sacrifice for what it pretends to give. We do not propose to argue the question of principle, although we are quite ready to do so, because it is not proper to this place; but we believe that the second argument loses its force if verses are systematically taught on a reasoned method. That iambs and elegiacs can be so taught has been proved already, and the time necessary for learning them has been greatly reduced. Mr. Winbolt has the credit for making a first attempt

to prove the same thing for Latin hexameters; a much more difficult task, which he has accomplished with skill, and we believe with success. He takes the only possible method, analysis of rhythm, and practices his pupils not by setting them to work on a whole piece, but on its members. He then examines the laws of proportion amongst these rhythms, and finally deals with the verse paragraph. Each chapter is provided with a number of exercises. More advanced students may learn from his book almost as much as the beginner, for we know of no book in English which treats of the structure of the hexameter verse in such a way as to show what rhythms, elisions and pauses are useful, what are common and what rare, and when is the proper time to use each. Mr. Winbolt wisely does not press too far the correspondence of rhythm with sense, but his examples are enough to show that there often is a real connection between the two. We recommend this book heartily to all teachers and learners of the delightful art of verse-writing.

Selected Letters of the Younger Pliny. Edited by E. T. Merrill. xlviii. + 473 pp. (Macmillan.) 6s.—A good selection of Pliny's Letters, carefully edited, should be welcome in schools and universities. We know of no selection, except that by Westcott, another American scholar, which is more elementary and less ambitious than Prof. Merrill's. The only criticism we would offer in general upon the book is that it is too full, if anything; the notes are similar in character to Mayor on Juvenal, but more concise; they aim at giving all information which can elucidate the text—explanatory, biographical, historical, legal, antiquarian, now and then philological. Since Pliny touches ancient life at so many points, the reader will learn a great deal from him and his commentator together. In so full a work, we might expect a reference to coins when the editor is discussing the title *Dominus* (p. 405), and an account of the arithmetical symbols of inscriptions might help to decide how far such symbols should be admitted into a text (p. 411). But it is seldom that an addition can be suggested. We have noted a number of excellent remarks on most of the topics mentioned above, e.g., the explanation of the Stoic method of suicide by starvation (p. 194), methods of punishment (232 *et al.*), the gesture of beckoning (361), and many relating to the *Realien* of ancient life—but was the *umbilicus* a rod or a knob? (see p. 197). It is not necessary, however, to say more than that the volume is admirably done. We would suggest, by the way, that *condicio* is not a "marriage possibility," but a "match," and that a man might be called a good match. What does the editor mean (p. 187) by "personification of the party under consideration?"

M. Tulli Ciceronis Epistolae. II. Epistolae ad Atticum. Edited by L. C. Purser. Not paged. Part I., i.-viii. Part II., ix.-xvi. (Scriptorium Classicorum Bibliotheca Oxoniensis.) 2 parts. 4s. each, paper, 4s. 6d. cloth.—Mr. Purser well keeps up the standard of this admirable series, and he, or Prof. Tyrrell, is the obvious person to edit Cicero's Letters. The editor gives in his preface a brief account of the literary history of the Letters to Atticus, and a description of the chief MSS., together with Lehmann's genealogical tree. He has struck out no new path, he tells us, but in the main follows Lehmann; so the reader who expects to find brilliant new conjectures will be disappointed. Mr. Purser is certainly right, following the plan of his series; we expect brilliancy from Dublin, but this is not the proper place to show it. Auidio is certainly right in i., 1, 1; but conservatism is carried too far when an editor is content to print the nonsensical *ἀνάθημα* in i., 1, 5; he would have done better to reproduce the MS. reading and leave it. (Does Mr. read *ειυτ*, by the way? We doubt it.) In i., 14, 4, he adopts *καρπαί* for *καρποί*; his own suggestion, *κοινὸν τόποι* is more likely from the *ductus litterarum*, but again this is a dark place where the MS. reading is best left alone. On the other hand, in i.,

16, 12, logic and grammar forbid us to believe that the words from *in quae* to *ascendere* are genuine; the preceding *quibus* is just paraphrased by these words, which give the whole of Philip's speech without fitting it to Cicero's. O, that some divining spirit would explain *fabam mimum* in the same letter! Whatever it may mean, neither word is a gloss (for both occur again in Seneca), and Mr. Purser is right to keep both. We have given the results of our examination of the earliest letters to show the editor's methods; to proceed with the rest on the same scale would be too long a task, and we will but note one or two points. The difficult passage in viii., 11, 14, partly nonsense as given by the MS., is left in its nakedness, with Madvig's reconstruction at the foot. Boot's might have been added, as closer. In the later books, more numerous passages are left doubtful, as v., 18, 1, xi., 39-40. It is mostly, but not altogether, the Greek words which have been so corrupted. An index of proper names adds to the usefulness of the volume.

Horace: Odes, III., IV. By John Sargeant. xxviii. + 153 pp. (Blackwood's Illustrated Classical Texts.) 1s. 6d.—As we have said before, we do not approve of the large amount of help given in books like this to pupils, by running analysis and elementary notes; the whole classical reading becomes a matter of acquiring other men's knowledge and opinions, and loses much of its educational value. On the other hand, the fullest commentary is desirable on points of taste, for these are things which the learner cannot be expected to see for himself at once, often cannot see at all when he is young, unless they are shown to him. Mr. Sargeant's translations are many of this character, and very good indeed. That is his strong point, and we wish he had made more of it. Such notes as that on *immanis*, iii., 11, 15, are excellent, and we are bound to say there are very few childish notes, if there are some unnecessary ones. It is pleasant to find humour without marks of exclamation; the point of iii., 24, 19, may be lost on a schoolboy, but some of his elders will enjoy it. With some pruning, and an addition to the literary side, this would be a capital book.

Edited Books.

The Poetical Works of John Milton. Edited by W. Aldis Wright. 607 + xxii. pp. (Cambridge University Press.) 5s.—Probably many people will turn the pages of this book without suspecting the amount of editorial labour involved in its preparation. Only a scholar can estimate that, because there is such a complete absence of any parade of scholarship, and yet immediately one takes a closer view the ability expended upon it at once discloses itself. A brief preface deals exclusively with the various editions of Milton's works since the printing of the well-known Epitaph on Shakespeare which was prefixed to the Second Folio in 1632. There is no life of Milton included in the volume. The poems are given in chronological order. The Latin and Italian verses come at the end; and then follow the notes. Altogether this is a volume to study with delight, not only because it is based on Milton's work, but because of its continual suggestions of the past history of his publications.

The Gem Reciter. Edited by Walter Grafton. 508 pp. (Andrew Melrose.) 2s.—A great number of books of this kind are already on the literary market, but this collection has many things to recommend it. It is bulky. The selection has also been made in out-of-the-way places, many things are omitted which are frequently found in such books, and many new pieces are included. A note of simplicity in feeling pervades the collection. The humorous selections are numerous, though rarely examples of the most dainty type, and names occur of poetasters

hardly known outside newspaper offices in provincial towns. There is a rather preachy preface couched in this vein: "The reciter is in turn a preacher, a word painter, and a poet. He voices the joys and sorrows of humanity."

Representative English Comedies. Edited by C. M. Gayley. 686 pp. (The Macmillan Co.) 6s.—The idea of the editor is one which ought to enlist the support of scholars, and no less of lovers of literature and students of society everywhere. It is to provide a kind of historical purview of English comedy (as illustrating English life) in a number of volumes, of which this is the first published. The plan is to take from amongst the mass of productions existing in this form those which are most representative of the period, and in the case of this volume we are introduced to works lying between the beginnings of comedy and the age of Shakespeare. Perhaps it is needless to remark that the selection is happy and complete; and the general editor hints at further volumes by means of which the whole domain of English comedy shall yield up its chief treasures, and another volume, it is hoped, may be written to deal with those still earlier experiments before comedy became an established dramatic force, which possess at least a high antiquarian interest and no small value to the lover of pure scholarship in English literature. The general editor presents a learned, historical account of the "Beginnings," and Prof. Dowden winds up the volume with his essay on Shakespeare as a Comic Dramatist. The selected dramatic authors are Heywood, Nicholas Udall, Stevenson, Lyly, Peele, Greene, and Porter. To every one of these considerable space is devoted. Each obtains notice in a critical essay, a version of his best comedy, and an appendix "On Various Matters." We shall look for the future volumes with keen interest.

Little English Poems. Arranged and illustrated by Lettice Thomson. xvi. + 104 pp. (Horace Marshall.) 1s. 6d.—A very suitable collection of simple English poems for young children in preparatory schools, which will save many teachers much searching. The book is prettily produced, and will highly delight young people.

An Edgbaston Book of Poetry. By Edith C. Colman. 388 + xii. pp. (Blackie.) 2s.—There are anthologies in any quantity in existence already, but this one has been compiled with a special view to the tastes of school girls, and as Miss Colman remarks in this volume, a girl may find poems which she can appreciate without help from a teacher. The volume is outwardly very attractive, and is calculated to please as much in the matter of external ornament as by its carefully selected contents. These are of a varied nature, ranging from Milton and Shakespeare to F. E. Weatherley and Miss Ethel Nesbit. We are glad to see that Mr. Henry Newbolt and the late Mr. W. E. Henley have secured places also, and that the unaccustomed name of Gabriel Setoun is included, in company with Suckling, Lovelace, and George Wither. These names prevent any charge of hackneyed or easily made selections. On the whole, very praiseworthy.

Rob Roy. Edited by A. T. Flux. 440 pp. (Black.) 2s.—This edition is reasonably good so far as the general lines on which this series proceeds permit it to be. The editorial introduction is unduly scanty, though it reads well. The notes are better than in some previous volumes: the editor, however, remarks that "the most interesting" of Scott's own notes are incorporated with his own; but in this edition they are mostly subjected to a process of boiling down into very small compass. On the whole, this book may be commended for class purposes.

English.

A Handbook of Modern English Metre. By Prof. J. B. Mayor. 156 pp. (Cambridge University Press.) 2s.—Prof. Mayor has made another valuable contribution to the study of the technique of English poetry. It ought to be a matter of congratulation for lovers of English verse that books of this kind are engaging attention. English versification has been too much neglected on this side of the Atlantic, although some very good books upon it have been produced in America, and no little attention has been devoted to it by Continental scholars. Prof. Mayor's newest work, we believe, will speedily find its way into the hands of the teachers of English literature in our own schools. It is mainly occupied in examining the form of English verse in which irregularities of one kind or another appear. It is not a guide to Prosody. Nobody will be able to make verse any the better for it. Prof. Mayor tries to explain how it is that the poets of England have come to use certain forms of verse-writing, and why they have departed so far and so frequently from the rules that seem natural and simple to the spirit of poetry. The chapter on the "Aesthetic use of Metrical Variation" is excellent; so is that devoted to "Rhyme, Stanza, Refrain," which is in some respects the very best where all the other chapters are good. Emphatically this is an important and a valuable contribution to English metrical literature.

A Study of Metre. By T. S. Omond. 159 pp. (Grant Richards.) 5s.—Teachers of literature not infrequently desire that some manual of prosody could be put into their hands which would enable them to attack this subject with more success than they usually attain in it. Every educationist would do well to read the present book, for many reasons. It is exceedingly well written. Mr. Omond has stepped into the arena with a theory of his own, or at least with one which has not been widely recognised in this country as feasible at all, which he states with extreme moderation and good sense. Briefly put, he follows the lead given by Joshua Steele, taken up by Coventry Patmore in a fashion, and then developed by Lanier, Dabney, and other writers on the other side of the Atlantic. Mr. Omond is numbered among the musical scansionists. Complete periodicity, perfect time measure, purely musical rhythms, he contends are the great distinguishing marks of English verse. Whether he proves all his points is another question; but there can be no doubt at all about it that he has written a singularly interesting book. He speaks of it as elementary. But no teacher will read it without feeling that some points of difficulty in scanning verse are cleared out of the way. English prosody fortunately is not an important factor in examination results, but this is an admirable book for a teacher who wants to make his pupils discover some basis for verse making which will be fairly trustworthy.

First Book in Old English. By A. S. Cook. xiv. + 330 pp. (Ginn.) 3s.—The first section of this book is an Old English Grammar, and students for whom the author's translation of Siever's "Old English Grammar" is much too full will find the first 120 pages quite satisfactory and trustworthy. In the Reader—the second part of the book—we have over 100 pages of extracts from various writers, selected with a view to present some idea of the Old English ways of life and thought. Prof. Cook has done well in normalising the prose extracts to an E.W.S. basis—it is folly to confront the beginner with dialectic difficulties. We can thoroughly recommend the book to teachers and private students alike. The six appendices will be very useful, at any rate, to the former. Evidently they embody the suggestions of well-wishers, who, perhaps, are inclined to forget that the book is essentially for beginners.

They are very interesting, however; and, personally, we wish the author could be persuaded to add a seventh, showing Brugmann's method of exhibiting gradation.

Errors in English Composition. By J. C. Nesfield. viii. + 319 pp. (Macmillan.) 3s. 6d.—There are more than 2,000 sentences given for correction, justification or improvement in this book. The solutions are given at the end, just as in mathematical books. In addition to the examples—culled mainly from present-day journalism—there are many suggestive discussions on controversial matters, which will be read with interest. We notice, amongst others, critical remarks on the split infinitive, tense and mood sequence, the use of prepositions, the apostrophe "s," and "than whom." The book will be a real help to students.

History.

Two Lectures on the Science of Language. By J. H. Moulton. x. + 69 pp. (Cambridge University Press.) 1s. 6d. net.—These lectures were delivered to the meeting of University Extension students at Cambridge last year, and though from their necessary limitations they are no more than an introduction, they serve to show what a revolution has taken place in this subject during the last generation. We commend the reading of this booklet that our readers may realise how much most of us are behindhand now.

First Lessons in United States History. By E. Channing. vi. + 260 pp. (Macmillan.) 3s. 6d.—Prof. Channing here tells the most popular parts of United States History for the junior forms, from the earliest to the latest times. It is plentifully illustrated with coloured and other pictures; each chapter has a brief summary and questions and there is an index. The constitutional history is naturally almost entirely omitted, and the consequence is that the history of the "most peaceful nation of the world" appears very warlike.

The Biblical History of the Hebrews. By F. J. Foakes-Jackson. xxx. + 414 pp. (Cambridge: Hefter.) 6s.—Canon Foakes-Jackson here gives a story of the Hebrews and their literature, as told in the Old Testament, from the point of view of one who has studied the "higher criticism" and approves of it in the main, but who is conservative in thought and prefers to believe the biblical record wherever it is not demonstrably false. The consequence is a hesitation leading sometimes to ambiguity as to what the author really believes about any given story. The book will prove useful as showing what even the most conservative among educated folk will allow in the way of criticism of the Hebrew literature. As such we commend it to our readers.

The New Zealand Colony. 140 pp. (Arnold.) 1s.—This is a delightful little book on "Maoriland," telling in a pleasant way the history and geography of the colony, and illustrated with a map, several pictures and two poems by "Arthur H. Adams," whom we take to be a New Zealander. There is no index, but a six-page appendix summarises the contents.

Lingard's History of England. Newly abridged and brought down to the Accession of King Edward VII., by H. N. Birt. x. + 645 pp. (Bell.) 5s.—The nature of this book is indicated in its title. It is intended for use in Catholic schools. It is provided with a four-page introduction by Dr. Gasquet, seven maps and six genealogical tables. Lingard's work came down to the Revolution of 1688, and was published fifty years ago. This abridgment shows signs of the old fashion both in language and in treatment of the history. We think it scarcely

worth while to have made this attempt to use a book now so out of date, and the continuation through the eighteenth and nineteenth centuries does not appear to have been written from a modern point of view. The international history specially has several misstatements.

Science and Technology.

Electrical Engineering Measuring Instruments. By G. D. Aspinall Parr. 322 pp. (Blackie.) 9s. net.—Hitherto the physicist and electrical engineer have possessed no single source of information on the details of the numerous types of electrical measuring instruments. All the more modern types of instruments are fully described in this volume, which will, therefore, be of the greatest value in the laboratory and testing-room. The volume is admirably illustrated with 370 line-diagrams, photo-reproductions and engravings: the diagrams are particularly clear, and add much to the usefulness of the descriptions given. Separate chapters are devoted to the following types of instruments:—Moving needle electro-magnetic, moving coil electro-magnetic, hot-wire and electro-static, electro-magnetic watt-meters, recording instruments, miscellaneous standard instruments, and electric supply meters.

Electrolytic Preparations. By Dr. Karl Elbs. Translated by R. S. Hutton. 100 pp. (Edward Arnold.) 4s. 6d. net.—This volume describes a typical series of electrolytic processes exclusively chosen from those made use of in the electro-chemical laboratory at Giessen. It is assumed that all who make use of the exercises have already followed a course of inorganic and organic preparations. After a brief description of the apparatus required, details are given of thirteen inorganic and twenty-five organic processes. Numerous references to original papers are quoted in connection with each process. The volume will be of much service to advanced students of chemistry.

Elementary Ophthalmic Optics. By Dr. F. Fergus. 106 pp. (Blackie.) 3s. 6d. net.—The aim of this book is to set forth those portions of physical and geometrical optics which are essential to the medical student beginning his ophthalmic studies. A brief introduction, explaining the trigonometrical functions of angles, is followed by chapters on reflection, refraction, and lenses. The spectrometer is briefly described in an appendix. The subject of physiological optics is not discussed.

Text-Book of Geology. By Sir Archibald Geikie, F.R.S. xxi. + 1,472 pp. (Macmillan.) 2 vols. 30s. net.—Every serious student of geology has long been familiar with Sir Archibald Geikie's "Text-Book," and the appearance of this fourth edition, incorporating as it does the advances in geological science during the ten years which have elapsed since the publication of the third edition, will be hailed with the greatest satisfaction. So extensive are the additions which have been made that the new edition runs to 300 pages more than the last, and there are nearly forty new illustrations. The publishers have very wisely divided the work into two volumes and those who have had often to use the old book will be thankful for the change. It is unnecessary in these columns to institute a detailed comparison between this and the preceding edition; it will suffice to point out a few typical examples of the thorough manner in which the work has been brought up to date. A useful table of abbreviations, employed in the numerous references to original memoirs which have proved so useful to students, has been added. The classification of the eruptive igneous rocks has been changed in accordance with more modern ideas; the section dealing with vol-

canoes and volcanic action now includes an account of such recent occurrences as the Martinique eruptions; the theories pertaining to coral reefs have been modified and elaborated so as to include the opinions of present-day schools of thought; and the table of geological record has been re-arranged and printed in a more convenient form. We have no hesitation in saying that every student who proposes to offer geology as a subject for a science degree at one of our universities will be compelled to obtain these volumes, and we are sure that no geologist will be quite content until he has placed the fourth edition of the "Text-Book" on his shelves.

Following the Deer. By William J. Long. 193 pp. (Ginn.) 4s. 6d. net.—These delightful papers of Mr. Long first appeared as a series of animal studies in a little book called "Secrets of the Woods," which was more especially intended for the use of children in schools. In their new dress, charming in its daintiness, the essays will secure the absorbed attention of readers of all ages. The book breathes of the woods. As the reader eagerly follows Mr. Long's reminiscences he develops a new sympathy with the ways of wild folk and learns to regard the beasts of the field as being as well worth careful study as his fellow men and women. The volume is sure of a wide popularity.

Ways of the Six-footed. By Anna Botsford Comstock. xii. + 152 pp. (Ginn.) 2s.—Mrs. Comstock is an active member of the Cornell University Nature-Study Bureau, which is well-known for its pioneer work in the organization of nature study among the schools of America; and these stories of insects accord well with the best traditions of that body of teachers. The treatment is picturesque, and—by no means a universal feature of school-readers upon natural history—the stories are at the same time trustworthy and related in excellent literary English. In the higher forms of schools it will be found of great value. The chapter entitled "The Perfect Socialism" could, in the hands of a capable teacher, be made to convey one of those ethical lessons in which insect life is so rich. The book is attractively printed and very beautifully illustrated.

The Insect Folk. By Margaret W. Morley. vi. + 204 pp. (Ginn.) 2s.—This book is obviously intended for young children. It is written in simple language, and conveys a great deal of sound information upon the commoner order of insects. On the other hand, the style is unnecessarily disjointed and colloquial, and contains Americanisms which are neither picturesque nor elegant. For this reason we can scarcely recommend the use of the book as a school reader in this country, although teachers may glean from it many useful hints. It contains a large number of useful illustrations by the author.

Lessons on Country Life. By H. B. M. Buchanan, and R. R. C. Gregory. xii. + 330 pp. (Macmillan.) 3s. 6d.—Teachers will find this book of the highest value in preparing lessons on the animals of the country. An astonishingly large mass of useful facts is provided, yet the information is so well arranged and profusely illustrated that every page is attractive. A little more than half of the book deals with the domestic animals of the farm, their habits, uses and treatment, and contains a useful section upon dairy work; the remaining pages are devoted to notes on the wild animals to be found in our woods and fields, and conclude with a table of classification. Though the purpose of the book is ostensibly to provide material for lessons in schools, it may be cordially recommended also to farmers and to all others who are interested in the life of the country.

Elementary Physiology and Hygiene. By Buel P. Colton. viii. + 317 pp. (Heath.) 2s. 6d.—This is a thoroughly good little book, well planned, simply written, and illustrated by a

number of excellent diagrams. The dependence of health upon physiological processes is clearly brought out, so that the reader is made to understand the reasons for the precepts of hygiene. A noteworthy feature is the prominence given to the effects which alcohol and tobacco have upon the system; these questions are treated in a spirit of reasonableness that is refreshing. The book may be confidently recommended, not only to students, but to general readers.

Mathematics.

A New Geometry for Schools. By S. Barnard and J. M. Child. xxvi. + 514 pp. (Macmillan.) 4s. 6d.—We have read this book with very great interest, and we think it deserves the serious examination of all who are interested in attempts to provide a satisfactory substitute for Euclid's Elements in the teaching of geometry. The book is divided into three parts. The first part, which is short (pp. 1-24), treats in a thoroughly interesting manner the fundamental concepts; the explanations and illustrations of technical terms will at once appeal to the average boy. The second part (pp. 27-251) is, however, the section that presents the greatest novelties of treatment. Perhaps the most striking feature of it is the extensive use made of the principle of symmetry; it is, we should imagine, all but impossible for a pupil to work through the text and exercises without having his intellect quickened and his reasoning powers strengthened, while at the same time acquiring a large stock of geometrical ideas. Part III. (pp. 255-501) is entitled *Theoretical*; though the general development is satisfactory there is, as might be expected from the nature of the case, not quite the same novelty of treatment. It may in general terms be said to contain the substance of Euclid's first six books together with various additional theorems, but of course the logical sequence is not that of Euclid. Though on some less important matters we would venture to differ from the authors, we would most earnestly recommend the book to the teaching public. It is no easy matter to provide a satisfactory substitute for Euclid; at any rate, it is long in making its appearance; but we certainly believe that this "New Geometry" is no unworthy rival on purely theoretical grounds, while in practical interest it is greatly superior.

Arithmetic for Schools and Colleges. By John Alison and John B. Clark. viii. + 304 + xxxvi. pp. (Oliver and Boyd.) 2s. 6d.—The theoretical discussions in this book are unusually good. The sixth chapter on the Laws of Operations is both clear and thorough and leads up to a satisfactory treatment of fractions. An excellent chapter on decimal approximations precedes the discussion of periodic decimals and of evolution. The discussion of approximations is rendered easier by the method adopted throughout of beginning a multiplication by the digit of highest order; it is very satisfactory to see this method coming into use, for its advantages are obvious and it offers no greater difficulty to the young pupil than the usual one. It seems a pity that Weights and Measures are postponed till after decimals have been finished; the earlier exercises are thus a little abstract, though concrete examples of an easy type occur from the beginning. Great stress is laid on proportion, but duplicate and triplicate ratios might well have been consigned to a work on the history of arithmetic. There is a good chapter on the metric system; percentages and simple interest with the usual applications are included amongst the subjects treated. The exercises are numerous and contain many examples drawn from physics as well as from the draper's shop.

Vectors and Rotors. With Applications. By O. Henrici, F.R.S., and G. C. Turner. xvi. + 204 pp. (Arnold.) 4s. 6d.—For a considerable time there has been a demand in some quarters that the elements of vector analysis should form part

even of courses that do not profess to be advanced; Prof. Henrici is of opinion that it is a subject which should be introduced into schools, not merely for its usefulness in applications, but for its educational value. In this book, based on lectures to first year students at the City and Guilds Central Technical College, the fundamental principles of vector analysis are expounded with a fulness and clearness that leave no room for misapprehensions in the mind of any competent reader, while the numerous applications to graphical statics show the great power and beauty of the method. To teachers who wish to gain some knowledge of the problems that arise in engineering practice and of the manner in which they are solved by a combination of graphical and vector methods this book can be unreservedly recommended; to many who were trained in purely analytical methods Chapter II. (Mass-Centres) and Chapter V. (Stresses in Frames) will be especially interesting. The applications to geometry do not seem to us to be of the same importance; we do not think that, if the needs of geometry alone were considered, the case for vector analysis would be anything like so strong as it undoubtedly is when its usefulness in mechanics and physics is made the basis of its claim for introduction into elementary teaching. Whether it can be successfully used in schools seems to us to be still an open question. It is hard to see how the subject could be presented more simply or attractively than is done in this book and yet the discussion of formal laws of operation, and specially of the vector product, presents difficulties that actual experience has shown to be very real to the beginner. It would be an undoubted gain to sound teaching if the demand for the introduction of vector analysis into schools were to lead to the laying of greater stress on the thorough comprehension of the formal laws of algebra; without such comprehension on the part of pupils the study of vector analysis would have little educational value and would probably reduce itself to the mechanical acquisition of rules. Yet the subject is so important that some mathematical masters may be found willing to give to vector analysis the time now spent, say, on geometrical conics.

Key to Practical Mathematics for Beginners. By Frank Castle. vi. + 226 pp. (Macmillan.) 5s. net.—Many teachers who have little leisure to study the newer ways of presenting old truths and who yet require to adapt their teaching to the new demands will find this key of great service. It is to be hoped no teacher will feel the need of the solutions in the earlier pages of the book, but in all probability there are not a few who will greatly profit by a careful study of the later pages. The labour involved in drawing up the solutions must have been very great, and, so far as a necessarily imperfect examination shows, the result is good. Many of the questions are really intricate in their arithmetic; a beginner who has the patience to tackle them must be a delightful pupil.

First Stage Practical Plane and Solid Geometry. By G. F. Burn. viii. + 240 pp. (Clive.) 2s.—The book is designed to cover the requirements of the elementary stage of the Board of Education in Practical Plane and Solid Geometry. The work seems to have been written both with knowledge of the subject and with appreciation of the difficulties of beginners. At times there is an undesirable vagueness of statement; for example, the first paragraph on the ellipse is equally applicable to many curves besides the ellipse. The chapter on the ellipse might indeed with advantage be rearranged; it is perhaps the least satisfactory in the book. The writer is at his best in the sections on Solid Geometry; these are very good and they contain frequent directions for the construction of models—an element in the training of the student that has been too much neglected. The diagrams are numerous and clear, but they seem too small,

though the price of the book possibly accounts for this defect. Numerous exercises are given for the practice of the student.

Practical Plane and Solid Geometry. By I. H. Morris and Joseph Husband. 254 + ii. pp. (Longmans.) 2s. 6d.—Like the preceding book, this one also meets the demands of the new syllabus in practical geometry. The treatment, while not perhaps introducing much that is novel, is well suited to the needs of beginners. The diagrams are very clear and the descriptive text is both accurate and compact. The book contains numerous exercises and seems to be well adapted to the needs of the students whom the writers have in view. It may be added that a publisher's note states that the present work takes the place of the book on Practical Plane and Solid Geometry, by I. H. Morris, in Messrs. Longman's Series of Elementary Science Manuals.

Miscellaneous.

The First Year of Responsibility. Talks with a Boy. By Maynard Butler. With an Introduction by the Master of Trinity College, Cambridge. viii. + 119 pp. (Swan Sonnenschein.) 1s. 6d.—A careful reading of these sympathetically written words of advice for young boys has convinced us that if boys could be persuaded to read the little volume it would do them a great deal of good. But boys are notoriously impatient of anything in the way of a sermon, and perhaps the best plan will be for fathers and schoolmasters to read the talks, and then, with the aid of the inspiration which Mr. Butler's words will give, to drop the word in season and so provide their boys with right ideals for future conduct.

Accounts for Private Schools. By Laurence G. Oldfield. 40 pp. (Educational Supply Association, Ltd.)—This book gives very clearly a business-like manner of keeping accounts. The system can be thoroughly recommended to all headmasters who employ a secretary, but it is much too elaborate for the ordinary headmaster. He cannot possibly give the time necessary for entering up all the books recommended. A day book, with school, pupils' and private ledger and pupils' account-book entered weekly, supplemented by a full income and expenditure account under the various items drawn up at the end of each term—the whole submitted to an accountant at the end of the year—will serve every need. But the book is well worth studying and gives many valuable hints.

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.

School Curricula.

YOU kindly ask me to write you a short letter with reference to school curricula; I gladly embrace the opportunity of saying a few words on the subject from the standpoint of a public-school teacher of classics. I hold strong views on the question. My belief is that for boys of ordinary, and less than ordinary, capacity the classical education given by public schools, admirable in theory, is largely nullified by its own complexity, and by the multiplication of other subjects. I believe that we attempt to teach far too many subjects, and that our methods in most of these subjects are far too elaborate and inelastic.

Simplification seems to me the prime necessity. I believe that an ordinary boy should try to master one, or at the most two subjects, and that he should have a fair acquaintance with two or three others. It is not possible, with the space at my

disposal, to go into details; but I do not hesitate to say that I think that, at present, linguistic teaching occupies a quite disproportionate amount of a boy's time, and that the teaching boys of ordinary capacity two dead languages simultaneously, when one considers the method employed, and the results attained, is unjustifiable.

I do not at all adopt the anti-classical position; but I have no doubt that if simplification is attempted, and a curriculum of subjects built up, with a view to due proportion and co-ordination, the classical hours are bound to be diminished.

I take the boy of ordinary capacity as the unit; special faculties should be carefully looked out for; and there should be enough elasticity to allow special tastes to be encouraged and developed.

So far as I can see, I do not think the details of such a central *core*, so to speak, of education would be so difficult to work out as the present complicated time-tables.

I quite admit that much must depend in any curriculum upon the personal influence of the teacher; but I believe that a curriculum could be devised which would depend less upon this factor than our present classical curriculum, and enlist the interest, if not the enthusiasm, of the boy from the first.

I have taught classics at Eton for nearly twenty years to boys of every degree of capacity. I have found that as a basis for teaching able boys they are excellent. But the effect of the present crowded curriculum, with classics as the basis, upon boys of ordinary or limited capacity is so absolutely negative, from the educational point of view, that I should hold that it would justify almost any experiment being tried. Possibly a new curriculum might break down; possibly there is not sufficient intellectual curiosity in the ordinary boy to build upon. But I can only say that I do not believe this to be the case; and I have little doubt, personally, that a simplified curriculum might produce remarkable intellectual results in our public schools.

Eton College.

ARTHUR C. BENSON.

MOST teachers feel that the curriculum—especially in girls' schools—is overcrowded, with the disastrous result that the mental energy of their pupils is being dissipated, and the habit of concentration of thought is not being formed as it ought to be.

In planning a curriculum it should be borne in mind that one main object of education is to develop *all* the mental faculties. For this reason early specialisation is to be avoided. The question, then, is: What are the subjects that best develop the powers of the mind, and how can the curriculum be arranged so as to include those necessary for this purpose? At the present time the cultivation of the memory is almost entirely neglected; yet the biographies of such men as Darwin, Westcott, Lord Acton—to mention only a few—plainly show that they could not have accomplished what they did in after life without the aid of a good memory.

Would it not be possible to arrange subjects, more than is done at present, in groups according to the faculties they tend to develop and rigorously to exclude all but one or two of each group? The secret of good teaching is the art of omission; is not this, to a certain extent at any rate, true of a good curriculum? In the early stages of education, side by side with reading, writing, and arithmetic, one modern language which will train the memory, and one science that develops observation rather than the reasoning power, should be taught. The cultivation of the imagination will at the same time be given through biographical history, poetry, &c. At this early stage, that is, up to the age of about twelve or thirteen, there should be few subjects learnt and at least three or four hours a week given to each subject, in order to lay a good foundation.

At the present time, owing to the multiplicity of subjects

taught, the foundations are often not securely laid, and that leads to considerable waste of time in after years. So moderate a number of subjects as that suggested would leave plenty of time for drawing, music, or some handicraft.

About the age of twelve or thirteen, elementary mathematics might take the place of observational science, and a second language, modern or classical, might be added. Geography and history treated scientifically, so as to develop the reasoning powers as well as the imagination, could be continued at this period. Later, the choice must be made between advanced mathematics and inductive science, while history will gradually give place to the more definite study of literature. Specialisation should not begin before the age of sixteen or seventeen, and then only if the general development of the pupil is satisfactory.

In order to have as ideal a curriculum as possible, it is important that a school should send in pupils for very few examinations. A "Leaving Certificate" such as that suggested by the London University permits of more elasticity in the curriculum than is possible in a school which sends in pupils for two or three examinations below those of the Senior Locals.

Lastly, it is my firm conviction that the utilitarian view of education, which in some quarters is being loudly advocated at the present time, tends to develop experts rather than men and women. If boys and girls leave school knowing *how* to use their minds, it matters very little *what* subjects they have, or have not, learnt at school; they will then quickly become experts in whatever they feel called to undertake as their life-work.

I am afraid I have responded to your kind invitation to take part in this discussion by a letter of too great length, or I would discuss the place of manual and physical training in education; but this is the less necessary, for our educationalists of to-day are fully alive to its value: it is not physical, but intellectual development, that stands a chance of neglect at the present time.

CHARLOTTE L. LAURIE.

President of the Association of Assistant-mistresses in Public Secondary Schools.

The Ladies' College, Cheltenham.

THE papers and discussions at the British Association on School Curricula and allied questions appear to me to indicate clearly so wide an interest and so much agreement on certain points that I cordially approve of your desire to continue the discussion in your columns. Amid some diversity of view one may note with reference to secondary education that it is generally agreed (1) That not only can brain power be developed and intellectual training be obtained by a study of classics (Latin and Greek) and mathematics, but also by the study of English, other modern languages and the sciences when properly taught. (2) That, inasmuch as pupils cannot profitably be taught in school all the subjects mentioned above, it is necessary that the curriculum of a pupil should have some relation to his future calling in life. As a consequence it follows that there should be different courses of studies or different types of curricula. The three types of curricula as set forth by Prof. Sadler appear to me to suit the requirements of different kinds of boys admirably. A fourth type might be set down for the ordinary High School for Girls. Now what I desire to see is a more direct application of these general principles. Ask your readers to select, for example, a certain type of secondary school and a certain class in that school, then to state the subjects that should be taught in that class, the hours per week to be devoted to these subjects, and how this time is to be divided among the subjects. As examples:—A school of type (a) and a class whose average age is thirteen; a school of type (a) and a class whose average age is fourteen; a school of type

(b) and a class whose average age is thirteen or fifteen; a school of type (c) and a class whose average age is sixteen; or any others. A suitable preliminary education may be assumed. Such a distinct curriculum from a number of your readers would prove most interesting and instructive.

Central Higher Grade School, J. THORNTON.
Bolton.

Correspondence Club for the Study of Pedagogics.

IN the September number of THE SCHOOL WORLD I suggested the formation of small correspondence clubs of schoolmasters and schoolmistresses for the joint study of the theory and history of education as contained in the works of our great educators. I have had a few replies from acting teachers in secondary schools expressing a desire to join some such club as I described, but not so many as I expected. It has been suggested to me that the reason of this is that my letter appeared during the summer vacation. May I repeat my offer, and say that it is desirable that all schoolmasters and schoolmistresses who propose to take part in the scheme, for an account of which I must refer to the last issue, should communicate with me as soon as possible.

22, Elmstone Road, S.W. A. T. SIMMONS.

The Stereoscope as an aid to Teaching.

WE are indebted to Prof. Cole for his scholarly criticism of our educational stereographs which appeared in THE SCHOOL WORLD for September. Apparently, however, Prof. Cole was under some misapprehension concerning the purpose of our book entitled, "Italy through the Stereoscope." He has criticised it as a text-book for schools, and asks whether it is to be read to the pupils, or how it is to be used, and proceeds naturally to point out what certainly would be grave defects were it meant to fill such a place. It is only due to us, therefore, that we be permitted enough of your valuable space to explain that this book was not written for class-teaching in schools, and to point out that its purpose is to act only as an interesting guide to accompany a popular stereographic tour through Italy. It is to be regretted that this fact was not specifically stated when, along with the series of school stereographs, this book and a few of its accompanying views were sent to you. The latter were included only to assist in realising the possibilities of the stereograph in bringing some of the results of actual travel into the home when used in conjunction with the specially designed maps and guide books. In the book in question Dr. Ellison made no attempt to follow distinctly historical or geographical lines: the task which was set him was to write *interestingly* around a certain series of stereographs for the purpose of our popular stereographic tour department. It is, therefore, only natural that this book is unsuited for teaching. Had Dr. Ellison written especially for school use the style of the book would have been radically different.

As suggested later in the article, we intend our stereographs to be used in illustration of the matter given in standard text-books. Prof. Cole grasps our idea completely when he says: "Probably English teachers can select what will suit their special courses, for series of pictures can be broken into and re-compounded in any order." That is the method followed by teachers who have been using our system for years on the Continent, in America, and in some British schools.

We cannot conclude without thanking Prof. Cole warmly for his very suggestive criticism, and assuring him that our system is continually being improved and revised by practical educators.

We trust this explanation will remove any misconception concerning the system from the minds of the readers of THE SCHOOL WORLD.

UNDERWOOD & UNDERWOOD.

A Method of Collecting Pure Carbon Dioxide by Heating Chalk.

IN the series of experiments on chalk, which now forms part of most school courses in chemistry, there is one link in the chain of argument which is incomplete—there is no satisfactory *direct* proof that the gas evolved on heating is the same that is set free by the action of acids. The identity of the losses in weight caused by heating and by treatment with an acid points strongly to this conclusion, but it is desirable to show later on by direct means that pure carbon dioxide can be got by heating chalk. It is true that by heating chalk in an iron tube we can collect a small quantity of gas which turns lime water milky; but on examination this gas is found to be chiefly nitrogen from the air originally contained in the tube¹. I find that the experiment can be readily shown if the chalk be heated in a current of steam, which carries off the carbon dioxide as fast as it is formed and prevents the reverse reaction represented by the equation $\text{CaO} + \text{CO}_2 = \text{CaCO}_3$.

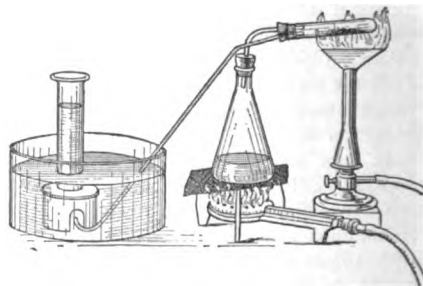


FIG. 1. [From "An Introduction to Chemistry." By D. S. MACNAIR (BFL).]

The apparatus used is shown in the accompanying figure. The chalk is heated in a test tube of hard glass through which a rather rapid current of steam is sent from the Erlenmeyer flask. At a low red heat a slow but steady stream of gas is given off which can be collected over water and is found to have all the properties of pure carbon dioxide.

¹[It is interesting to note, however, in this connection that the author of a recently published elementary textbook of chemistry directs his readers to weigh out one gram of chalk into a counterpoised iron tube (!), heat it with a Bunsen burner, collect over water several jars of the gas which is evolved, and finally, to weigh the tube again and note that its weight has diminished, that the contents have been converted into lime, and that the loss in weight is approximately the same as that produced when a gram of chalk is heated in a porcelain crucible in a furnace. If any reader of THE SCHOOL WORLD has taken the trouble to attempt to carry out these instructions, I should be much interested to hear of his results. It would probably be quite safe to assert that the author himself had never tried the experiment.]

D. S. MACNAIR.

The School World.

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SIXPENCE.

THE TWO METHODS OF TRAINING TEACHERS.

SECTION 3 of the Teachers' Registration Regulations makes training compulsory, but subsection (2) offers the young teacher the choice of two kinds of training.

(2) He must either—

(i.) Have resided and undergone a course of training for at least one year, or in the case of a student who has taken honours in the Final Examination for a degree after spending four academic years at some University in the United Kingdom have undergone a course of training for two terms at least taken continuously, at one of the universities or training colleges mentioned in Appendix D to these regulations or some other recognised institution for the training of secondary teachers, and have passed the examination for one of the diplomas or certificates in theory and practice of teaching mentioned in Appendix C to these regulations; or

(ii.) Have passed an approved examination in the theory of teaching, have spent at least one year as a student teacher under supervision at a recognised school (not being an elementary school), and have produced evidence of ability to teach.

Accordingly, candidates have to consider which of these alternatives is preferable.

With regard to cost, it is probable that there will not be much difference. Between twenty and thirty pounds is the usual fee for the year's training in a non-residential college, and it is unlikely that any good school will undertake to deal with student-teachers for less.

The name "student-teacher" is unfortunate, inasmuch as it suggests "pupil-teacher" with all the obloquy commonly associated with that word. Further, the term is actually in use at present to indicate a pupil who pays for her instruction in advanced subjects by giving instruction in junior classes. Such a pupil differs from a pupil-teacher merely from the fact that she teaches in a secondary school, and usually gets no payment in money. It will take some little time before the new student-teachers rid themselves of the unpleasant connotation of the name thus thrust upon them. On the one hand, parents must be taught that these teachers are not raw pupils but highly educated men and women, seeking an insight into the practical details of their profession; and on the other, the public must be convinced that schools

are not permitted to use these student-teachers as a cheap reinforcement of their staff. The Board of Education seems determined to recognise none but really satisfactory schools, and to exercise a certain amount of supervision over the working of the plans submitted for the training of students. At the beginning, at any rate, a great deal will depend on the reputation of the school. A student who has been trained at a good school will stand an excellent chance of being generally accepted as thoroughly accredited.

In contrasting the two methods of training, it is obvious that each has a special line of weakness. The training college is inclined to be somewhat doctrinaire, given over to theories and ideal states. The schools, on the other hand, are tempted to rest content with things as they are, to accept the present standards and ideals and train the student-teachers in the best way of attaining them. Further, it is likely that public opinion in England will favour the more practical attitude adopted by the schools. In appointments for elementary schools, at the present moment, there is always a preference given to a candidate who has been a pupil-teacher. The mechanical knack acquired during the pupil-teachership always stands the young teacher in good stead in mere class-handling, which is about the only thing in teaching that an inexperienced body of school-managers can appreciate. There is a danger that student-teachers will acquire this mechanical dexterity at the expense of a certain loss of breadth of view and intelligence in applying principles. A year's training confined to one school, however good that school may be, is necessarily narrower than a year which includes several schools of different grades and types. The lesson of the *Wanderjahre* of the old craftsmen is not without point in these latter days. This danger is foreseen by the Board of Education; for its representatives are insisting upon the visiting of a certain number of other schools, by the student-teachers of a given recognised school. There is a danger that these visits of observation may degenerate into mere purposeless gaping, but there is no need to assume that they will be carelessly supervised. Further, the requirements of "an approved examination in the theory of teaching" will ensure that the science of teaching is not entirely sacrificed to the art. In the case of an isolated school it will probably be difficult to get

the necessary theoretical instruction; but it is exceedingly unlikely that such a school will claim recognition unless the headmaster is somewhat enthusiastic in the matter of the science of his profession, and, therefore, able and willing to provide the necessary opportunities.

With regard to the practice in school, there appears to be much less likelihood of friction in the case of the student-teacher than in that of the students of a training college. The student-teachers are, after all, a part of the school; they are introduced by the head; they are put into definite relations with certain of the staff; they have no connections of an external kind that would naturally lead to friction. The training-college student who is attached to a school for practice is introduced by the head as before, and put into the same relations with certain members of the staff. In both cases we may assume the sympathy of the head and the latent antipathy of the staff. But the case of the training-college student is complicated by the existence of the Master of Method. He is the stormy petrel of training. It is with him that the trouble begins. For reasons that are apparent to all—and that are not entirely to the discredit of the Master of Method—he is regarded with suspicion and dislike by most of the staff. He requires to use a great deal of tact in order that he may get for his students the best that the teachers of the school can give. But given this tact, and given the payment of a fee to the class-teacher who has most to do with the practice of the student, and the chance of friction is remote. The class-teacher feels himself in some sort a Master of Method himself, and the resulting fellow-feeling leads to a kindlier attitude towards the professional Master of Method.

In point of fact, the two methods of training—when effectively carried out—are identical in essence, though they start from different points. Both must provide theory and practice. The college starts from the theory side, the school from the side of practice. If the training college has a practising school attached, it has its work complete within itself, though perhaps labouring under a certain degree of artificiality. But in most cases it will be impossible to have a secondary school set apart for each training college. Accordingly, outside schools must be sought for the necessary practice, and it is then very difficult to see how a student-teacher differs from a training-college student attached to a particular school, especially when both classes of students make a series of visits to schools of various kinds. The real difference comes to be the Master of Method. As the school cannot afford a special Master of Method, it must employ some member of the staff who is unlikely to have the same special qualifications for this kind of work as are possessed by the professional Master of Method; though, no doubt, the member of the staff will have the advantage of closer touch with the daily life of the school. If it is said that the professional Master of Method has too high ideals and is altogether too theoretical, it ought to be sufficient to point out that one year's

tincture of theory is a scanty enough allowance to counteract the tendency of a lifetime to frictionless rule of thumb.

The conditions are different in the country and in the town. A good school in a small country town may well claim recognition as a training centre for student-teachers, and do capital work with one or two of them. Further, any one of the great public schools that cares to take up the work has everything at hand within itself to produce excellent results. With a large staff such as one finds in a great public school there are sure to be one or two who have given the science of their profession a little attention, and are therefore able to give beginners useful guidance. For it cannot be too strongly impressed on those interested in the subject that to know how to teach a subject excellently is not in itself any guarantee that the teacher can show another how to teach that or any other subject. The power of teaching is one thing, the power of teaching how to teach is another.

For schools in large centres it would be well to utilise whatever agencies are already at work. This is actually being done in London, where several of the schools under the Girls' Public Day School Company have adopted a system of student-teacherships in conjunction with the London Day Training College. Under this arrangement, the schools undertake the entire responsibility for the practical training of the students, and rely upon the training college for the theoretical part of the course. The school is, therefore, the centre of the training, and the students pay the fee to the school. A portion of this fee is paid by the school to the training college in respect of the instruction in theory, and the rest of the fee goes to the school that provides the necessary supervision in practical work. A Mistress of Method is appointed by the schools concerned. She is responsible to the schools on the one hand and to the training college on the other. She acts in harmony with the college staff so as to maintain a proper correlation between the theory as given in the lectures and the practice as carried on by the students in the schools. Since she is an officer of the schools, and is paid by the school authorities, there can be no friction between her and the staff whose colleague she is.

This co-operation between the college and the schools may take various forms. One important school, for example, sends its student-teachers to the training college to be entirely under the direction of the college staff both in theory and practice. Such students, therefore, differ from the regular students of the training college only in the fact that they are entered as student-teachers of the school, and not as students of the college. All such arrangements have the great merit of securing a broad training in theory by specialists, while leaving the teachers of the schools masters in their own field, free from any interference from without.

THE PLACE AND VALUE OF MUSIC IN SCHOOL WORK.

IN spite of the strides which England has made during recent years towards the general appreciation of music and its earnest study, it must be admitted that the Public Schools have not, for the most part, taken an adequate share in the task of effecting this improvement. Not for the first time, we must sorrowfully note, is the phenomenon to be observed of an important national movement going forward in which the Public Schools are, to say the least, taking no lead.

Since the majority of school music-masters are earnest and capable musicians, as well as good teachers, the cause of this comparative lack of success must be sought in the system under which they work. A very slight experience of the usual conditions of school music will reveal the fact that the most important influence which hampers music-masters is the knowledge that, as a rule, the educational world entirely refuses to take school music seriously. The result is a lack of stimulus and encouragement which makes their task, in spite of much zeal and ability, a difficult, sometimes an impossible one. And the matter does not end here. A vicious circle is created from which extrication is difficult. For, whilst the indifference of their colleagues discourages the efforts of music-masters, the maimed success which results therefrom makes most schoolmasters less inclined than ever to take music seriously, and thus the two unfavourable conditions tend to re-act on one another, and to assist one another, *ad infinitum*.

It is unnecessary, and probably useless, to state in any but the briefest terms the considerations which might induce schoolmasters to regard seriously the work of their musical colleagues. But it may be worth while to suggest, first, that one of the characteristics of vitality in a school is the encouragement and maintenance of strenuousness and seriousness in *all* the departments of school life; secondly, that if one of the admitted faults of modern Public Schools is their tendency to turn out numbers of highly respectable, efficient and polite men—"good fellows" they are generally styled—of somewhat limited individuality, then the serious cultivation of subjects outside the ordinary *curriculum* of games and school work might tend to develop a touch of originality and distinction in some of these; thirdly, that allowing boys to go with a latent artistic faculty inadequately developed is doing those boys a serious wrong—a wrong far more serious than can be dreamed of by a worthy schoolmaster entirely without artistic sensibility; finally, that if education is at all desirable for its own sake, as distinguished from technical training (an idea, however, which apparently seems fantastic to many modern "educationists"), then music, intelligently taught, may be made a means of education second in effectiveness to few, if any, other subjects. Admitting these considerations to be valid, we may perhaps be allowed very briefly to inquire why, in spite of all, the educational

world continues to refuse to take school music seriously.

The answer is simplicity itself. The educational world refuses to take school music seriously because it is for the most part unmusical, and has the very natural and human frailty of finding it difficult to see why a subject which seems to it unimportant must needs be important to anyone else. Headmasters are appointed to their posts on account of qualities among which (quite properly, of course) a knowledge of music need have no place. Consequently, in spite of every desire to help and encourage, they do not always find it easy to form a just estimate of the quality of the work which their music-masters are accomplishing. Assistant-masters, on the other hand, are to a considerable extent drawn from the ranks of the "good fellows" mentioned above, who do not usually add to their conspicuous qualities of efficiency and zeal a serious regard for art in any form. English boys do not, as a rule, at first feel naturally drawn to artistic pursuits outside the regular round of work and play, and so it happens in many schools, though certainly not in all, that the music-master finds himself enveloped in an atmosphere of sturdy Philistinism which his most strenuous enthusiasm will appear quite powerless to affect. Let us proceed to consider how Goliath's stronghold, kindly and vigorous in the main, may be impressed with the notion that the study of an art may be worth taking seriously.

We may take it as certain that the music-master himself must take the first steps towards extrication from the vicious circle of indifferent musical success caused by, and causing, indifferent encouragement. There are few signs that improvement is likely to originate with the other side, nor, perhaps, is it reasonable to expect that it should. Clearly, then, if music-masters wish to secure that their work shall be taken seriously, they must begin by acting, in spite of frequent absence of stimulus, as if they themselves believed that the work is worthy of being taken with the utmost seriousness by themselves. Disinterested and strenuous work seldom fails to obtain respectful recognition from some, at least, of those who witness it. Music-masters must begin, then, by treating every detail belonging to their department as though the greatest issues hung upon it; by acting as though the strongest possible stimulus was at their backs. In giving more particular suggestions as to how this intention can be manifested, there are reasons to be considered why such proposals should not be of too definite a character.

In the first place, conditions vary greatly in different schools. It is only by thinking out detailed schemes for himself that a man is likely to hit upon methods which will suit his own particular circumstances. Again, work which is to be vitally effective must be spontaneous and original, not the result of theories and dogmas imbibed from other minds. Saul's armour never fits David, and what Saul would accomplish with brazen helmet and coat of mail David may effect more easily with five smooth stones out of the brook. Nothing,

then, will be given here more than hints as to general lines and wide principles. Details must be filled in with reference to special circumstances. It would be worse than useless, and certainly presumptuous, to attempt to deprive others of the honourable task, the peculiar advantage, of thinking and acting on their own initiative. Perhaps, however, the following simple prescripts may be set forth without indiscretion. They appear to be not of universal recognition, and yet, probably, examination will prove them convincing. Their application, moreover, will involve no surrender of spontaneity or individuality:—

(1) *Treat each pupil from the beginning as though he had in him the latent capacities of an artist.* In the first place, it may be that he has those capacities, only needing careful teaching to bring them to light. Again, if he has not the latent capacities of an artist, he may yet have those of a good amateur, and many pupils who are really musical require the closest watching and most careful handling on the part of the teacher before the fact will become apparent. Innumerable good musicians have been lost to society because their teachers have assumed from the beginning that they were incapable, whilst all the time they possessed capacities which might have been developed by dint of some watchful persistence, combined with faith.

It may be taken as certain that pupils will not, except in the rarest cases, be worried or harassed by the adoption of this line. Experience shows unmistakably that the attitude of the master is generally accurately reflected in that of the pupil. A zealous, discreet, and painstaking teacher will almost always find zealous and painstaking learners. A master who is in earnest with his work makes an appeal to the self-respect of his boys which seldom fails to meet with response. On the other hand, young people are extraordinarily quick to discover slackness or incapacity in their teachers, and inwardly to despise it. A master who is a bad disciplinarian or a lax teacher is practically never popular with his pupils except in the most superficial sense.

(2) *Strive to make music-teaching educational in as wide a sense as possible.* In spite of popular opinions to the contrary, it is wrong to suppose that the practice of music is a purely mechanical operation in which the brain has no share. By forcing pupils to think out the complex details of time, fingering, and part-playing, for themselves, with confidence and accuracy; by rigidly abstaining from giving direct help when thought or research on their part can achieve the necessary result; by systematically encouraging, even compelling them to strike out their own line in the treatment of classical compositions—by means such as these sound musicianship can be made to oust superficiality, and the best use will be made of the extremely subtle operations of the brain demanded by the practice of music, to train the mind to act forcibly and promptly in all directions, and both to educate taste and induce intellectual self-reliance.

(3) *Adopt every possible means of making music a part*

of school life. It is undesirable that the work which boys are doing in the music-school should be kept apart from the life of the school, and turned into a sort of mystic cult from which all but the initiated are excluded. On the contrary, it is well that the whole school should be led to take an interest in the musical work which is being done by a part only, and should be encouraged to feel some pride in it. The means of arousing this feeling must of course vary with the conditions existing in different schools. But it will generally be possible, for instance, to confine the performances at school concerts entirely, or chiefly, to the boys themselves. Bringing in outside help is, in a sense, humiliating and discouraging to those who learn music, whilst one of their greatest needs is encouragement. A modest artistic result achieved by the boys themselves is better for them, and more interesting to listeners, than a brilliant performance given by outsiders. Not that concerts given to the boys by professional performers may not be valuable in the highest degree; but their function is totally different, and the two classes of concert should be kept separate. Examinations are sometimes suggested as an effective means of inducing the world to take school music seriously, but their tendency is all in the direction of hampering and cramping teaching. A successful concert given by the boys to their fellows is a far better test of good work.

This idea of school concerts may be expanded into the valuable practice of inciting violinists and pianists to play together for their own amusement, into the encouragement of the boys to get up small concerts and entertainments among themselves, and generally to use what they learn in the music-school for the pleasure and enlightenment of those about them. In this way the social element in music becomes emphasized—the value of the art as a civilising and humanising agency—in a society which can be specially benefited by such means.

There is little doubt that a music-master who courageously follows out these slight and perfectly practicable suggestions will do something to force the educational world to take his work seriously. If ever that attitude becomes general, then the schools will take their due share in a national artistic enlightenment, and certainly not till then.

At a very early stage in his work Thring formed the opinion that music might be used as a refining and elevating influence on school training. So far as the traditions of the public schools were concerned, he was venturing out into an entirely unknown sea when he made the innovation of introducing music into his regular system of education. But he believed that, in addition to a generally refining influence, it could also be made a means of interesting and stimulating boys not specially open to intellectual ambitions; so one of his earliest school ventures was the engagement of a music master. "Life and Letters of Edward Thring," G. R. Parkin (Macmillan).

SOME COMMON TEXT-BOOK ERRORS
IN DYNAMICS.

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IT will no doubt be within the recollection of many teachers who have recently given proofs of their "thoughtfulness" by the active part they have taken in discussing the merits and demerits of Euclid as an introduction to geometry that not many years have elapsed since Dynamics was the subject of controversies just as keen as those which have lately arisen in connection with geometry. The favourite bone of contention was "mass" and "weight," and as great things might come of such debates, it is surely a little disappointing to find that, as the result of the dynamical discussion, nothing at all happened, and the same fallacies are still being copied from text-book to text-book and from examination paper to examination paper, and are being to-day handed down from teacher to student to be again handed down by the student when he becomes a teacher. The following remarks are written in the hope of reviving interest in questions which have lately been to a great extent forgotten, or shall I say, "gone out of fashion."

Commencing with some form or other of the laws of motion as the starting point, and assuming rectilinear motion to be taken before the difficulties connected with the parallelogram law are treated, we find that most text-books try to deduce everything from the first and second laws, and that the poor unfortunate third law is kept ignominiously in the background. As long as this is done the notion of *mass* must of necessity give rise to difficulty. To define mass as "quantity of matter" is hardly satisfactory, for it leads to the question, "what is quantity of matter?" Accordingly we find the second law saddled with the two incompatible duties of defining quantitatively equal forces and equal masses somewhat as follows.

Two forces are said to be *equal* when if applied to the *same* body they produce equal accelerations.

Two masses are said to be *equal* when the *same* force produces equal accelerations in both.

But how is the *same* force to act on different bodies? If the bodies are acted on simultaneously, it cannot be the same force which acts on them. If, on the other hand, they are acted on successively we have no justification for assuming in any case that it is the same force which acts on both. If a body A is accelerated, some force is acting on it, but the acceleration produced only affords a measure of the force as long as it acts on A. As soon as the acceleration of A ceases, the force ceases to exist so far as A is concerned, and if a second body B now receives an equal acceleration we cannot say that the force acting on it is the *same* force. On the other hand, if we substitute the words "equal forces" for "the same force" in the above definition, we are confronted

with the difficulty that the previous definition of "equal forces" only applies to forces acting on the same mass, not to forces acting on different masses.

The missing link in the argument is supplied by the Third Law, which tells us that action and reaction are equal and opposite, and *mass* is now quantitatively definable by the property that the masses of two bodies are inversely proportional to the accelerations which they acquire in virtue of their mutual action and reaction. Forces acting on different bodies are now known to be equal if the accelerations which they impart to the bodies are proportional to the accelerations which these bodies would acquire under their mutual action and reaction.

The second law without the third being thus seen to afford only a comparison of different forces acting on the *same* body, it may be with advantage applied to the solution of "train problems," and similar examples where the forces which accelerate the motion of a body are expressible in gravitation units. If, for example, it is required to find, in tons weight, the pull of an engine when a train of so many tons acquires a velocity of so many miles an hour in so many minutes, the use of poundals, involving multiplication and subsequent division by 2,240 is bad workmanship, and if a new name, *tonal*, is invented for working with tons, and similar names are coined for every other case, one might just as well, in solving the problem of three cats killing three mice in three minutes, introduce the name *catal* to define the amount of cat which will kill one mouse in one minute. Such problems should be done either by the unitary method or by proportion employing the simple relation :

force on body	accel. of body due to force
weight of body	accel. of body due to gravity

This relation is not used nearly as much as it ought to be, for it furnishes an easy, intelligible and practical method of dealing with the great bulk of problems on motion under force, a method which, moreover, is familiar to most beginners as the result of thorough drilling in arithmetical problems on mowing so many acres in so many days, or other equally interesting matters.

So far, however, the learner has had to take in nothing which is directly opposed to common experience. It is in connection with the parallelogram of velocities that the conventional treatment involves assumptions which common sense shows to be absurd. A man cannot be in two places at the same time, and velocity is rate of change of position, *ergo* he cannot have two different velocities at the same time. Yet we find the beginner confronted with the statement that *if a moving point possesses simultaneously two velocities* represented by two sides of a parallelogram, these are equivalent to a single velocity represented by the diagonal. Now, a man who wished to travel from London to Oxford, and also wished at the same time to travel from London to Cambridge, might effect a compromise by going by London and North-Western Railway to Bletchley, but he

would find that this journey was in no sense a satisfactory substitute for travelling either by Great Eastern Railway towards Cambridge or by Great Western Railway towards Oxford, let alone for the two journeys taken together.

When we come to the illustration of the parallelogram law which does duty as a proof, we find something very different. A particle moves down a tube with one velocity while the tube moves with another velocity, then the particle is shown to describe the diagonal of the parallelogram defined by these two velocities. Now, one of these velocities is that of the *tube*, not of the particle, the other is also not the *actual* velocity of the particle, but its *velocity relative to the tube*, and what the illustration really teaches us is that, if the velocity of A relative to B is represented by one side of a parallelogram, and the velocity of B relative to C is represented by the other side, the velocity of A relative to C is represented by the diagonal. The books carefully avoid the use of the word "relative" in speaking of the motion of the particle along the tube, with the result that what might be clear and intelligible becomes obscure.

I have heard it said in defence of the conventional misstatements that relative velocity is difficult for a beginner to understand, and that most learners understand the parallelogram of velocities. But, as I have just shown, the notion of relative velocity does actually of necessity enter into the conventional treatment, and I fail to see how a beginner can be made the wiser by being kept in ignorance of the fact that one of the velocities with which he is dealing is a relative velocity. I never could understand the usual text-book proofs of the parallelogram of velocities myself, and I do not believe many people really do understand them, though some think they do. Most beginners swallow the parallelogram of velocities (along with a good many other things they ought to understand, but do not) on faith; "faith" in this case being defined by the well-known "Brummagem" schoolboy's answer as "believing that which we know not to be true."

The average student brought up on orthodox lines usually has no idea of how to set to work to find the direction of the smoke of a steamer or where a marksman on an express train should aim to hit a target. The chances are that the track of smoke will be drawn in front of the steamer when it should be behind, and that the marksman will aim the wrong side of the target.

There are two other ways of approaching the parallelogram law: (i.) by regarding the law purely as a *definition* of component velocities and accelerations, (ii.) by defining component velocities by the property that the actual change of position in any time shall be the same as would be produced if the two velocities in question had existed *successively* for equal intervals.

The parallelogram of forces stands on a somewhat different footing. One particle A can by its action alter the motions of a number of different other particles, B, C, D, and it naturally follows from the third law that B, C, D simultaneously

exert reactions on A. Thus A may be regarded as being acted on by any number of forces simultaneously—a view confirmed by every-day experience—and the fact that A cannot move simultaneously with two or more accelerations leads to the important property that *any system of forces acting on a particle is equivalent to a single resultant force*.

The fact that this resultant is given by the parallelogram law cannot be proved without making some assumption. If the subject is approached from the point of view of relative motion, a convenient assumption to start from is that the *relative motion of two bodies is unaltered by applying to them parallel forces proportional to their masses*.

If, then, P and Q denote the two forces the joint effect of which on a particle *m* is required, take a second equal particle *m* acted on by a force equal and parallel to P alone. The velocity which the first acquires relative to the second in any time interval is that due to Q alone, and is the same as if Q alone existed; the velocity which the second acquires is that due to P alone. From the correct statement of the parallelogram of velocities, the velocity of the first particle is derived by the parallelogram construction from its velocity relative to the second and the velocity of the second, whence the proposition follows at once.

Newton's proof as originally given in his *Principia*, and not as "brought up to date," is also a good one. The assumption involved in it is that *a force impressed on a particle in a direction parallel to a given line will not affect the rate at which the particle approaches that line*.

There are the further alternatives of taking the parallelogram of forces for granted, or basing it on Duchayla's proof or an experimental verification.

The chief points which we have discussed may be summed up as follows:—

(1) The first and second laws of motion without the third only enable us to compare different forces acting on the *same* body. They do not afford a quantitative definition of mass nor any information about forces on different bodies.

(2) Train problems and other examples in which forces have to be expressed in gravitation units should not be solved by the equation $F=ma$, but by the proportion—

$$\frac{\text{force on body}}{\text{weight of body}} = \frac{\text{accel. due to force}}{g}$$

These problems may conveniently be taken as exercises on the second law, if preceded by a little explanatory discussion about gravity.

(3) The notion of mass should be first introduced after the third law when it can be defined quantitatively. The dynamical unit of force and the equations, $F=kma$, $F=ma$, will then follow.

(4) A particle cannot possess more than one velocity at a time, relative to a given frame. The velocities which it is usually sought to combine by the parallelogram law do not really simultaneously exist in the particle, but are merely its velocity

relative to a second body and the velocity of the latter.

(5) In such cases, where relative velocities are of necessity tacitly implied, the word "relative" should not be omitted.

(6) The principles of dynamics teach us that any number of forces on the same particle are equivalent to a single resultant.

(7) But to prove that this resultant is given by the parallelogram law, involves some further assumption. Probably the best way is not to trouble beginners with formal proofs of the parallelogram of forces.

It is only fair to add that what I have said about the parallelogram of velocities is very similar in purport to an article contributed, some time since, to the *Mathematical Gazette*, by Mr. R. F. Muirhead (if I remember rightly).

But the more widely such matters are discussed the better.

THE IDEAL READING-BOOK.

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ON the subject of the reading-book opinions seem to be as much divided as on every other detail of school work. Some schoolmasters frankly pay no attention to the matter: any book will do, provided it be cheap. Others follow a good selection of short pieces for a year or two, and then on an inspector's recommendation or by some lucky accident pick up another and begin afresh. Others use science readers, geography readers, commercial readers, biographical readers, literary readers filled with facts and beautified or defaced with illustrations, spelling lists, tables of derivations, and directions as to word building. Once more, a few use an anthology for verse and continuous work for prose, and many take considerable trouble over their selections. The publishers go on flooding the market, and, for their price, the books produced are excellent. For general geographical and historical information the "Royal Prince's Readers" (Nelson's), the "World and its People" (Nelson's), the "Web of Empire" (Macmillan), are, in capable hands, thoroughly useful productions. For literary work, graded carefully, Dent's "Temple Literary Readers" may be recommended as cheap and pretty to look at and containing fine passages *ad libitum*, while the new books of the Norland Press are a delight to literary teachers. For natural history W. Warde Fowler's "Tales of the Birds" (Macmillan) and "A Country Reader" (Macmillan) form an ideal preparation; while continuous prose is thoroughly well represented by Macmillan's abridgment of some of Scott's novels, Blackie's similar abridgments and the Pitt Press edition of Kingsley's "Heroes." Hawthorne's "Wonder Book,"

Dickens' stories (abridged), almost any of Scott's, Longfellow's, Hood's and Coleridge's poems may be bought at a very low price; and no teacher can say that the market is not full of books to choose from; while some publishers are willing to try any new abridgment and show great enterprise. Still, the authorities either disregard the subject as unimportant, or very properly consider that the teacher is of more importance than the text. There is little grading in many schools, and the principles which should guide the choice of books throughout a school are wanting. Would it not be well for the authorities to agree first regarding principles and then to leave the choice of reading books to one hand? The present paper attempts to lay down some guiding rules and to show how they may be followed.

First, what is the object of the reading-book? If it be to impart information in geography, history, elementary science, nature-study, the plan of the chooser is clear. He has only to get his catalogues together (Macmillan, Nelson, Blackie, Ginn's, are among the most useful) and the choice is easy. But if the object of the reading-book be to train taste, to impart a love of literature and good books, to discourage the taste for merely dreadful, frivolous, sentimental, prurient work, the choice of books is rather more puzzling. On the answer to this first question depends the whole of our procedure. The present paper takes it for granted that science, geography, history, and similar readers belong to the science, geography and history lessons, and are in no other sense reading books, ideal or non-ideal. Granted, then, that the reading-book is from the first to have a clear aim in view and that aim not informational but ethical and æsthetic, the next question looms in view.

Secondly, are we to read scraps or continuous work? Now on the reply to this our whole conception of training in literature is based. Every child that has the advantage of careful maternal or nurse training begins on continuous work. The stories of Jack and the Beanstalk, of Cinderella, of Blue Beard, are long romances. He takes them up at certain chapters, requires enlargements of certain developments; and to his limited vision each of them is a three-volumed novel with an explanation of the scene, a mass of situations and a final tragedy or rounding off. The child and his mother do not believe in scraps. When the tale teller is compelled to fall back on her own invention, what long, rambling, continuous work we find unrolling itself to the eyes of audience and *raconteuse*. The thorough appreciation of scraps is one of the last things to be grasped by the cultivated mind. Books of elegant extracts, whether prose or verse, lay no compelling hold upon the association-loving mind of the child. So far as possible, then, the book of selections should be avoided.

If this be so, it follows that for little children the reading-books should be full of long stories complete in themselves; six of them would be quite enough to fill a book. They should be

classical, *i.e.*, stories with an imprimatur; they should be cleared of the hardest idioms and very cautiously freed from words that are absolutely beyond the intelligence of the reader; but hard words may be left in a greater abundance than hard idioms. If the ideal book could be found, this clearing of idiom may be done by the teacher himself.

As we go higher in the school the reading-book becomes more classical, fuller of idiom, less docked of hard words, but, as in every class, full of interest. The verse book, which must be separate from the prose, follows the same lines. As soon as the class can appreciate a tale in verse—*i.e.*, as soon as they can appreciate verse at all—there is plenty of material at hand. To a boy of ten the "Pied Piper of Hamelin" is a continuous and big work, while Ben Jonson's "It is not growing like a tree" is an unintelligible and useless scrap. Once the main contention is allowed, the book-chooser will find the ground become less and less rough as he proceeds.

Thirdly, if the reading-book is to be not informational, but ethical and æsthetic in purpose, and if again it is to be continuous work in prose or verse, the idea underlying the word "continuous" expanding as we proceed, the next question fronts us—how are such books to be placed in the hands of the children? For it is evident that long lists similar to those at the end of this paper will have to be drawn up, and the books will have to be purchased in such numbers as to allow the children of all the classes to have during the reading lesson a copy each (this being far preferable to one copy being shared between two). There seems to be only one way in which to answer this question. Schoolmasters may talk of expense, of want of room, of unnecessary trouble in providing and choosing books; but *the whole of the higher training of the child-mind is closely connected with this matter of reading-books*. We are comparatively reckless in the fitting up of laboratories; shelves, cupboards, taps, gas, balances, bottles have to be bought *because we cannot get on without them*. Exactly the same is it with our reading. Shelves, cupboards, books, locks, keys must be bought; *we cannot get on without them*. It seems to the writer of this paper that every class in every school must possess its library (quite distinct, of course, from the school library). Assuming that the average number of children in a class is thirty, and that at least three hours per week are devoted to the reading book (and surely three are a minimum from the first class to the lowest), the probability is that about fifteen books, some being quite short, will be required for the school year. (Here, again, one must assume that the child remains for a year in one class, though of course exceptions may occur.) Every class, then, will ask for a locked cupboard capable of containing some 450 or 500 books. At this the schoolmaster is aghast until he comes to work out the expenses on paper. The present writer followed this system for years, and would not go back to any other; it is not all a counsel of perfection.

Our lines being laid down, our bookcases made, and our classes being ready, it remains to choose our books; and, before any lists are added, it may be well to anticipate a few objections.

No one looks for originality in any papers on school work, and the newest fad has been tried long ago. We are in many instances (the teaching of modern languages, for instance, of science, of natural history) only reverting to the practices of our ancestors, and it may be questioned whether, even in the time-honoured misteaching of Latin and Greek, we are not simply departing from the freer, easier method of early days, a method which the gods may send to us once more. Nor is the plea which I am putting forward new at all: it is only a plea for continuous and varied reading as an introduction to literature. The pages of biographies are full of its praises; it is the schoolmaster with his notes, biographies, glosses, snippets, word lists, analysis and spelling, who kills the nascent love of literature.

Now the first objection to anything educational is its expense. One can but make a rough calculation, but the lists will show that, allowing for occasional change, wear and tear, loss of books, making of bookcases and keeping in order, £1 per child will provide all the reading-books necessary for a school life of seven years. Even this might be considerably lowered, for the lists make allowance for the purchase of expensive as well as inexpensive books. And if, further, we take into consideration that a large number of the books are texts which will not wear out in seven years, that bookcases once provided are provided practically for ever, the cost of reading-books to a school account extending over twenty years of the school's existence will be found, in a school of 200 children, to be about 6s. per boy for the whole of his school course (seven years). Surely a grant of 1s. per year for reading-books is not extravagant. The next objection to the scheme put forward is that the reading aloud, the parsing, analysis, etymology, spelling, all give way to the reading-book. The answer is that this paper only deals with the reading-book, and with one kind of reading-book, and that all these other subjects may have due consideration given to them in another paper and by another writer. The third objection may be that literature cannot be taught, and that only by allowing those who have it in them to read for themselves can the appreciation of great works be gained. The objection opens up a large subject, but the scheme proposed is certainly one which would *lead* rather than *teach* children to love literature.

Those who favour the use of readers on science history and geography will find that the expense will be slightly, but very slightly, more than the shilling per year (in school accounts lasting over twenty years).

Before I add my tables and lists, it may be well to recapitulate. An ideal reading-book should, in every class and at every stage of school life, be ethical and æsthetic in aim rather than informational. It should, from the first, consist of

TABLE OF SUGGESTED READING BOOKS.

Approximate age of children.	BOOKS.	Approximate cost of library (15 copies of each book), and case for books.
8-9	Æsop, John Gilpin, King Arthur, <i>Grimm</i> (Gardiner & Darton), <i>Hans Andersen</i> , Arabian Nights, 1st series (Dent), Sever: Champions of Christendom, Little Cousins, 5 vols. (Ward, Lock), <i>Baring Gould's Fairy Tales</i> , Shockheaded Peter	£22
9-10	Robinson Crusoe, La Fontaine (translation), Alice in Wonderland, <i>E. Nesbit's Stories for Children</i> , <i>Kate Greenaway's Pied Piper</i> , Gulliver, Labours of Hercules, Arabian Nights, 2nd series (Dent), Lays of Ancient Rome, <i>Grimm</i> , <i>Andersen</i> (Newnes)	£23
10-11	Water Babies, Wonder Book, Through the Looking Glass, Tom Brown, Pilgrim's Progress, Reynard the Fox, The Red Cross Knight (1st and 2nd series), Glaucus, The Middle Temple Reader (selections) (Norland Press), <i>Kingsley's Heroes</i> , Stories from Herodotus (Church), Bible Stories (O.T.)	£18
11-12	Tales of the Birds (Macmillan), Tanglewood Tales, The Ancient Mariner (Nelson), Jungle Book (two vols.), <i>Dejoe's Plague and Fire of London</i> , <i>Aytoun's Ballads</i> , <i>Jacobs' Celtic Fairy Tales</i> , Sintram and his Companions, The Human Boy, Selections from <i>Campbell's Poems</i> , A good Boys' Paper, Bible Stories (O.T.)	£25
12-13	Deserted Village, Marmion, Nicholas Nickleby, Lavengro, Bracebridge Hall, The Boy's Froissart, The Story of the Red Deer, Hiawatha, The Voyage of the <i>Sunbeam</i> , <i>Dickens' Christmas Carol</i> , Natural History of Selborne, A good Boys' Paper, Bible Parables (N.T.)	£18
13-14	Asgard and the Gods, Old Christmas, Eöthen, Kenilworth, Ivanhoe, Romney Rye, <i>Gray's Elegy</i> , Pickwick, Wild Nature Won by Kindness, <i>Longfellow</i> (selection), <i>Tennyson</i> (selection), The Vale of the White Horse, Stories of the Aeneid, Autobiographic Sketches (<i>de Quincey</i>), David Copperfield, A good Boys' Paper, The Bible (abridged)	£24
14-15	<i>Bowdler's Shakespeare</i> , The Golden Treasury, Wordsworth (Norland Press), Malory, The Old Testament Apocrypha, <i>Macaulay's Clive</i> , <i>Tom Hood's Miss Kilmansegg</i> , Selections from the poets, Macmillan's Advanced Reader (selections)	£21
	In addition, 15 copies of a good Natural History, and the same number of copies of magazines containing special articles and stories, should be kept for occasional use	Optional £70

longer and continuous rather than of shorter pieces, and as the children grow older it should become more "continuous." The book should be constantly varied, and fifteen books may easily be read in a year. Revision of books read in lower classes should take place regularly all through the school. Is it too much to suggest that all teachers in a school should know, by careful study, the books read in the school? *Quis custodiet custodes?*

THE WELSH COUNTY SCHOOLS ASSOCIATION.

THE Welsh County Schools Association was founded in 1895. During the six years which had elapsed since the passing of the Welsh County Schools Act in 1889, the joint education committees had prepared the schemes for the intermediate and technical education of the inhabitants of their counties, and several of the schemes had received the Royal Assent. Where the schemes had become law, the local and county governing bodies had been constituted, and these had taken over old foundations, acquired some private schools of repute, and opened new schools. The other counties were taking active steps to exercise their powers, and as many as ninety-five schools in all were in process of formation to work under the provisions of the Act. Wales was face to face with a series of entirely new problems in secondary education, of which the new authorities had practically no experience, and public opinion was somewhat unformed as to the direction which the work of the schools should take.

At this juncture it was felt by the headmasters and headmistresses of such schools as were then in existence that it would be well to form some organisation to facilitate the discussion of the many problems which were confronting the authorities in the organisation of an entirely new system of secondary education, and to help to mould public opinion as to the nature and aims of secondary schools. A meeting was summoned on May 24th and 25th, 1895, at Shrewsbury (for no town is more convenient for meetings of North and South Welshmen than the ancient capital of Powys, though it is no longer in Wales), and it was unanimously resolved to form an Association of the Headmasters and Headmistresses of the County Schools of Wales and Monmouthshire. Its objects were declared to be (a) to facilitate the interchange of ideas and information on all school matters, e.g., teaching, examinations, scholarships, internal management and organisation generally, and the relations of headmasters and headmistresses, governing bodies, and assistant-masters and mistresses; (b) to communicate, if considered desirable, with public bodies connected with education. Mr. W. Glynn Williams, M.A., a distinguished *alumnus* of Shrewsbury, who was and is

N.B.—Editors are not mentioned, because in most cases they are legion. Booksellers can always give information on this point. The cost in the third column covers the purchase of really well and profusely illustrated copies, wherever illustrations are provided.

carrying on the traditions of his old school at the ancient foundation of Friars School, Bangor, was elected president; Mr. Trevor Owen, M.A., the Headmaster of the Carnarvon County School, the first school to be opened under the Act, and Mr. A. B. Badger, M.A., Technical Adviser to the counties of Carnarvon and Merioneth, were appointed honorary secretaries; Mr. William Lewis, Headmaster of the Llanelly County School, became honorary treasurer; and a committee of four was elected (the number of the committee has since been raised to six).

Mr. Glynn Williams filled the chair until 1897. His successors have been Mr. R. W. Jones, B.A., Headmaster of the Lewis School, Pengam (1897-1899), Mr. W. J. Russell, B.A., Headmaster of the Wrexham County School (1899-1901), and Mr. William Lewis, B.A., Headmaster of the Llanelly County School (1901-1903). The president for the present year is Mr. Trevor Owen, M.A., Headmaster of the Swansea Grammar School and Principal of the Municipal Technical College, whose portrait we publish. Mr. Badger resigned his post as secretary on his departure from Wales, and Mr. Trevor Owen carried out the secretarial duties until 1902, when he found it necessary to resign his post owing to the great increase in his work consequent upon his appointment to Swansea. His resignation was accepted with great regret, and Mr. W. Jenkyn Thomas, M.A., Headmaster of the Aberdare County School, was appointed to succeed him. Mr. William Lewis managed the finances of the Association until his elevation to the presidential chair, and Mr. T. R. Dawes, M.A., Headmaster of the Pembroke Dock County School, was elected in his place.

Since its establishment in 1895, the Association has increased in strength, usefulness and influence. The membership was at first small, but as new schools were opened it became larger and larger, until, at the present time, the headmasters and headmistresses of the ninety-five county schools of Wales are, with very few exceptions, active members. Meetings are usually held twice annually. They are well attended, and the proceedings are always brisk, *aphasia* being almost an unknown disease among Welsh teachers. Much work is entrusted to the executive committee, but the resolutions submitted by them are by no means accepted as a matter of course. A great variety of questions has been discussed—lively debates often resulting. It is reported that Disraeli used to say that he never thoroughly understood a question until it had been threshed out by the House of Commons; in the same way, those who are at the head of the county schools of the Principality are bound to acknowledge that they have at least a fuller knowledge of educational questions after they have been discussed by the Association. Nor are the discussions by any means confined to purely academic questions. All the many details of the administration of secondary education in Wales have been fully considered, and, having five representatives on the Central Welsh Board, which has been entrusted with the bulk of the administrative

work, the Association has been able to have its views carefully considered. The smooth working of the Welsh system is largely due to the complete understanding between administrators and teachers which has been secured by this representation.

The Welsh County Schools Association can claim that its efforts have been productive of benefits to education not only in Wales but in England. It was at the request of the Association that the Central Welsh Board approached the Board of Education on the matter of science grants, and, directly as the outcome of conferences between representatives of the Board of Education, the Welsh County Schools Association and its own executive committee, the Central Welsh Board obtained not only for Wales but also for England the clauses entitling "Division B"



Mr. TREVOR OWEN, M.A.

Headmaster of the Swansea Grammar School; President of the Welsh County Schools Association.

schools to earn science grants on easier terms than were possible before. But the Pension Scheme is the most notable benefit secured by the Association, and it may be as well to relate the history of the scheme and its present position.

The movement was started by Mr. W. J. Russell, of Wrexham, to whom belongs the chief credit of bringing it to a successful issue. In June, 1897, he read a paper on pensions before the Welsh County Schools Association, and it was ordered to be printed as a basis for further discussion. At their next half-yearly meeting the Association adopted a memorial inviting the Central Welsh Board to undertake the organisation of a pension scheme, at the same time offering suggestions as to the main lines on which a scheme might be drawn up. When this memorial was presented, Mr. Russell, who in the meantime had been elected to the Central Welsh Board as a representative of the headmasters and headmistresses of North Wales, moved on October

29th, 1898, that it be referred to a committee. This motion was seconded by the late Mr. Thomas Ellis, who emphasised the fact that such a scheme was necessary for the good of the schools, and the efficiency of education more than in the interests of the teachers themselves. He also urged that it was best to deal with the matter immediately, while the majority of the teachers were still young, and that the expense would be much less than at a later period. Principal Reichel and the Hon. W. N. Bruce warmly supported the motion, which was carried unanimously. This Committee met, and, after agreeing on the general outline of a scheme, determined to call in the advice of a skilled actuary. Mr. Duncan C. Fraser, Actuary of the Royal Insurance Company, was asked to draw up a report. This report was carefully considered by the Committee, and a scheme based upon it was approved by the Central Welsh Board at Llangollen without a division. It was ordered that the scheme should be forwarded to the several county and local governing bodies, and to the Associations of Head and Assistant-masters and Mistresses of Wales. The suggestions and amendments proposed by these bodies were considered by the Committee, and where possible engrafted on the scheme.

A conference was next summoned at Shrewsbury between the Central Welsh Board and representatives of the county and local governing bodies of Wales at which the scheme was discussed. There was some little opposition, but the scheme had the support of such prominent and influential educationists as Mr. Humphreys Owen, M.P., chairman of the Central Welsh Board, Mr. T. Mansel Franklen, Mr. Richard Martin, Professor Anwyl, Mrs. Morgan B. Williams, &c. (to whom, by the way, the thanks of the teachers of Wales are due for their powerful advocacy), and, on the motion of Mr. Franklen, a resolution approving the scheme and recommending it to the support of the county governing bodies was passed by 55 votes to 13. Finally, at Merthyr, in November, 1901, the Central Welsh Board reappointed the Pensions Committee, and empowered it to take such steps as might be necessary to bring the scheme into operation. Having received this mandate, the Committee appointed deputations to interview county governing bodies, explain the scheme, and press its adoption upon them.

There are in Wales sixteen county governing bodies, and nine of these, Brecon, Cardigan, Denbigh, Flint, Glamorgan, Montgomery, Pembroke, Radnor and Swansea, have accepted the scheme. As these counties are responsible for nearly two-thirds of the total contributions to the fund, their adherence is more important than might be supposed from a mere consideration of their number. Several other counties had the matter under consideration, but the passing of the new Education Act has caused delay, the county governing bodies, shortly to pass out of existence, preferring to throw the responsibility of accepting or rejecting the scheme on their successors.

Finally, it should be stated that the consent of

the Board of Education was given to the introduction of the scheme at any date after April 1st, 1903. The rapid advance of the scheme in public favour, only six years having elapsed since its inception, should encourage the secondary teachers of other parts of the kingdom in their efforts to obtain similar benefits for their schools and themselves.

GLASS-WARE FOR CHEMICAL LABORATORIES.¹

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IN the following article is given a description of the most suitable glass apparatus for use in an ordinary "science school" chemical laboratory. It is anticipated that the details given below will be of use to teachers who wish either to equip a chemical laboratory or to extend the scope of one already in existence. Description of the ordinary glass apparatus only is given, as it is in ordering this class of glass-ware where mistakes most frequently arise. Since some pieces of apparatus are used more frequently than others, the list is divided into two portions. The first portion, which is headed "Bench Apparatus," contains the apparatus required for *each* student. The second portion, with the heading "General Apparatus," contains that required occasionally; hence the latter set of apparatus will suffice for four or more students.

BENCH APPARATUS.

In the following list the quantity of apparatus supplied to each student is placed first, then follows a statement of suitable sizes and quality, together with the approximate price of the articles.

Twelve test-tubes, $5 \times \frac{3}{8}$ in., made of good Bohemian glass, since if made of soft glass the tubes are only suitable for heating liquids, as they readily fuse when used for heating solids. (4s. per gross.)

Two boiling-tubes, 6×1 in. (8s. per gross.)

Twelve ignition-tubes, $3 \times \frac{1}{2}$ in., made of hard Bohemian glass, best supplied from stock as required. (2s. per gross.)

Three glass stirring-rods—3, 5 and 7 inches long, and $\frac{3}{16}$ in. diameter. (10d. per lb.)

Four feet glass tube, $\frac{1}{8}$ in. bore, soft for bending, best supplied from stock as required. (10d. per lb.)

Two watch-glasses, 2 in. diameter. (7s. 6d. per gross.)

Two circular glass plates, ground on one side, 3 in. diameter. (6d. per dozen.)

Three plain glass funnels, 2 in., $2\frac{1}{2}$ in. and 3 in. diameter respectively. The sides of the funnels

¹ We are indebted to several of the firms mentioned in this article for permission to use illustrations from their catalogues. Figs. 1, 6, 7 and 10-13 are from the list of Messrs. Townson and Mercer; Figs. 3, 5, 8 and 9 are from that of Messrs. Baird and Tatlock; Fig. 2 from that of Messrs. Gallenkamp and Co., and Fig. 4 from that of Messrs. Muller, Orme and Co.

should slope at an angle of 60° exactly; the larger end should be ground flat and the stem cut off at an angle as shown in Fig. 1. (3s. 6d. to 5s. per dozen.)



FIG. 1.—Funnel.

One 4-oz. Erlenmeyer flask of hard Bohemian glass, or better, Jena glass (see below). (Fig. 2.) The walls of the flask should be thin, as thick-walled inferior quality flasks usually break when heated. (3s. per dozen.)

One 8-oz. Erlenmeyer flask, as above. (5s. per dozen.)

One 18-oz. Erlenmeyer flask, with neck 1 inch diameter, to be fitted up as a wash-bottle, to contain distilled water. (7s. per dozen.)

Three beakers—3-oz., 5-oz., and 7-oz. capacity respectively, of hard Bohemian glass, or better, Jena glass. The squat form with lip (Fig. 3) is preferable, and the walls must be thin. (From 2s. 6d. to 4s. 6d. per dozen.)

Two Berlin-porcelain evaporating dishes, glazed inside and out, 3 inches diameter. (6s. per dozen.)

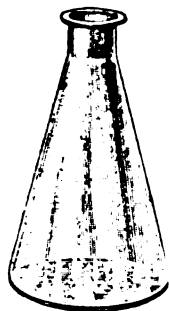


FIG. 2. Erlenmeyer Flask.

GENERAL APPARATUS.

The following apparatus is required less frequently than that enumerated in the former list. Several sets should be placed in an accessible

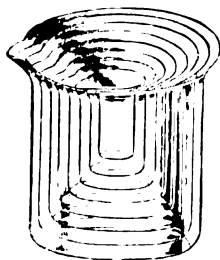


FIG. 3.—Lipped Beaker.



FIG. 4.—Gas jar.

position. About one set to six students will usually suffice.

Three glass cylinders, with ground edges at top (Fig. 4), 8 in. \times 1 $\frac{3}{4}$ in. internal diameter. (6s. per dozen.)

Six cylinders, similar to above, 6 \times 1 $\frac{1}{2}$ in. diameter. (4s. per dozen.)



FIG. 5.—Woulffe's Bottle.

Two two-necked Woulffe's bottles of 8-oz. capacity. (Fig. 5.) (10s. per dozen.)

Two two-necked Woulffe's bottles of 12-oz. capacity. (12s. per dozen.)

Two stoppered retorts of 8-oz. capacity. (7s. 6d. per dozen.)

Four thistle-funnels, 6 to 8 inches long. (1s. 6d. per dozen.)

Two stoppered bell-jars, 40-oz. capacity. (Fig. 6.) (1s. 6d. each.)

Two wide-necked round flasks, 6-oz. capacity, known as carbon dioxide flasks. (3s. 6d. per doz.)

Two round flasks, flat bottoms, 24-oz. capacity, of hard Bohemian glass, or better, Jena glass. (Price 7s. 6d. per dozen.)

Three beakers, tall form, 18-oz. capacity. Hard Bohemian glass, or better, Jena glass. (7s. 6d. per dozen.)

Six feet combustion tubing, $\frac{1}{2}$ in. internal diameter, of hard Bohemian glass, or better, Jena

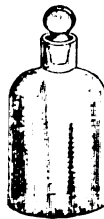


FIG. 6.—Stoppered Bell-jar.



FIG. 7.—Stoppered Bottles.

glass. To be used for making tubes for heating to a high temperature. (1s. 9d. per lb.)

Selection of soda-glass tubing, $\frac{3}{8}$ to $\frac{1}{2}$ in. internal diameter, for glass working. (1s. per lb.)

Selection of flat, well-ground, stoppered bottles, with both narrow and wide necks (Fig. 7), of 8, 10, 12, and 16-oz. capacity. (From 4s. to 6s. per dozen.)

Two calcium chloride drying-tubes, 6 in. long. (3s. 6d. per dozen.)

Three Berlin-porcelain crucibles with lids, 1 $\frac{1}{2}$ in. diameter. (4s. 6d. per dozen.)

Graduated Vessels.—Two qualities of graduated vessels are usually supplied by the dealer. For elementary students the "second" quality may be used, but for exact analytical work the "first" quality is necessary. The prices quoted are for "first" quality; the second quality is about 33 per cent. cheaper.

One graduated measuring cylinder, unstoppered, 100 c.c. capacity. See Fig. 8. (1s. 3d. each.)

One graduated measuring-cylinder, unstoppered, 250 c.c. capacity. See Fig. 8. (2s. each.)

Two graduated measuring-cylinders, unstoppered, 500 c.c. capacity. See Fig. 8. (2s. 6d. each.)

One graduated measuring-cylinder, stoppered, 1,000 c.c. capacity. See Fig. 9. (6s. each.)

NOTE.—The above measuring cylinders are suitable for elementary students.

One each measuring flasks of 50 c.c., 100 c.c., 250 c.c., 500 c.c., and 1,000 c.c. capacity respectively, graduated with *two* marks for measuring

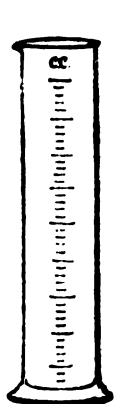


FIG. 8.—Measuring Cylinder (open mouth).

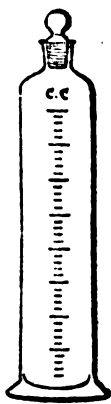


FIG. 9.—Stopped Measuring Cylinder.



FIG. 10.—Measuring Flask (two marks).

and pouring (Fig 10). The 50 c.c. measuring-flask makes an admirable density bottle. (From 9d. to 2s. each.)

NOTE.—These flasks are necessary for accurate work, and adapted for use by senior students.

One each 10 c.c., 25 c.c., and 50 c.c. pipettes; (Fig. 11.) (From 5s. 6d. to 8s. per dozen.)

Three 20 c.c. pipettes. (Fig. 11.) (6s. per dozen.)



FIG. 11.—Pipettes.



FIG. 12.—Burette with Stopcock.



FIG. 13.—Solid Glass Stem Thermometer.

Six Mohr's burettes with glass stopcocks, 50 c.c. capacity, graduated in $\frac{1}{10}$ c.c. (Fig. 12.) (3s. 6d. each.)

One each thermometers, solid glass stems (Fig. 13); one graduated from -5° C. to 105° C. in half degrees, the other graduated from -10° C. to 200° C. in degrees. (2s. 6d. each).

JENA GLASS.

It is highly desirable that what is termed "first quality" glassware should be purchased for laboratory use. The poorer qualities of glass are usually more fragile, do not withstand changes of temperature readily, and are attacked more or less by all liquids.

In volumetric analysis, when working with some of the cheaper forms of glass-ware, it will frequently happen that the beakers and flasks will give a distinct alkaline reaction to pure water, even after the vessels have been used a number of times. This property, of course, unfits such glass for use in acidimetry and alkalimetry, and is undesirable at any time. For all work, therefore, it is desirable that a good quality of glass should be used. Good Bohemian glass is fairly satisfactory, but not equal in hardness, durability and freedom from alkalinity to the now well-known Jena glass. The latter withstands sudden changes of temperature without fracture, and is especially suited for vessels, such as beakers and flasks, which are used for heating liquids. Liquids may be evaporated to dryness in vessels made of this glass as readily as in porcelain vessels, and will dissolve no perceptible quantity of the material of the vessel. When heated to a high temperature, as in combustions, the glass rarely breaks, even if moisture condenses and comes in contact with the heated portions. So that, although the initial cost is roughly speaking 25 per cent. more, the greater certainty of successfully finishing an experiment, the greater accuracy of working, and the smaller percentage of breakages, more than repay the extra outlay.

PURCHASE OF GLASS-WARE.

It is difficult to select particular firms to supply particular classes of goods, but the following firms may be selected to supply good and trustworthy chemical apparatus. The selection is made simply to help teachers in purchasing, and is by no means exhaustive.

- In London, among others, are
- Messrs. Townson and Mercer.
- Messrs. J. J. Griffin and Sons.
- Messrs. W. and J. George.
- Messrs. Baird and Tatlock.
- Messrs. Müller, Orme and Co.
- Messrs. Brewster, Smith and Co.
- Messrs. Gallenkamp and Co.

In the provinces, Messrs. Philip Harris and Co., of Birmingham, and Messrs. Reynolds and Branson, of Leeds, are able to meet all the requirements of a chemical laboratory.

THE INFLUENCE OF EXAMINATIONS ON EDUCATION.

By C. H. SAMPSON, M.A.
Fellow of Brasenose College, Oxford.

AT the recent meeting of the British Association a very interesting *interim* report was presented to the Educational Science Section on behalf of the Committee on the Influence of Examinations upon Education. The report specifies nine points which have been laid before persons of experience in school and university teaching, and gives extracts from fifty-six replies. No attempt is made to arrive at a general conclusion, and the difficulty of any such attempt is obvious. But many interesting and suggestive criticisms of examinations in general and certain particular examinations are recorded, and deserve our careful attention. After many years of experience in Oxford as a college tutor and also as a Delegate of Local Examinations, I venture to offer one more opinion on one aspect of the general question and on sundry matters of a more detailed character.

It is unfortunate, but apparently inevitable, that in such a discussion as this the weakness rather than the strength of examinations should be so constantly emphasised. No one troubles to prove, possibly because no one cares to dispute, the general propositions that examinations have their rightful sphere as discriminating and stimulating influences in educational work, and that in some form or other examinations are the accepted means of testing individual fitness for professional and other purposes in the work of ordinary life. And yet hardly anyone expresses any real whole-hearted satisfaction with the manner in which existing examinations are worked. Can we suggest any general explanation of the dissatisfaction so commonly expressed both by teachers themselves and by those who have to judge of the results that follow from examinations?

I cannot help feeling that teachers too often lose confidence in themselves and in their teaching work as the centre of all true education. There is a tendency to exalt examinations into a position unjustifiable in theory and unsatisfactory in practice to all concerned. In theory examinations are made for education, and not education for examinations. In practice the syllabus of examinations is the only working ideal of education in the minds of many teachers, with the inevitable result that sooner or later they are angry with the examination for not being what their fancy painted.

I know quite well that much of this tendency springs from the absolute practical necessity of preparing a certain number of individual pupils for some definite competition on which their future careers may depend. But the absorbing interest of these special efforts ought not to obscure the sense that the general training of character and intellect is the teacher's real work. No examination can possibly cover all the ground that teaching ought to cover. If teaching is concentrated solely

on one special examination, failure ends either in undue depression or in fitful criticism, and success may be pleasant for the moment, and yet barren of abiding results.

Those who have read the report will remember a very comprehensive criticism quoted from "S. 25." I cannot help thinking that he has a too exalted view of the possible functions of examinations. He says, with perfect truth, that the training of character is a most vital part of a master's work. He then complains that the reports of examiners are practically useless, because "they do not deal with training of character." To my mind, training of character is one of those parts of our work of teaching that we must be content to leave to some more abiding test than any examiner can devise. Inspection may bring with it in the future the "many days of close contact and the advice and encouragement" which "S. 25" cannot find in our examination system. Meanwhile, cannot the members of a teaching staff do more in the way of taking counsel with and encouraging one another than they sometimes seem able to do?

The effect of this ultra-specialisation on the pupils cannot be more clearly illustrated than in the criticisms made in this report on entrance scholarships at Oxford and Cambridge. We know at Oxford too well the dangers indicated. I am quite ready to admit that within the twenty-one years of my experience there has been some advance in the standard of scholarship examinations. But I am also quite sure that the attitude of schoolmasters towards these examinations has changed out of all proportion to this advance. So far as classical scholarships are concerned, the trouble is not serious. The range of the examination is (in general) wide enough to set a reasonable standard of work for the last year, or even the last two years, at school. If only modern languages were more effectively represented (as they probably will be when the proposed Final School of Modern Languages is in working order), there would not be much ground of complaint. In the case of other subjects, this quite uncalled-for specialisation is to all true friends of education a source of grave regret. This tendency is at its worst, in my judgment, in schools where mathematics is kept apart from natural science. I have lately been talking to two scholars, one elected for mathematics and one for natural science. They come from quite different schools, in both of which there is excellent teaching given in both subjects, but in separate departments and to separate sets of boys. The mathematical scholar is utterly ignorant of any form of natural science, and the science scholar knows no mathematics beyond the merest rudiments. We are endeavouring to counteract this tendency by incorporating a fairly comprehensive "general paper" in our examinations for mathematical scholarships. The whole subject of science scholarships is surrounded with difficulties as to the scope of the examination. It is easier to recognise our duty to encourage science than to know how best to carry it into effect. Possibly it

may be wise to offer a scholarship for mathematics and some branch of natural science taken together.

Many criticisms on examinations as directly affecting schools arise in connection with the work of such bodies as the Oxford and Cambridge Joint Board or the Delegacy or Syndicate of Local Examinations. It is inevitable that a given school should, when examined by one of these bodies, be subject to certain regulations as to the form and subject matter of the examinations which hamper its freedom of choice. No one is more conscious than those who are engaged in such work of the great difficulty of adapting the scheme of examination to the need of all sorts and conditions of schools. So far as the Oxford Local Examinations are concerned (and of these alone I can speak from personal experience), the steady increase in the number of those whom we examine is a constant source of encouragement, in spite of what one critic in this respect calls our flagrant ignorance of the average schoolboy. We are constantly receiving, often asking for, and constantly acting upon, suggestions from schoolmasters and others who are in touch with educational work. If we have erred in the direction of too many new experiments recently, at any rate we cannot be accused of stagnation. And when we have made an experiment we do not hesitate to modify it in deference to a consensus of representative opinions. It is so much easier for critics to criticise than to offer really constructive suggestions. Some two years ago we sent out to persons who had recently entered candidates for our examination about 500 circulars on a point where the experience of actual teachers would have been simply invaluable. Of these circulars 400 were never answered.

Few departments of the work of examining bodies are more difficult than the selection of examiners and the assignment of them to different schools. It would be impracticable to carry out the suggestion of "S. 25," that examiners should "*only* be selected from experienced and enlightened schoolmasters." So far as my knowledge goes, examining agencies are only too ready, wherever possible, to obtain the co-operation of those who have or have had definite school-teaching experience. But it could hardly be expedient that *only* those who have retired from school-work should examine, and it is impossible that those at present engaged in it should, as a rule, find time and opportunity to examine other schools. Is it certain that the average schoolmaster would be always ready to accept with equanimity the criticisms of a member of the working staff of another school?

The criticisms on Responses at Oxford as at present constituted are perfectly fair, but they hardly do justice to the actual position. It is a matter of common knowledge that an abstract resolution in favour of accepting French or German in lieu of one of the two classical languages for all purposes of Responses was rejected by a small majority in Congregation last year. It is an open

secret that steps have been taken to draft a similar scheme in favour of candidates in certain Honour Schools. For all examinations in and after Michaelmas Term, 1904, a course of elementary geometry has recently been prescribed in lieu of the text of the first two books of Euclid. For the past two years set books in Latin and Greek have ceased to be necessary. They may still be offered, but the alternative of unprepared translation in either Latin or Greek or both languages is freely open.

I notice that the views expressed in the report are, as a rule, strongly in favour of unprepared translation as against set books. I quite agree with this view in all cases where a working knowledge of a language is being tested. On the other hand, whenever candidates are capable of studying and appreciating the literature of a language, it is a grievous pity that the study of a work of literature as a whole should be abandoned, as is too often the case, in favour of the study of isolated passages which are regarded as likely to be set in examinations.

THE EDUCATIONAL VALUE OF SCIENCE.¹

FROM the point of view of the schoolmaster these collected papers may not inaptly be styled "the gospel according to Armstrong." For the last twenty years Prof. Armstrong has been insisting that a radical change in English educational ideals is imperative, and in this book are to be found the most important of his contributions to educational science. The modern conditions of human intercourse are profoundly different from those in existence when current systems of public school and university education were formulated and stereotyped. The development of science during the nineteenth century has resulted in a complete transfiguration of our methods of thought and action, but so rigid has pedagogic conservatism been that, despite this growth, there has been little educational evolution, and our scholastic system is still, to all intents and purposes, medieval.

Those observers whose business it is periodically to diagnose the state of our national education are, however, of opinion that symptoms of improvement are evident, that a quickening of our educational forces has begun. It may be hoped that the near future has in store much that will gladden the educational reformer's heart and result in the production of intelligent and resourceful young citizens, no longer dominated by the tyranny of antiquated authority, but alive with the spirit which demands personal experiment and individual research. The future historian who traces the history of the growth of English education will, it may be predicted with confidence, attribute much of the improvement during the twentieth century to the patriotic and self-denying efforts of a small

¹"The Teaching of Scientific Method and other Papers on Education." By Henry E. Armstrong, LL.D., Ph.D., F.R.S. xiii. + 476 pp. (Macmillan.) 6s.

band of scientific pioneers, among whom Prof. Armstrong will be given a prominent place.

The main contention of these essays may be stated briefly in a few sentences. Hitherto English education has been too bookish, too much concerned with words instead of things. Boys and girls have been taught as if the only faculty worth serious cultivation was the verbal memory, and as if the only standard of truth was an appeal to precedent. The practical training of hands and eyes has been neglected and learning by rote has been glorified. Instead of being led to believe because they themselves have personally proved by experiment a given truth, they have been taught to accept statements on the authority of the teacher or the text-book. Prof. Armstrong urges that learning should take place by *doing* if it is to be of real value. The class-room must for the future become subsidiary to the workshop; and there pupils are not to practise scientific tricks in the way that poodles perform antics under the eyes of their trainers, but are to answer questions by experiments devised by themselves with that object in view. The attitude of the scientific detective, or of the keen scout, is to be developed at whatever cost. The facts of science are of second-rate importance; the matter of vital consequence is that scientific methods should become natural habits of the learners, so that they may always have trustworthy reasons for the faith that is in them. Such training will, it is claimed, we think rightly, endow boys and girls with initiative, resource, and general intelligence, and enable them to face new circumstances with confidence, because they have learnt already to trust their own natural powers.

Like many reformers, Dr. Armstrong is so dominated by his message that he is apt to lose sight of the good points in the procedure of the many who have not yet accepted the heuristic method as the way of educational salvation. The classical education given by our public schools and universities has, after all, produced great statesmen, great divines, great lawyers, great soldiers—many of them. As Huxley pointed out, the proper teaching of classics is, up to a certain point, instruction in the scientific method, and the classical instruction in our public schools is at least the best teaching to be found in the country—a fact which is not surprising in view of the years of experience classical masters have to draw upon. Moreover, public-school boys learn initiative, too, through their games and their systems of self-government; in fact, the best products of our public schools are youths of whom we can all, exponents of the heuristic method included, well be proud. It is conceivable that a more sympathetic disposition towards the believers in classical education would strengthen the advocacy, by Dr. Armstrong and others, of the introduction of the teaching of scientific method in all schools and colleges.

Some practical teachers who have acquainted themselves with the reforms urged by Prof. Armstrong, while admitting the truth of his generalisations, are unable to see how they can

satisfy him, please the advocates of commercial and other forms of education, and meet the demands of parents, when they have only something under thirty hours per week at their disposal, and yet must not—they are told—set their pupils any home work. The fundamental questions which have yet to be answered are: What subjects are essential to the curriculum of each grade of school, and how much of the available time should be given to each such subject? Once these questions are decided and entrance examinations to the professions and universities modified accordingly, and teachers will enter heartily enough on the work of reform.

Many of the minor points raised by Prof. Armstrong will not meet with general acquiescence. We think, for instance, that the good text-book will long play an important and useful part in the work of the school. Again, what is possible and right in the education of an individual alone must of necessity be modified when the education of a class is being dealt with, and to urge that boys and girls are not sufficiently treated as individuals in schools is much the same as saying the classes are too large—in other words, that as a nation we are unprepared to spend a sufficient amount on the education of our children. Similarly, to abuse examinations indiscriminately is to lose sight of the fact that, while many schoolmasters and schoolmistresses are very ordinary human beings, with very inadequate training and emoluments, the abolition of every form of examination might lead to a falling off in the present poor quality of our education.

To conclude, it must be said that no teacher can afford to neglect this book; it deserves careful study. The vigorous style and the enthusiasm of its author will probably convince every reader that the book is worth reading more than once.

THE TEACHING OF ARITHMETIC.¹

A REVIEW

By SIR OLIVER LODGE, F.R.S.
Principal of the University of Birmingham.

THESE two volumes consist of hints and instructions to teachers: they are not intended to be put into the hands of the pupils. They are quite elementary, but they contain occasional information some of which must be new to some teachers, and it would be a pleasure if we could unreservedly commend them; but unfortunately there is a good deal in them that we are constrained to consider pedantic, fidgeting, and over-laborious, and a few things that we think unsound.

These assertions we must make good by quotation, but meanwhile the scope of the volumes may be indicated.

¹ "The Teaching of Arithmetic" By W. P. Turnbull, M.A., formerly Fellow and Assistant Tutor of Trinity College, Cambridge, and sometime Fellow of St. Catherine's College, Cambridge. Vol. I, pp. vi. + 225. Vol. II, pp. viii. + 208. (London: O. Newmann & Co., 1903.)

Volume I. consists of first principles, the simple rules, a chapter on mental arithmetic, on dealing with concrete numbers, on G.C.M. and L.C.M., then a long treatment of fractions and decimals, concluding with "Practice;" then appendices on the use of Tillich bricks, on series, on a perpetual calendar, and on weights and measures.

The second volume consists of chapters on ratio and proportion, roots, mensuration, a chapter on negative numbers, and on some properties of numbers; with an appendix on remainder-tests.

That the author is well acquainted with his subject and delights in it may be taken as manifest throughout, and that a teacher may find some useful hints in the book is also true; but there are serious divergences—differences of opinion—between what the author thinks true and sound and what the present reviewer is disposed to agree with. Accordingly most space must be given to criticism, because it is in some of these places that the book is likely to do harm if followed by too assimilative and docile a teacher.

Very early in the first volume (on page 3) the author says:—

For a sighted child the means I would recommend for showing number is *length*. . . . Why length?

Given a unit of length, a length which we agree to call "one," all other numbers, integral or fractional, can be represented by length. . . .

Conscious exactness, of course, in representing even the number 2, by correctly doubling a given unit, is impossible. For man it is impossible, &c. . . .

Length, or Line, is continuous; and, rightly understood, so is Number.

The last sentence we hold to be false, as exhibited in detail in THE SCHOOL WORLD for December, 1902. The former sentences are objected to as needlessly complicating a simple matter. Children, like savages, readily acquire the ideas two and three, &c., and by dealing with objects—say oranges—they get the idea exactly; there is no approximation about it. The idea of approximation is out of place.

On page 5, dealing with bricks, it is said that

The teacher can begin arithmetic by placing on the table a *one* and a *two*, naming each. The children will soon know which is the *one*, which the *two*. And so on, up to the *ten*. At a later stage they will learn that two is greater than one, three greater than two, &c.

Why at a later stage? This sort of elaboration of the simple only worries children. Every child knows almost before he is out of the cradle that two is greater than one. But the author seems to think that the forming of the notion of abstract number is hard:—

The child sees three dogs, three nuts, three fingers, and so on; and from all these groups he extracts—or abstracts—that which is common to them all, the number three. The child, in order to perform this abstraction, must get rid of the dog's head and tail, the shell of the nut, the joints and nail of the finger, and so on; which does not seem a very easy task. . . .

There must not be different kinds of objects for different

numbers—three dogs for the number three, four geese for four, five cats for five, and so on. Better keep to dogs throughout than vary the animal. Better have the balls of a ball frame than such complex things as dogs. Better still are the simple Tillich bricks (p. 6).

The idea of *six*, for instance, is to be developed by showing him repeatedly the brick *six*. This is said to be much better than talking of a motley assemblage of things—six beans, six apples, six nuts, &c.

Perhaps some teachers may agree with this, but I do not. I hold that to form simple number conceptions, objects are right; and that later on, for the clear perception of fractions and the like, lengths and divided scales are right too, but that they are more difficult and do not come first. Moreover when they do come, they should come experimentally not didactically.

On page 8, the author appears willing to confuse the children by discussing whether to call the digits "figures," "marks," or "digits." He emphasises the desirability of keeping children for a long time to the lower range before proceeding to numbers above ten; which is probably right in moderation, but it is rather strong to say:—

Let the children become expert in dissection, addition, subtraction, multiplication, and sharing, in the range 1 to 10, before the word "eleven" is heard.

At the same time the following quotation from Kehr, on page 9, is surely sensible:—

"In no subject of instruction," says Kehr, "is the punishment for haste and hurry so much felt and so lasting as in arithmetic. Is it not a humiliating thing that, in spite of three and four arithmetic lessons a week, many children, even in the upper classes of higher elementary schools, are so slow and inaccurate in the operations within the range 1 to 100 that they stick fast if asked $37 + 39$, $91 - 46$, 4×18 , or $76 \div 4$? And yet in practical life most calculations are within that narrow range. The fault lies in this, and in this alone—a rotten, yielding foundation; a foundation not deep and firm."

The author rightly advocates also that children should find out rules for themselves, and be assisted to formulate rules instead of being told them from the beginning; but he overpresses this when he says (on page 17): "Let them find out for themselves that twelve inches make a foot." This is hardly one of the laws of nature that can be ascertained by experiment.

At the same time the following are sensible remarks:—"Do not correct a child who says 'two and three is five'" (p. 18).

"Do not torture children by insisting on their saying 'twice three is six.' 'Two threes are six' is good enough" (p. 19).

"The word 'unit' is not easily intelligible to children" (p. 19).

In chapter II. the author quotes several curious methods for subtraction, and wisely advocates the "shop" or complementary method as in every way easier and more powerful than the old-fashioned and still ordinary method, whereby the child wastes time by saying or thinking, "six from

three you can't," and then proceeds to mysterious operations of so-called borrowing and paying back, which the author rightly points out is really a method of equal additions:—

Thus in taking 269 from 310 we add 110 to each number, and really take 379 from 420.

The author says that there is no logical fault in this common method, but that the method is somewhat unnatural.

It seems a strange thing, when we have to take 27 from 43, to alter the sum and take, instead, 37 from 53, while, if we had been asked to take 37 from 53 in the first instance, we should have altered *this* sum and taken 47 from 63 (p. 26).

It is indeed an extraordinary method when thus expressed; old-fashioned teachers may fail to recognise their ordinary procedure in this guise, and the author does not make it perfectly clear. But if they will take the trouble to go through the operation of taking 269 from 310 they will find themselves saying 9 from 10 (a ten which is not really there) leaves one, then 7 from 11 (a seven which is not there, from an eleven which is not there) leaves 4, and then 3 from 3 (the first three being not there) leaves 0, so that the result is 41; but the course of procedure has been virtually to add a gratuitous digit 1 to every place except the unit places; that is really to add 110 to both numbers.

If any teacher does not believe this and upholds the habitual procedure as the best possible, I would ask him, or perhaps more especially her, to think it possible that he, or she, may be mistaken.

On page 29 we are told that—

The sign \times may be used as an abbreviation either for "times" or for "multiplied by." In the early stages the teacher should be very clear as to which meaning is intended.

As a reviewer I am bound to say that I do not consider the distinction in the least important. I believe, however, that many teachers will agree with the author rather than with me.

On page 31 a good deal of time and attention is given to this problem:—

How many nuts must I have in order to give 5 to each boy in a class of 47?

We are told, after a page of discussion, that we must be careful to multiply five by forty-seven and not forty-seven by five, which appears to me an instance of fidgeting pedantry; the reason given being that the forty-seven refers to boys, and the answer is wanted in nuts. I should have thought a thing like that not worth discussing, because any child could see that the answer was 5×47 .

I wish to maintain parenthetically that the complete statement is as follows:—

$$47 \text{ boys} \times 5 \frac{\text{nuts}}{\text{boys}} = 235 \text{ nuts};$$

where the fraction is to be read "nuts per boy," and "boy" cancels out. At this complete form of symbolism Mr. Turnbull and many of your readers will be horrified, and may consider

the above form of statement essentially wrong. It is positively right, however, though I do not assert with any certainty that it is an appropriate mode of treatment for children. I would not be understood as denying even that, however; it is the method which has to be employed, sooner or later, when dealing with comparatively complicated sums in physics and mechanics.

Again, in division, a great deal of attention is paid to the difference between "measuring" and "sharing," and the children are to be able to say which it is that we are doing in any given case.

The answer to the question "What is a third part of twelve?" is "sharing" twelve by three.

The answer to the question "How many three's make twelve?" is said to be "measuring" twelve by three.

This distinction is emphasised by the bulk, and even the title, of the chapter, and runs throughout it; but surely it must be regarded as needless? If not, I should welcome instruction on this point from practical teachers. It appears to be a distinction made by German writers. I do not deny the distinction, but I doubt both its emphatic and helpful character. So also a careful distinction is drawn between the factors of a multiplication. The following quotation from page 44 illustrates the author's point of view:—

In every multiplication there is a multiplier and a multiplicand. The multiplier multiplies. The multiplicand is multiplied. The very name "multiplier" indicates activity; the multiplier is the active factor. The very name "multiplicand," if we know a little Latin, indicates passivity; the multiplicand is the passive factor. When we *measure* 12 by 3 we are given the product and the multiplicand and we find the multiplier. We are given the product and the passive factor, and measuring may be called "passive" division. When we *share* 12 by 3 we are given the product and the multiplier and we find the multiplicand. We are given the product and the active factor, and sharing may be called "active" division.

All this is tedious and unnecessary, in my judgment.

The teacher is well advised to illustrate sharing and measuring in the sight of the children by such a thing as ribbon, which can be folded and creased; but one of the examples is the following:—

Take a ribbon, say 3 feet 2 inches long . . . mark the points 12 inches, 24 inches, and 36 inches on it, and show how you could easily share this ribbon into three equal pieces if it were not for the two inches over at the end.

An extraordinary notion to instil.

Of the two inches each can be cut into three equal pieces, and you find that $\frac{1}{3}$ of the ribbon is 12 inches plus $\frac{1}{3}$ of each of the two inches, or $12\frac{2}{3}$ inches. In giving this little lesson the word "measure" should be avoided (p. 51).

On the other hand, the author rightly says that sand and a tin cup are useful to exhibit a remainder; and further on, that a sheet of postage stamps is useful in dealing with area questions.

Concrete quantities the author calls "named numbers" and he has a whole chapter on "Operations with Named Numbers." With several

points in his treatment of concrete quantities the present reviewer fundamentally disagrees.

The impression must not be conveyed that the whole book deals with these extremely rudimentary matters, but the same sort of objections must be taken through the treatment of the slightly higher parts—over-elaboration, unnecessary laboriousness, and pedantic attention to artificial details.

The same sort of arithmetic goes on through the two volumes, with no outlook into anything bigger or beyond. It is a matter of drill—tedious drill—in acquiring tools which you are never shown how to use, except for dealing in minute detail with a similar type of subject matter.

The author delights in his arithmetic, and makes it an end in itself. To a few children it might be the same; but the majority of children, and teachers too, would be utterly sick of a subject if they acquired it, and it only, to this unnecessary degree of perfection.

The extraordinary elaboration can be illustrated by the method by which rule of three is introduced. (p. 182):—

We begin with a very simple sum:—

The price of 2 yards of ribbon is 10 pence. What is the price of 20 yards?

Here we are told three named numbers: 2 yards, 10 pence, and 20 yards. These three named numbers are called "terms." . . . [Six lines omitted.]

Next, lead the children to see that in this sum there are two parts, a condition and a question. Work the sum with the class. Then:

What is the price of 20 yards? Is the price of 20 yards always 8s. 4d.? On what condition is it 8s. 4d.?

"The condition is that the price of 2 yards is 10 pence." We will call this part of the sum—the part which says that the price of 2 yards of ribbon is 10d.—the "condition."

The other part of the sum is:

"What is the price of 20 yards?" Lead the children to give the name "question" to this part. What is the condition in our sum? What is the question?

A few very easy sums can now be worked by the teacher with the help of the class. In each case, before the sum is worked, the children will find the condition and the question.

Then follows a long discussion about goods and cost, and about money having to be paid for goods, so that "goods and cost go together; they are connected; they belong to each other" (p. 185).

Next, lead the class to draw certain general conclusions about the two sorts of thing that belong to each other.

For 7 yards we pay 6s. 1½d. How much do we pay for 30 yards?

What is the whole sum? the condition? the question?

Condition: For 7 yards we pay 6s. 1½d.

Question: For 30 yards we pay how much?

What two sorts of thing are together in the condition? "Yards and money." Tell me the first without saying "yards"; give a name that would do for anything we can buy. "Goods." Now tell me the other sort of thing in the condition. "Money." Tell me without saying "money." "Cost." So what two sorts of thing are together in the condition? "Goods and cost." And in the question? "Goods and cost." How many yards are in the condition? "Seven yards." How many yards in the question? "Thirty yards." Do 30 yards cost more or

less than 7 yards? "More." Then *for more yards we pay more money.* But suppose the 30 yards in the sum to be altered to 3 yards. Do we pay for the 3 yards more or less than for the 7 yards? "Less." Then *for fewer yards we pay less money.* The sentences in italic can be written on the blackboard.

As if this was a thing requiring instruction! It is brain-addling work, but it goes on for several pages, and even overflows into another volume.

When working out a rule-of-three sum the children are instructed to say, "the more the more, and the less the less," in order, I suppose, to get the order of terms right before applying a rule. But in questions about the time men take to dig a garden they are to say "the more the less, and the less the more." All this is most painful. It crops up again in the treatment of proportion in the second volume in the following form (vol. ii., p. 23):—

In the butter sum (§ 21) what is the condition? (That the value of 1½ lbs. is 10d.) What is the question? (What is the value of 2 lbs.?) How many terms are given? (Three.) How many terms are there in the sum? (Four.) Notice the proportion. Does 1½ lbs. increase or diminish in order to become 2 lbs.? (It increases.) In what ratio does it increase? (In the ratio 1½: 2, or 3: 4.) Then does 10d. increase or diminish in order to become x pence? (It increases.) In what ratio does it increase? (In the same ratio as 1½ lbs. increases to become 2 lbs., that is, in the ratio 3: 4.) If for 2 lbs. we had 1 lb., would x pence be more or less than 10d.? (Less.) Is the sum as it stands at present a "more more less less" sum, or a "more less less more" sum? (A "more more less less" sum.) Which are the "two sorts of thing" in the sum? (Pounds of butter and money.) Which are the terms that belong to each other? (1½ lbs. and 10d. belong to each other; so do 2 lbs. and x pence.) Are the terms 1½ lbs. and 2 lbs. in the condition or in the question? (1½ lbs. is in the condition and 2 lbs. is in the question.) Where are 10d. and x pence? (10d. is in the condition, and x pence is in the question.)

Arrive at something like the following:—

In every rule of three "more more less less" sum there are four terms, two in the condition and two in the question. Each term in the condition has corresponding to it a term of the same kind in the question; and, in whatever ratio one term in the condition would have to be increased or diminished in order to become the corresponding term in the question, in the same ratio would the other term in the condition have to be increased or diminished in order to become the term corresponding to it in the question.

After a time, for "rule of three more more less less sum" the children can say "direct proportion sum."

By this sort of teaching the children will, if docile, get immersed in the idiosyncrasies of a particular teacher, and may get expert at discovering what he wants. It is a study, therefore, of a very limited kind of human nature, but it is difficult to imagine anything more futile as an introduction to mathematics.

Once more, parenthetically, I should like to say that "the unitary method" now so much employed by teachers is in all respects vastly better than any form of "rule of three;" and that the best

mode of expression in the early stages is to make a full fractional statement, e.g., thus :—

If 6 yards cost 8s. 4d.
1 yard costs $\frac{1}{6}$ th of 8s. 4d.
So 17 yards cost $\frac{17}{6}$ ths of 8s. 4d.

which can be evaluated.

The author's mode of dealing with roots illustrates the same peculiarities, as the following extracts (II. p. 75) show :—

85 is not the square of any whole number, but lies between the consecutive squares 81 and 100. 81 is the highest square that does not exceed 85 and may be called the square "in" 85. 81 is the highest square that does not exceed 81 and may be called the square in 81.

The square in a number is the highest square that does not exceed the number. Thus 81 is the square in every number from 81 to 99 inclusive.

The squares in 25 and 45 are 25 and 36. Their roots are 5 and 6. It is convenient to speak of 6, which is not the square root of 45, as the root "in" 45.

Again, on page 102 :—

We may say that

1 is the integral root in 1'545049.
1'2 is the 1-place " " "
1'24 is the 2-place " " "
1'243 is the 3-place " " "

By the integral root in a number we mean the highest integer with a square not exceeding the number. By the 1-place, 2-place, 3-place, &c., root in a number we mean the highest 1-place, 2-place, 3-place, &c., number with a square not exceeding the number. We say "integral" root in a number because, as we see, there may be other roots in the number. When we were dealing only with integers and integral roots, we could say simply "root in a number;" and this we can still say when there is no doubt as to our meaning.

In this part of the book one finds, scattered about, abbreviations like the following:—D.N., T.D.N., S.F.

It appears that D.N. means decimal number, and M.D.N. means mixed decimal number :—

According to the language used in this book, both '24 and 3'24 are *decimal numbers*, but '24 is, and 3'24 is not, a *decimal*. 3'24 is a *mixed decimal number*: it is the sum of a whole number, 3, and a decimal, '24 (II. p. 92).

It is very disappointing thus to have to find fault with a book written by a Cambridge mathematician, but it appears to me to emphasise all the faults to which mathematicians in the narrow sense are liable in teaching; and even though it were true that the thorough and pedantic training advocated in the book could result in producing scholarship winners, that is not the object of education. If inspectors of schools anywhere proceed on lines corresponding to those in this book, the teachers and pupils subject to their influence are to be commiserated.

THUCYDIDES' PELOPONNESIAN WAR.¹

THE "Temple Classics" seems to be departing somewhat from its old principles in publishing this book. The earlier translations in the series were chosen for their value as literature, not as giving a literal or necessarily a verbally faithful reading of the ancient work. The reader of Chapman, or North, or L'Estrange, had before him a fine piece of English, sometimes one made immortal by its association with still greater masterpieces: the lover of letters, not the surreptitious schoolboy, sought for them. But Mr. Crawley's translation is worth nothing as a piece of English beside the noble work of Hobbes which was passed over for it; whilst as a translation the editor seems to have done his best to make it accurate. Searchers after information, therefore, will find what they want here, but not those who love a fine style. Mr. Crawley is commonplace and verbose, he has no ear, and cannot point an epigram or antithesis, but we have tested him in a number of places, and find him a good "crib," with the exception of a few passages, two of which we will mention. Both come in the introduction, a section of well-known difficulty. First, in i., 2, the word γούν, which gives a piece of corroborative evidence, is translated "accordingly," and the passage is made to run thus :—

The goodness of the land favoured the aggrandisement of particular individuals, and thus created faction which proved a fertile cause of ruin. It also invited invasion. Accordingly Attica, from the poverty of its soil enjoying from a very remote period freedom from faction, never changed its inhabitants. And here is no inconsiderable exemplification of my assertion, that the migrations were the cause of there being no correspondent growth in other parts. The most powerful victims of war or faction from the rest of Hellas took refuge with the Athenians as a safe retreat; and, at an early period becoming naturalised, swelled the already large population of the city to such a height that Attica became at last too small to hold them, and they had to send out colonies to Ionia.

That is, the fact that exiles filled Attica "proves my assertion that Attica increased more than other parts." But that is not his assertion at all. He says the rich parts changed their inhabitants, and the poor did not; "at any rate (γούν, it is admitted), Attica, a poor part, did not change its inhabitants; and it is a proof of my argument that Attica increased more than other parts (μη ὁμοίως, not so little) by migrations-into-other-parts (μετοικίας ἐς τὰ ἄλλα)." Crawley translates as though the text read διὰ τὸ τὰ ἄλλα μη ὁμοίως αὐξηθῆναι; but no forcing can give any subject for this infinitive "but Attica." Note "by the way" the infelicity of the three *froms* in the third sentence; a trick which is repeated elsewhere. The other passage is in chapter 21: "assuredly they (? the conclusions) will not be

¹ "Thucydides' Peloponnesian War." Translated by Richard Crawley. 334 + 280 pp. 2 vols. (Dent.) 1s. 6d. each, net.

disturbed" by the lays of poets or the works of chroniclers. The Greek says the reader should believe me, and "not trust the lays of the poets" or the chroniclers. We do not understand the English. There is a plan of the battle of Plataea in vol. i., but it is impossible to distinguish Greek from Persian. We think something more has been learnt about Plataea since that plan was made.

A HISTORY OF AMERICAN LITERATURE.¹

PROF. TRENT is quite alive to the advantage he possesses over the other historians of literature in the series of which his book forms one volume. In striking contrast to many nations, the literary achievements of the people of the United States scarcely extend over a single century. Thus, the scale of the work can be large. The reader has no cause for regret, for the author is enabled to write with an ease and even an amplitude of expression which would have been impossible had his range been wider or his space more restricted. The absence of cramping limitations is further favourable to the writer because it gives him room to emphasise one of the characteristics of American literature, namely, the relatively large number of fairly important writers, inferior, of course, to the great men, but still of respectable merit. Not that the pages are crowded with detail, or that the critic's standard of respectable merit is low. In fact, this admirable book is steered with great skill between the two dangers which beset the histories of literature. It is not over-burdened with names of authors and books so that the reader cannot discern the general trend of literary development. Nor, on the other hand, is the writer one of the "tendency" school which subtly analyses influences, movements and reactions, to the exclusion of pertinent information and of valuable personal criticism.

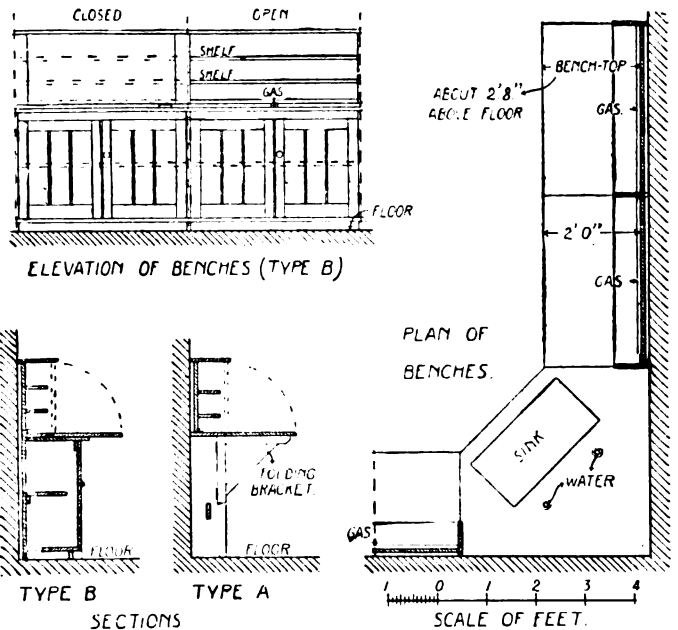
The book is in two large divisions. Up to 1830 the subject is arranged under three periods, the Colonial, the Revolutionary, and the Formative periods, names which sufficiently explain themselves. A modern historian is far enough from 1830 to be able to treat the literature before that date in a spirit of historical criticism, to trace the growth of literary taste, and to pronounce more or less decisive verdicts. But we are too near the writers of the period subsequent to 1830 to discuss their relation to the general course of

national progress, or to determine in anything but a tentative fashion their ultimate position in universal literature. Accordingly, Prof. Trent makes no attempt to philosophise on the later writers; he classifies them as novelists, historians, poets, and so forth, and discusses each on his own merits. In the later as in the earlier chapters of the book, so far from displaying a desire unduly to magnify the fruits of American literature, he is almost too careful to point out the low literary worth of many popular writers, and to lay stress on the absence of creative originality of the highest order in any American author. The only two who, in his opinion, will take a permanent place in international literature are Poe and perhaps Whitman.

The book will make an excellent addition to the school library. The older boy who has discovered Hawthorne and Wendell Holmes may be sent to it for information, and he will read on for pure pleasure.

SCHOOL LABORATORIES.¹

WE welcome this attractive book as an attempt to put before the layman the peculiar conditions which work in practical science involves. The first eighty-seven pages are de-



voted to chemical laboratories, enumeration of the necessary rooms being followed by a detailed account of the fittings required, aided by plans of laboratories and fittings drawn to scale. The

¹ "A History of American Literature." By Wm. P. Trent, M.A., LL.D., Professor of English Literature in Columbia University. xx + 608 pp. (Heinemann.) 6s.

¹ "The Planning and Fitting up of Chemical and Physical Laboratories." By T. H. Russell. xx + 178 pp. (Batsford.)

author's remark, "the room should be planned for the benches, not the benches for the room," is worth commending. Success in designing is only to be obtained by arranging the fittings and then surrounding them with walls, a fact which architects accustomed to ordinary domestic work are apt to ignore.

Mr. Russell appears to be wedded to the old style of chemical bench with its drawers, cupboards, and re-agent shelves. The benches at the Manchester School of Technology figured in the book are, in fact, a replica of Dr. Thorpe's much earlier designs for the Yorkshire College. The decay of "test-tubing" in recent years has made this style of bench, in some circumstances, a doubtful advantage and a needless expense. Some useful suggestions for closing wall benches are, however, given, as shown in the figure reproduced on p. 417 with the permission of the publisher. Lecture-room seating is carefully dealt with, but the plan, occasionally possible, of putting the first seat in a well, a boon to a lecturer in a large room, is not mentioned. We think that water-cocks, filter-pumps and the carrying of drainage through floors, deserve more treatment in this section.

Pages 88-116 deal with physical laboratories. The exclusion of iron and steel, insisted upon, is, with rooms of large span, a serious matter, and moreover involves the use of brass or copper gas and water pipes, though this point is not brought forward. A great deal of students' work, even in magnetism, can be done without this rigid exclusion, especially if pendant gas-pipes which can be doubled up out of the way are used, instead of pipes fixed on the benches. In describing the benches hardly enough stress is laid on the advantage of each student having a free end as well as a side to work at. The optical room seems to deserve more than the few lines allotted to it, and the subject of wiring, including the laboratory switchboard, with its invaluable rheostat, finds no mention at all.

Ventilation, warming and lighting (pp. 116-148) are hardly included in the title of the book. While commending the author's treatment, to attempt such a feat in thirty pages must be somewhat unsatisfactory, and we fear that the average architect will fight shy of units of heat and even the simple equations given. The book concludes with appendices on the Board of Education regulations which bear upon the subject, followed by lists of apparatus required and an index.

It is a pity that no attempt has been made to indicate the probable building requirements—as judged by the style of work done in institutions of different kinds—for such information would have been a help to architects in advising lay clients.

In conclusion, we would only ask that these criticisms may be taken as showing appreciation of, and interest in the book, which stands almost alone and is likely to be of considerable value.

A. E. M.

TWO BOOKS ON METHOD.¹

IT is one of the most hopeful signs for the future of the country that there is a real awakening of interest in education. And this interest is a twofold one. It manifests itself not only in the public demand for greater educational opportunity and efficiency, but also in the spread of a spirit of earnest enquiry among teachers as to the true end of education and the best methods of securing the realisation of that end. Teachers are beginning to take their profession seriously. They are awakening to the truth that the process of education is founded upon a scientific basis. The schoolroom is being transformed, and transfigured by the light of great aims and interests. The teacher is beginning to feel that he may do a great service for his country, and a great service for science at the same time. He has an eager welcome for such books as Stratton's "Experimental Psychology and Culture," which reveals to him new possibilities in schoolroom observation, and Royce's "Outlines of Psychology" (The Macmillan Company), which brings the most scientific results of the study of mind into direct relation with the practical work of teaching.

The two volumes before us, dealing with General Method, and the Method of Class Teaching, will be found both stimulating and practically helpful.

The new edition of the "Elements of General Method" is considerably enlarged, especially in the treatment of interest and correlation. It carries the student a stage nearer his professional work than the "Outlines of Psychology." The principles are here seen guiding and inspiring practice, clothing themselves in the form and organisation by which young minds are guided in their growth, and the edifice of knowledge is reared. The aim of education, the relative value of studies, interest, correlation, induction, apperception, the will, are the main subjects discussed. The treatment of these subjects is full, fresh and clear. The author has an intimate personal acquaintance with the teacher's difficulties, and is able by his knowledge and experience to make many suggestions which should add to the teacher's pleasure in his work, and his success in it.

The other volume has a title which may mislead English readers, who are apt to think that "The Method of the Recitation" confines itself to reading and what is usually called reciting. "The recitation" to the American teacher is "the lesson" to the English teacher; so that this book is really on the method of teaching class subjects.

We have no hesitation in giving it a very high place among books on practical method. The authors must be congratulated on the clearness

¹ "Elements of General Method." By Chas. A. McMurry. 331 pp. (The Macmillan Company.) 4s.
"The Method of the Recitation." By Chas. A. McMurry and Frank M. McMurry, Ph.D. 339 pp. (The Macmillan Company.) 4s.

with which they have shown how the teaching of individual notions, the progress from individual to general notions, and the application of general concepts in new directions constitute the main problems of instruction, and how these problems may be logically solved in the various subjects of school study. The illustrative lessons give definiteness to the suggestions and hints, and though some of them have an American setting, they all have a value as concrete embodiments of educational principles.

These two volumes can be recommended both to students of education and to teachers who desire to keep in touch with the developments of method.

THE TEACHING OF MATHEMATICS IN SCOTTISH SCHOOLS.

THE Scotch Education Department have just issued an important circular on the teaching of mathematics, with special reference to the requirements of the Leaving Certificate Examination. In this circular they have accepted the changes in mathematical teaching suggested by the British and Mathematical Associations, and recently adopted by the Board of Education, and by the Universities of Oxford, Cambridge, and London. It is not too much to say that this action of the Department ensures the introduction of the "new method" into every public school in Scotland, whether higher-grade or higher-class. The Leaving Certificate Examinations dominate the whole field of education in Scotland, and for good or ill largely determine the nature and scope of the teaching in the various subjects of examination. On abstract principles such a position cannot very well be defended, but in practice it has resulted in a general marked improvement in the methods of instruction—a general improvement which would have been impossible without the "benevolent despotism" of a central authority.

The main features in the circular may be summed up as follows:—

(i.) In the study of arithmetic more attention should be paid to the explanation of the ordinary rules and to the employment of contracted methods.

(ii.) Systematic practice in the use of logarithms should receive more attention.

(iii.) Pupils should be made to realise that the fundamental laws of algebra and arithmetic are the same, and they should be encouraged to employ algebraical formulæ in arithmetical calculation. Similarly, the explanation and illustration of algebraical expressions by graphical methods might with advantage be introduced at an earlier stage.

(iv.) With regard to geometry, it is advisable that certain fundamental geometrical results should be established as far as possible, in the first place by trial and experiment, involving accurate drawing and calculation, before advance is made to a deductive proof.

(v.) These changes are not to take effect till 1905. In the course of 1904 a series of specimen examination papers will be issued in order to give teachers a definite idea of the scope of the examinations.

(vi.) No separate paper will be set in arithmetic after the examination of 1906.

(vii.) No change has been made as regards the papers for honours.

Regulations.

Examinations in mathematics are held in three grades, lower, higher, and honours. Candidates may be presented for examination in any grade, but those who fail to pass in the grade in which they are examined will not be credited with a pass in a lower grade. In writing out the answers to the questions in the mathematical papers it is essential that the full detailed work should always be given in its proper sequence as part of the answer. The work should be written out with such care and neatness in the first instance that a second copy may not be required. But if from any cause a second copy of any answer is made, this copy must include all the detailed working, and the first copy must be struck out with the pen. In geometry all the figures should be careful and accurate. For this purpose candidates must be provided with a fairly hard pencil, a flat wooden ruler graduated on one edge in inches and tenths of inches, and on another in centimetres and millimetres, two set squares (45° and 60°), a protractor graduated to degrees, and compasses furnished with a pencil point. In all the mathematical subjects marks are given for neatness, arrangement, good style, and well-drawn figures. Candidates in the higher grade and in honours must be provided with a table of four-place logarithms of numbers and trigonometrical functions.

LOWER GRADE.—The examination in lower-grade mathematics will consist of three papers (Mathematics I., II., and III.), for each of two of which two hours will be allowed, while one hour will be allowed for the third. It will embrace the following subjects:—

Arithmetic.—The elementary rules; prime factors of numbers; weights and measures in common use; the metric system; vulgar and decimal fractions; elementary methods of approximate calculations by decimals; practical problems. The intelligent use of algebraical symbols is permitted, and no question will be set on recurring decimals.

Algebra.—Numerical interpretation of formulæ; simple algebraical transformations; the graphical representation of simple functions; equations of the first degree in one and two variables; easy quadratic equations; problems leading to the above equations.

Geometry.—The main propositions given in Euclid, Books I. and III., with deductions and constructions arising from them: simple loci; application of arithmetic and algebra to geometrical theorems and problems. Elementary drawing to scale. Proofs will be accepted which appear to form part of a logical treatment of the subject.

Candidates who take the lower-grade examination in mathematics may not be presented in any of the additional subjects.

HIGHER GRADE.—The examination will consist of three papers (Mathematics I., II., and III.), for each of which two hours will be allowed, and will embrace the following subjects:—

Algebra.—The subjects of the lower grade; more difficult transformation, equations and problems; application of graphical methods; elementary theory of indices including logarithms; surds; the remainder theorem; ratio; proportion; progressions. Arithmetical questions will also be set, including questions on theory and exercises involving the practical use of logarithms.

Geometry.—The main propositions in Euclid I.-VI. and XI. 1-21, with deductions and constructions arising from them, but excluding the theory of incommensurable quantities; the elementary properties of simple plane-faced solids; mensuration of plane and solid figures; approximate solutions by drawing to scale. Proofs will be accepted which appear to form part of a logical treatment of the subject.

Trigonometry.—Elementary trigonometry, including the

solution of triangles, with the aid of four-place logarithms. Graphical solutions of problems.

Candidates who take the higher-grade examination in mathematics may be presented in one (but not in more than one) of the following additional subjects:—Elements of dynamics; geometrical conics; analytical geometry.

EDUCATION AT THE CAPE OF GOOD HOPE.

THIS year's report of the Superintendent-General of Education for the Cape of Good Hope, dealing with the work of the year 1901, has reached us. It is a bulky volume of over four hundred foolscap pages and gives details of every branch of the work of the Department of Public Education.

The features of the educational history of Cape Colony for 1901, that is for the second year of the war, are, the report states, similar to those of the previous year, but more pronounced. Dr. Thomas Muir, F.R.S., the Superintendent-General, summarises his report as follows:—

The loss in schools which in the first year was 61, mounted up to 131 in the second year of the war. The bare fact is significant enough, but its full import is not grasped until the progress of preceding years is recalled. During the seven years immediately before the war there was an average increase of 166 schools a year. The events of the years 1900 and 1901 are thus responsible not merely for the loss of the 192 schools above noted, but for the loss of all the schools which two years of progress might have brought into existence. Another fact which deepens the picture is that the loss fell entirely on the white population, the schools which have disappeared being third-class public schools, farm schools and poor schools. In all probability the year 1904 will be near its close before we shall have regained the ground lost.

When we come to look at the number of pupils enrolled the figures are much less unpleasing, there being an actual increase of 2,484 for the year. This is the more striking in view of the fact that in the previous year, when there had also been an increase, the number had been considerably less, viz., 425. Here again, however, the real state of affairs is not understood if we do not keep in mind the immense increases of the preceding years of progress. Up till the war the increase in the enrolment had been leaping upwards at the average rate of 7,491 pupils a year; growths of 425 and 2,484 for the two years of the war are thus only noteworthy because of being growths and not shrinkages.

The records of inspection, though, of course, less favourable than those of the preceding year, are astonishingly good in view of the existence of martial law and all the hardships which it entailed.

In the actual widening of the curriculum by the spread of instruction in boys' handiwork, girls' handiwork, drill, vocal music, and experimental science, there has been no check to progress. This is a very satisfactory feature.

Equally satisfactory is the improvement in the qualifications of teachers, the ratio of trained to untrained having increased in spite of all the adverse circumstances.

The growth in the number of school libraries was not maintained. In the provision of new school buildings little was accomplished, notwithstanding the willingness of school managers and the Department. As had been more than once indicated, there is no point in the administration more in need of reform than that which concerns the granting of Government aid for new buildings.

The only fitting comment on the whole year's record is that, while gloomier than that of 1900, it is still not unminged with spots of brightness.

TWO IRISH EDUCATIONAL REPORTS.¹

THE recent publication of these two reports is attended with more than usual interest. In the year 1901-2 Irish education plunged into a new system, part of which consisted in the non-publication of the results of the examination, so that until the Intermediate Board brought out its belated report the answers to several interesting questions remained uncertain. In the first place, the number of candidates who took the examinations in 1902 showed a slight increase on the whole over 1901—8,379 as against 8,117—but not so large an increase as 1901 over 1900, when the number was 7,608. There was a large increase, viz., over a thousand in the preparatory grade, but a decrease in all the other grades, and particularly in the senior, both increase and decrease being shared proportionally by boys and girls. It seems premature to draw any conclusion as to the effect of the change of the age limits. The results of the examination were not in accordance with the Board's anticipations, for after sending the results to the schools they revised the lists, issuing a new pamphlet. Even then the percentage of passes was appreciably lower than for several previous years, being for boys 60·7 as against 64·4 in 1901, for girls 54·2 as against 69, and for both together 58·9 as against 65·7. The preparatory grade suffered most, and the girls more than the boys. Under the new system the Board obviously intend to reduce the number of exhibitions, both in value and in number. In the senior grade they are of two values, £50 and £40; in the middle, of two, £30 and £25; and in the junior, of three, £20, £15 and £10. There are none in the preparatory. The total number of exhibitions awarded was 249; 189 to boys and 60 to girls; in 1901 (omitting the preparatory grade in which 127 were awarded, 94 to boys and 33 to girls) the number was 338, 224 to boys and 114 to girls. It must also be remembered that under the old system there was a large number of retained exhibitions, which will disappear under the new. Similarly there were 250 prizes, varying from £3 to £1, awarded in 1902, 190 to boys and 60 to girls; and in 1901 (omitting the 134 prizes of the preparatory grade), 540, 386 to boys and 154 to girls. The exhibitions were awarded in three different groups, the totals in the different groups being: classical group, 59 to boys and 4 to girls; modern literary group, 84 to boys and 50 to girls; science group, 46 to boys and 6 to girls. The amount of the school grant paid to managers was practically the same as in previous years, viz., £57,413 divided among 268 schools, the highest amount paid to a single boys' school being £1,941 to the Christian Schools, North Richmond Street, Dublin, and to a single girls' school £990 to Victoria High School, Londonderry. The most interesting pages in the report contain some severe comments on the refusal of the Government to allow the appointment of permanent inspectors for 1902-3, and an earnest appeal for their early appointment in order to carry into effect the Act of Parliament of 1900. The report contains the reports of the examiners of 1902, published too late to be of any use for the examinations of 1903. The examiners seem to think that the abolition of set courses is already working a useful effect, but they comment *passim* on the abundant evidences of mere cram memory work; one mathematical examiner goes so far as to say that mere memory work should be penalised. This fault extended to all the languages, including Irish, and even to English composition. On page xvii. the examiner writes: "In very many schools the teachers had tried to forecast what subjects the examiners would select for the composition exercise, and had drilled their pupils to reproduce

¹ (1) "Report of the Intermediate Education Board for Ireland for the year 1902." (2) "Intermediate Education Board for Ireland: Report of the Temporary Inspectors, 1903."

prepared essays on those subjects. Though the forecast proved to be at fault, the candidate, in nowise deterred, transcribed the essay with which he had been crammed. . . . Fully one-third of the middle-grade candidates had been prepared according to this simple method."

The first question one is tempted to ask about the Report of the Temporary Inspectors is, "Is this the whole report?" One of their instructions was to report on "the qualifications of the staff generally," but on this matter there is no word, nor yet is there any statement that any part of the report has been withheld. The temporary inspectors were four: Messrs. M. A. Bayfield, Cloudesley Breerton, C. H. Jeafferson, and T. M. Roberts; three of these had been inspectors the year before, and were very pleased with the results of their previous work, as they found very marked improvement all round. The report, however, deals only with half of the ordinary school work, viz., English, Latin, Greek, and modern languages. No word of comment is offered on mathematics or science. Nor do the inspectors explain how hurried and superficial their "angel visits" were. The book contains, however, some exceedingly useful hints, especially on the teaching of French. There are many severe remarks on the teachers and teaching. These are no doubt fair from the inspectors' point of view, but when will an inspector or an Intermediate Commissioner fairly face the question from the teachers' point of view? or how long will Irish schools be expected to "make bricks without straw," or to have staffs of good teachers without providing them a mechanic's wage?

SCHOOL HYGIENE.¹

Essentials of School Buildings.

IN drawing up the following remarks upon school buildings in relation to health the Sub-Committee had before them the regulations issued by the Board of Education both for elementary and secondary school buildings. As these are open to anyone, and give a large amount of detailed instruction as to the planning and fitting up of both classes of schools, it seems better to the Sub-Committee to confine themselves to some general observations applicable to all classes of school buildings, avoiding as far as possible details applicable to particular classes of schools, which can be readily obtained from the regulations mentioned above.

GENERALLY.—The plan or general scheme of the building should be arranged with a view to provide for the particular system of organisation and routine that is intended to be adopted in the school.

The main points to be kept in view are simplicity and directness, that is to say, narrow corridors or passages are to be avoided; all parts of the building and playgrounds should be easily overlooked, so that the duties of supervision may be reduced to a minimum. There should be no buttresses or projecting parts of the building to form corners or places screened from observation.

Every part of the inside should be thoroughly well lighted.

The staircases should be planned so that there is easy and direct access from every part of the building to the open air, and so distributed that no part of the building can be cut off by fire; they should be arranged to discharge into open places of

sufficient size to prevent jostling or crowding in case of two or more classes being dismissed at the same time. The general scheme must provide for rapid and orderly movements of large numbers and easy accessibility to every part of the building for the principal.

In the case of large boarding-schools, the residential buildings should be kept separate from the educational block; in this way each boarding house may be placed so as to have the most favourable aspect, can be more easily isolated in case of sickness, and the air can be allowed free play all round.

The objection to arrange a school in the form of a quadrangle is that there will necessarily be a certain amount of stagnant air, and that only two sides can have a favourable aspect.

SITE.—A damp or low-lying ground should be avoided—if possible, a position on the top or side of a hill facing south with a gravel, sand, or chalk soil, sheltered to the north and east by trees, preferably pines. Ground water should not come within about 10 or 12 feet of the surface. The advantages of a good soil, such as sand or gravel, may be entirely neutralised by an impervious layer of clay a little below the surface.

The erection of a school building upon made ground is very undesirable.

In towns, care should be taken to place the school away from main or noisy thoroughfares, the neighbourhood of railways, factories, or any industries causing dust and smell. A wide street with the houses low on the opposite side should be chosen, both for light and the avoidance of noise. Otherwise, unless the building can be put at least 60 feet back from the street, there will be disturbance to the work. In any case, the room where noise is of less importance, such as studios, laboratories, cloak-room, staircases, corridors, and the assembly hall, should be placed on the street side, aspect having been taken into consideration. Double windows should only be allowed where there is an effective and complete independent system of ventilation. The places that the children may have to pass on the way to school should also be considered when settling the position of a school.

ASPECT.—The building must be placed so that the sun has free access to every part that is in constant use. The best aspect is probably south-east: this allows the morning sun to shine into the room, while it is off it before the hot part of the day. Rooms facing due west will be very hot in summer, and should, if possible, be used only in schools where work is not carried on in the afternoon. It is suggested that on a free site the best plan will be to place the side of the hall in which the windows are (in a school on the central hall plan) to the north-west, placing the studio at the north end and grouping the classrooms on the south and east.

ENTRANCES.—In arranging the entrances regard should be had to the prevailing wind, in order to provide shelter; there should be covered space for early comers to wait in on wet mornings. They should not open directly into the hall, nor be used for cloak-rooms. A strong draught is produced when two entrances open opposite to each other with a straight corridor between. In mixed schools there must be a separate entrance for boys and girls.

CLOAK-ROOMS must be large, airy, and well lighted, and placed so that they are under easy observation from outside. They should be easily reached from the main entrances, and the doors so arranged as to allow the various forms of cloak-room drill that are customary in the elementary schools. The stands should be some distance apart with 12 inches between the pegs, of which there should be only one row, so arranged that the clothes can hang clear away from the wall and allow of the proper circulation of air. In the case of boys' schools less space will be required. The best umbrella holders are the "turnstiles." Cloak-rooms should be warmed, and special

¹ From the Report of a Committee of the British Association on "The Conditions of Health essential to the Carrying on of the Work of Instruction in Schools." Presented to the Educational Science Section of the Association at the Southport meeting.

attention be paid to their ventilation. Lavatory basins should not be placed in the cloak-rooms.

CLASS-ROOMS.—(a) *Area.* The area of the floor space to be occupied by the pupils should be not less than 18 square feet per child.

(b) *Lighting.* The main light to be from the left, other windows being subsidiary and for the purpose of ventilation.

The transparent glass surface should be, if possible, one-quarter of the floor space to allow for dark days, and should never, even on the south side, be less than one-sixth. The sill of the window should not be more than 3 feet 6 inches from the floor, but if higher should be bevelled off. The glass should be carried as near the ceiling as may be constructionally possible. The piers between the windows should be as narrow as possible, and splayed or bevelled off.

The back row of desks must not be placed behind the last window. Transoms or heavy mullions should not be allowed even if the requisite amount of glass area is provided, as they cast shadows. The colour of the walls is important with regard to lighting. The light yellows and buffs often found and recommended are not satisfactory, yellow in particular producing fatigue and nervousness in a marked degree as compared with other colours. Some light shade of green or grey seems on the whole the most satisfactory colour. Blackboards placed at a height within easy reach of the children should run round the walls.

SLEEPING-ROOMS.—The most satisfactory arrangement is probably that of open dormitories containing a moderate number of beds. The cubicle system is less to be recommended, while that of having rooms for two or three should be unhesitatingly condemned. Not less than 65 square feet of floor area should be provided for each occupant.

PLAYGROUND.—Every school should be provided with sufficient open space immediately round the school building for the purpose of a playground: this should in no case be less than 30 square feet per head. In the case of secondary schools this should be in addition to the playing field for regular games. Boarding schools require considerably more space than day schools.

VENTILATION.—The Sub-Committee, while feeling to the full the enormous importance of the subject of proper ventilation in regard to the success of the school, both as to the mental and physical development of the pupils, feels some difficulty in offering any suggestions as to how a satisfactory result can be secured. Many schemes are put forward, both "mechanical" and "natural," each of which claims to secure perfect ventilation, but all of which in actual practice fall far short of their promises. The Sub-Committee would, however, like to utter a word of warning with regard to certain systems that rely on the introduction of hot air both for the warming and ventilation of the rooms. Such a system may work well enough in the case of one or two large rooms, but in a school with its large number of rooms with an always varying number of occupants the difficulty of adjusting the pressure becomes very great. The continual movement and opening of doors is also apt to interfere with the proper working of the system; in addition to this there is the breathing of the warmed air. In winter the incoming air must be raised to a considerable temperature to allow for the cooling effect of the windows, walls, &c.; and, although somewhat cooled down by the time it reaches the pupils, it must, it would seem, lose most of its invigorating qualities, even though it has not been heated sufficiently to burn the organic particles present. Rooms heated by hot air are apt to have an enervating and debilitating effect. In order to warm and ventilate a room by hot air only it is, of course, necessary to introduce the fresh air at the top, extracting the foul air at the bottom. This, again, is open to several objections: those sitting near the outlets are in

a continuous stream of all the bad air in the room; the breathed air is brought down again past all the people in the room (as are the products of combustion if artificial light is in use); the windows can never be opened because if they were the whole working of the system would be upset; finally, in summer, when the incoming air is cooler than that in the room, there is a tendency for the entering air to fall straight down to the outlet below. This system has undoubtedly many strong supporters, but the unsatisfactory state of things existing in many schools where it has been installed has induced the Sub-Committee to urge that a good deal more experiment and experience of it is required before it can be safely recommended. On the whole, it seems that the solution is likely to be found in some plan by which the fresh air (warmed when the weather is cold so that it can be freely introduced without discomfort and maintained at a temperature of not less than 55°) is brought in at a low level, the foul air being taken off at the highest point (mechanical power being used to make sure of sufficient movement) and the actual warming of the room being done by some form of direct radiation.

SANITARY.—The sanitary conveniences in boys' schools may well be placed outside the main building; but in girls' schools, and where there are very young children, they must be provided in the main building, but should be cut off by a properly arranged ventilating lobby. This part of the school building should be thoroughly well lighted, so as to ensure its being kept properly clean. Deodorants or disinfectants should not be allowed, as they take away one certain and easy means of detecting anything wrong. To prevent unpleasantness reliance should be placed on perfect cleanliness. Frequent inspection by the principal is of the greatest importance, as when these matters are left entirely to the school-keeper it is not uncommon to find in schools otherwise splendidly equipped and managed a very undesirable state of things. In planning a school great care should be exercised as to the position of lavatories, &c. No windows in the main building should overlook the approach to them.

Eyesight in School Children.

(a) The three principal *preventable* causes of defective sight in schools are found to be—

(1) Defective and flickering lighting of school buildings and rooms.

(2) Faulty positions of scholars with regard to light and with regard to the work upon which they are occupied.

(3) Bad type of print and writing both in school-books and upon blackboards.

To these may be added causes less under the control of the school, though definitely affecting the child in its relation to school life, namely—

Defective nutrition.

Insufficient sleep and clothing, and home habits and conditions injurious to general health.

Home lessons conducted under unfavourable conditions of light position.

(b) The three conditions necessary for preserving the sight in school life are found to be—

(1) That the schoolroom and classrooms should be sufficiently and steadily lighted, whether by daylight or by artificial lighting.

(2) That scholars should maintain correct positions in school, both in regard to the direction of the light falling upon their work and correct posture, and with regard to the books or objects upon which they are at work.

(3) That the paper and type of all books used in school should be appropriate. Blackboards should be properly prepared and placed, and the writing upon them clear and of a

suitable size. Slates of the ordinary description should be abolished or replaced by others of a more modern kind.

LIGHTING OF ROOMS.—A classroom is considered to be sufficiently lighted by daylight¹ in all parts in which a portion of the sky is visible by the scholar; by artificial light when small type known as *brilliant* can be read in any part of the room at the distance of 18 inches from the normal eyes. In place of blinds a sliding screen covering only part of the window should be arranged so that sunlight may be prevented from falling directly on the scholars, and that with a minimum loss of daylight. Windows should always be carried as near to the ceiling as possible, so as to secure the largest amount of sky. The height of the window-sill from the floor also requires careful consideration. It should never be so low as to cause dazzling of the scholars' eyes.

The window-glass should be perfectly clear without any muffling or clouding, not only on account of securing the largest amount of light, but to save the check to the eye-nerve of thwarted vision. Windows ought not to be broken up by bars where these can be avoided; and plate-glass is preferable, where possible, as being a good non-conductor. It retains the heat of the fire in the room, and also takes the heat out of the sunlight entering the room. Careful attention should be paid to the ratio between window area and floor space.

Reflected light from the ceiling becomes well dispersed and is steady.

CORRECT POSITION OF SCHOLARS.—The correct position for a child, when sitting at a desk to write, is such that his feet may be firmly planted on the floor or foot-rest, the seat of his chair reaching forward to his knee, the back of the seat supporting both middle spine and shoulders. The front of the desk should come well over the knees and be at such a height that both arms can be laid on it easily without raising the shoulders. The slope of the desk should be about 30°, and this position will be found to bring the paper at about the distance of from 18 to 20 inches from the eyes of the normally proportioned child.

In reading, the slope of the book should be 45°; and this exercise should for the most part be taken sitting rather than standing, in order not to dissipate nervous energy from intelligence and eyesight; and great liberty of movement must be allowed within these requirements, either when standing or sitting, to avoid strain upon the delicate nervous organism.

Desks and seats must be so placed that light falls from above (dispersed light causing no shadows) or from the left. Light must be steady and not flickering, and must fall upon the work and not upon the eyes of the worker.

THE TYPE OF BOOKS AND DEFECTIVE SIGHT.—School books are considered to be appropriate and well printed when the paper is thick enough to prevent the ink showing through; the colour of the paper slightly toned white, not glazed; the ink a good black; the size of the type pica leaded; and the length of line about four inches.

A feeling is expressed by many that school books should be "passed" by some hygienic authority as appropriate to eyesight before being received in schools from the publishers.

Blackboards should be slated black to receive the white chalk. They should be at a maximum distance of 30 feet from the observer, should be well illuminated, and the writing upon them should be well spaced and not less than an inch depth.

As while hypermetropia (longsightedness) is generally congenital, myopia (shortsightedness) is generally acquired. The simple methods adopted for discovering defective eyesight in its early stages and maintaining an alertness in observing an increased deficiency are as follows:—

An examination of the eyes in any case where a child appears to be stupid; tends to hold the book or object at which he is set to work too near his face; cannot see the blackboard so easily as his comrades; complains of headache, seeing "colours," or has watering or redness in the eye, or squints.

The examination of all children over the first standard annually by means of Snellen's letter test, or by tests of broken circles or incomplete squares. Anything more complex has been found to be misleading except when used by experts. In the use of Snellen's letter tests, daylight being variable, it is desirable to arrange a couple of argand burners or electric lights so that the type shall be thoroughly illuminated while the lights are screened from the child under observation. But it should be remembered that the test so conducted only gives the working power of those eyes under identical conditions in the schoolroom, and it should not be supposed that a less illuminated or less clearly written blackboard will be readable at a similar distance.

Children need to be taught and trained to secure for themselves proper lighting at work, and to maintain proper habits of posture, &c., with regard to light; while remembering that the habit may be the result of eye defects or defects of lighting, teachers should make a point of correcting any tendency to form a mere habit of getting objects close to the eyes, in order to protect the children against loss of eyesight in school life.

Separate classes might be arranged in large schools for high myopic cases. In all cases special attention has to be given to the myopic under the guidance of the oculist.

It might be well to recommend the appointment of a medical man skilled in eye disorders to each large school or group of schools, when all cases of defective sight should be referred to him for examination and report.

GEOGRAPHICAL EDUCATION.¹

By H. J. MACKINDER, M.A.

CLASSICS and mathematics are effective educational disciplines largely because, as the result of long experience, they can be taught by methods which are progressive from the lower to the higher forms of a school. If geography is to be generally utilised in secondary education it must become similarly *progressive* rather than merely cumulative of facts. In practice this implies the fulfilment of three conditions:—

- (1) That the pupils be classed in special "sets" for geography, lest they omit stages in the argument;
- (2) that the master know the subject thoroughly; and
- (3) that the public examinations be based on some generally accepted sequence of exposition, as in the case of languages and mathematics.

It would probably be hopeless to expect a general fulfilment of the first two conditions unless the third be practicable. It is well, therefore, to concentrate attention upon this.

The phenomena of geography are capable of arrangement upon alternative principles, either according to regions or according to categories. In the one case the chapter-headings of a text-book would be such as "France," "India," &c.; in the other they would be such as "volcanoes," "climates," &c. The former is spoken of as regional geography, the latter as general, or commonly, but unfortunately, as physical geography. In the university the general classification may often be advisable, but in the school it is submitted that the *regional* basis should in the main be adhered to, for distribution is of the

¹ Special instruments have been devised to measure exactly the amount of daylight in any part of the room.

¹ Abstract of an Address before a joint meeting of the Geographical and Educational Science Sections of the British Association at Southport, 1903.

essence of geography and imparts to regional geography a unity not possessed by physical geography. Indeed, the latter might be described as a series of chapters treating of the geographical aspects of other sciences—astronomy, geology, meteorology, botany, zoology, anthropology, strategy, economics, and history. The separation of school geography into two subjects, topography and physical geography, has probably done more than anything else to arrest its development as a discipline.

It is suggested that it would be quite possible to weave into the regional treatment so much as is needed of other sciences by taking these in *one at a time* in the successive stages of the strictly geographical argument. This idea will be most easily conveyed by sketching a possible course of instruction. Let it be divided into six stages, of which the first will be elementary, the next four secondary, and the last higher.

STAGE 1 (elementary).—It is agreed on all hands that the teaching of geography should commence with the home. This, however, involves among other things the observation of the apparent movements of the sun and stars, and hence their explanation by means of the globe. The lie and names of the continents and oceans would also be learnt upon the globe, and some idea of their chief contrasts won from the reading of simple stories of discovery, adventure, and travel, the teacher everywhere asking the pupil to contrast with the home conditions.¹

STAGE 2 (ages thirteen and fourteen).—This, which is usually omitted, should have for subject such a wider "home area" as would permit of the study of entire river basins, water partings, coast and hill forms, &c. The real study of the use of maps as opposed to mere plans and sketch maps would commence here, and this would be the approximate stage for the introduction of such ideas as the disposition, folding, faulting, and sculpture of rock strata as explanatory of the surface forms.

STAGE 3 (ages fourteen and fifteen).—Here the "home country," the British Isles, would be considered as a whole. The land-forms and essentials of structure would be quickly yet accurately conveyed by the use of the ideas and terms learnt in Stage 2, and time would thus be available for a thorough explanation of the climatic contrasts; a subject unsuited to Stage 2 by reason of the limitation of the area then studied. Moreover, the teaching of elementary physics by the science master would at about this stage render the fundamental ideas involved more easily appreciable.

STAGE 4 (ages fifteen and sixteen).—Here we come to the comparison of the home country with the great civilised countries of Europe. The physical facts, both morphological and climatic, would be conveyed quickly yet accurately by means of the ideas and terms learnt in Stages 2 and 3, and special stress would now be given to the political and economical facts. The pupils would be ready for these both by reason of their progress in history and of their increasing interest in the newspapers. Care would be taken to correlate the political with the physical. Problems and essays would be set.

STAGE 5 (ages sixteen and seventeen).—This would be devoted to the study of the whole globe, especially outside Europe. It might include more accurate astronomical ideas (*viz.* Stage 1), for which the pupils would have become fitted by reason of their mathematical studies; also the leading facts conditioning plant-life. Both of these contributions would be pertinent to the treatment of climates. The history of discovery (*viz.* Stage 1) would be utilised in explaining the chief place-names. The pupils would by this time have accumulated a considerable background of knowledge which would be appealed to. The increasing wealth and variety of the data would necessitate firm grip on principles and a logical method.

Therefore a specialist teacher would be advisable in order to obtain mental discipline, just as a classical sixth form requires a composition master.

STAGE 6 (university and college).—Here we should naturally find both deeper intension and wider extension. By the adoption in part of the general classification—*i.e.*, by the study of the distribution of particular types of phenomena—the student would become critical and be prepared for original research. On the other hand, by the complementary effort to construct a harmonious regional geography out of a great series of varied data he would be inspired with a broad and philosophical outlook.

Nowhere is the contrast between the general and the regional method more conspicuous than in the treatment of the wind system. The temptation is great to commence deductively from an imaginary landless globe. But this is essentially unsound because it implants wrong and unscientific habits of thought. The trade winds, for instance, should first be learnt and *realised as a great fact* in the description of the North Atlantic, the complementary wind being added in the description of the South Atlantic. The double system would then be found again in the Pacific and a generalisation demanded by the pupil which would presently be limited by the facts of the Indian Ocean. The Sahara Desert would carry the generalisation a step further and into apparently different phenomena. Only in the end would deduction from ideal zones or belts of climate be permitted by way of mental stocktaking.

The criticism of the practical teacher for such a scheme as is here outlined would probably be grounded on limitations of time. It is submitted that, with the pupils in geographical sets, specialist teachers, and agreement as to examination bases, very much might be accomplished even with the hours now usually available. At the risk, however, of appearing visionary it is further submitted that those hours should be extended on the ground that geography is one of six elements needed in any liberal as opposed to technical education. These elements are:—

- (1) Language, with reading and writing as its implements, and the mother, the foreign, and the dead tongues as its varieties.
- (2) Mathematics, or training in abstract thought.
- (3) Experimental science, or training in thought about concrete things.
- (4) History, or outlook through the time covered by human records.
- (5) Geography, or outlook through the space accessible to men.
- (6) Religion and philosophy.

It is submitted that the inclusion of these six elements in a general education is more essential than the study of several varieties of any one, *e.g.*, several languages or several sciences.

Apart, however, from any such theoretical argument, it is claimed that geographical teaching, if it deals with real conceptions and not merely names, trains in the mind a distinct power, that of thinking in terms of the map, of visualising intricate correlations, of ordering complex masses of fact—a power of the utmost value in the practical affairs of after-life. Geography rightly taught should tend to correct the academic bias of linguistic and mathematical study, the specialist bias of scientific study, and the archaic or sentimental bias of historical study. Its danger lies obviously in superficial knowledge and uncritical thought. Taught in the past too often by those who knew little of it, geography has no doubt deserved its inferior position among educational disciplines.

Finally, it is submitted that geography can be placed in its rightful position only by the simultaneous application of a four-fold policy:—

- (1) The encouragement of university schools of geography where geographers shall be made, of whom many will become secondary teachers.

¹ In the case of children not proceeding to secondary schools selected portions of Stages 2 and 3 must be taken in the latter part of the elementary training.

(2) The appointment of trained geographers as teachers in our secondary schools, either for geography alone or for geography and general help in other subjects.

(3) The general acceptance of a progression of method in the subject, not expressed in detailed syllabuses issued by the State or other dominant authority, which would tend to stereotyped teaching, but in a tradition similar to that which at different times has governed the teaching of language and mathematics.

(4) The setting of examination papers by expert geographical teachers.

It is obvious that these four measures must be applied simultaneously, for schools will not appoint specialist teachers unless there is a supply of them to select from; and yet a supply will not be forthcoming unless there be a promise of posts, nor is the teacher independent of the examiner or yet of the general esteem of his subject based on a belief in the value of its methods.

An Ounce of Fact.—The adoption of a new syllabus for geography in the London Matriculation and of geography as an obligatory subject in the Intermediate Examination of the Faculty of Economics and Commerce, coupled with the appointment of a holder of the diploma of the Oxford School of Geography as teacher of the subject at University College School, London, has contributed to results which are patent in the Pass List issued last month by the London University.

ITEMS OF INTEREST.

GENERAL.

DURING the present Session Prof. John Adams, of the University of London, is giving two courses of lectures which are open without fee to teachers. The lectures are delivered on Saturday mornings. The first course is being given at King's College, Strand, London, on the "Nature and Origin of Knowledge, and its place in Education." The second course will be given during next term in the Botanical Theatre, University College, London, on the following dates:—January 16th, 23rd, 30th; February 6th, 13th, 20th, 27th; March 5th, 12th, 19th. The subject is to be: "Temperament, Type and Character in Education." Application for cards of admission should be made to Prof. Adams, 5, Clement's Inn, W.C., giving full name and address, and also the name and address of the school in which the applicant teaches.

LORD LONDONDERRY addressed a conference of divisional inspectors at the Board of Education on October 13th. In the course of his address Lord Londonderry said that he had summoned the inspectors to explain some of the reasons for the recent changes in the organisation of the inspectorate of the Whitehall branch of the Board of Education. New authorities were now taking up the work of education in the country, and the present moment was one in which the official representatives of the Board throughout the country had a great opportunity. It was in their power to render invaluable assistance by co-operating with the new authorities in an educational policy which should be an increasingly fruitful source of benefit to the community. It was natural that the Board of Education should overhaul the organisation which existed before the recent legislation, and should make such changes as the new conditions required. The Board had appointed a chief inspector in the full sense of the term. Those officers hitherto known as chief inspectors, and now known as divisional inspectors, acquired increased powers, and had a greater measure of responsibility for the conduct of the affairs of the Board in their respective divisions. These divisional inspectors would be required to

visit the inspectors in charge of the several districts under their supervision. By this means, and by occasional conferences with the whole body of the staff in his division, each divisional inspector would promote the appreciation by the whole body of the inspectors of the policy with which the work of each in his own district should be in harmony. The interviews and conferences between the chief inspector and the divisional inspectors would be the necessary links in the chains of communication between the responsible heads of the Department and the district inspectors.

THE lectures and classes for the session 1903-4, conducted by the London Chamber of Commerce under its scheme of higher commercial education, commenced on October 7th. The success which has attended the lectures and classes during the past two sessions has induced the Chamber to extend its teaching. The lectures now include:—commercial and industrial law, commercial history and geography, banking and currency, political economy, accountancy and the methods and machinery of business. The classes are intended for advanced students only and have been arranged to promote the study of modern foreign languages from the commercial point of view. They include:—Spanish, French, Italian, German, Dutch and Russian. Classes in Portuguese, Chinese, Japanese, Hausa, Hindustani and English will be formed provided sufficient applications are received.

It will be of interest to many teachers of geography to know that lantern slides illustrating Tasmania and its resources can again this winter be borrowed from the office of the Agent-General for Tasmania, 3, Victoria Street, London, S.W. The slides are made up in complete sets of about fifty each, and with each set a pamphlet will be sent to assist the lecturer in describing the country. The only cost to the borrower will be the carriage on returning the slides, about one shilling. As some difficulty has been experienced in the past in allotting dates convenient to applicants, as many dates as possible should be given in every application.

THE National Home-reading Union is intended to guide readers in the choice of books so that they may at once arrive at a knowledge of those best suited to their needs. In order to give this useful information, the Union draws up book-lists on a large number of subjects, graduated in difficulty to suit all capacities. It also publishes three magazines monthly, containing articles on every subject chosen; the lists and the articles being prepared with great care by authorities on each subject. Besides this, tutorial help is freely given; questions are answered and papers corrected at the request of any member. Anybody may join the Union on payment of the small subscription. For the present session, the following are a few of the subjects which have been adopted for the special courses section:—(i.) The History of England's Naval Power; (ii.) Celtic Literature and Folk-lore of the British Isles; (iii.) Dante "Paradiso," &c.; (iv.) Mediæval Italy, especially Florence; (v.) Emerson and the Concord School. Full particulars may be obtained from Miss Mondy, Surrey House, Victoria Embankment, London, W.C.

A COURSE of free lectures to teachers on "Animal Life in a Freshwater Aquarium" is being given by Dr. A. C. Haddon, F.R.S., University Lecturer in Ethnology, Cambridge, at the Horniman Museum, Forest Hill, London, S.E., on Saturday mornings. Admission is by ticket only, to be obtained from the Clerk of the Council, County Hall, Spring Gardens, S.W. The main object of this course is to help teachers who wish to teach natural history in their schools. In order to save time, a certain amount of general knowledge of structural and systematic zoology is taken for granted. The living animal in its

natural habitat is the real subject for study, though the external features and those characters that can be noted by handling are constantly described; but anatomical facts, which can be learnt only by dissection, will be employed occasionally. The lectures are illustrated by living and dead specimens in the museum, supplemented by lantern slides. All students are strongly recommended to keep alive as many as possible of the animals referred to in the lectures, and to make notes of their habits, and drawings from life of their appearance in characteristic attitudes. All the books in the library bearing upon freshwater animals have been brought together, and they can be consulted in the library whenever the museum is open. The course is intended to interest teachers in freshwater animals, and to point out to them the mode of life and the main features of the anatomy and physiology of the characteristic creatures that live in our streams, ponds, and ditches, especially those which can be readily kept in aquaria.

THE annual conference of the National Federation of Assistant Teachers in public elementary schools was held in Newcastle-on-Tyne on September 26th. Mr. T. T. Cullum in his presidential address said that the time had arrived for drafting a code of regulations dealing with dishonourable conduct and any breach of professional etiquette which may arise out of a teacher's ordinary duties. He proceeded to raise such questions as: Is it unprofessional for a man to accept a salary which is less than £80 per annum? Is there a surfeit of examinations? Should capricious wanderers be admitted to the federation? Should a false standard be set up by a systematic detention of classes? and he referred also to an alleged *espionage* of colleagues, and abuse of colleagues with disparaging accounts of their abilities for self-aggrandisement, and asked, would the medical profession, for instance, tolerate any of the foregoing or similar mischievous conduct. The conference, in a series of resolutions, protested against the unwieldy size of classes and schools, and against attempts to revive the examination system; and recorded the opinion that the appointment and dismissal of teachers should be in the hands of local education authorities, and that religious tests for teachers in publicly aided schools should be made illegal.

AT the autumn general meeting of the Incorporated Association of Assistant-masters it was agreed that, although the most satisfactory method of bringing professional opinion to bear upon local education committees was by the direct representation of teachers upon such committees, the Association should press for the inclusion of assistant-masters in advisory committees where such were likely to be formed. A resolution was adopted stating that, inasmuch as the Association was fully representative of the assistant-masters in the secondary schools of London, and was the only association so representative, it should, in the opinion of the meeting, be allowed to recommend a member for election to the education committee for London about to be established. Another resolution was passed urging that meetings of the education committee for London should be public. Captain W. R. M. Leake, of Dulwich College, read a paper on "Cadet Corps."

THE School of Art Wood-carving now occupies rooms on the top floor of the new building of the Royal School of Art Needlework in Exhibition Road, South Kensington. We are requested to state that some of the free studentships maintained by means of funds granted to the school by the Technical Education Board of the London County Council are vacant. The day classes of the school are held on five days of the week, and on Saturday mornings. The evening class meets on three evenings a week and on Saturday afternoons. Forms of application for the free studentships and any further particulars relating to the school may be obtained from the manager.

ACTING upon the recommendation of the Advisory Board of Military Education, the Secretary of State for War has decided that there shall be no change in the subjects of examination, or in the mode of conducting the competition of candidates for admission to the Royal Military Academy and Royal Military College at the examinations to be held in June and November, 1904, and June, 1905. The subjects of those examinations will, therefore, be as laid down in the regulations reprinted in January, 1903, and separate lists for Woolwich and Sandhurst will be maintained. The special history period for 1904 will be from A.D. 1837 to A.D. 1870.

THE second international congress for the development of the teaching of drawing is to be opened during the first week of August, 1904, at Berne. Its aim will be to study the advantages and defects of methods of drawing instruction, to render these methods more helpful for the preparation of young students for their future professional duties, and to show the moral and educational value of drawing. The congress will consist of a general and an educational division. The general division will examine the results in different countries of the resolutions adopted by the preceding congress and study the ways and means of assuring the existence of a permanent international committee. The educational division of the congress is to be divided into two sections: (1) General Instruction; (2) Special Instruction. The duty of the first section will be to study the methods of drawing instruction and its social value, beginning at the kindergarten and proceeding up to university education. The second section will study everything concerning special instruction in professional, technical and artistic drawing. A special committee has been appointed to take steps to make the stay in Switzerland of visitors to the congress as pleasant and inexpensive as possible. M. Leon Genoud is the president of the organisation committee and M. C. Schloepfer the secretary, to whom communications should be addressed at Fribourg, Switzerland.

THE following resolutions were carried unanimously at a recent meeting held at Upton-on-Severn: That, in the opinion of this meeting of the Upton and Malvern branch of the National Union of Teachers, all teachers, both heads and assistants, in secondary endowed schools regulated by schemes made by the Charity Commissioners, should have a right of appeal in case of dismissal.

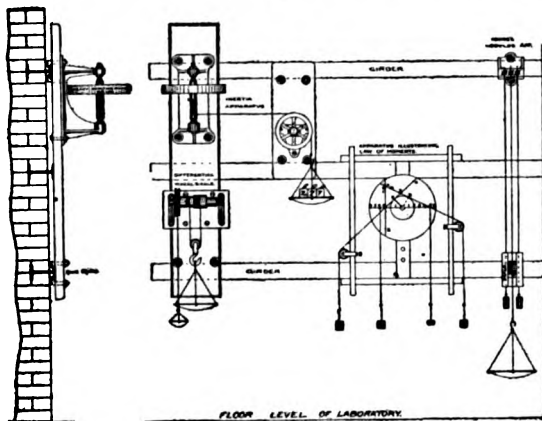
WE have to record the birth of a new educational periodical. The *Student*, a monthly journal for students and teachers, is edited by Messrs. J. W. Knipe and S. H. Hooke and published by the Omega Press, Fishponds, Bristol, at twopence a number. The first number contains twenty pages of interesting reading. Mr. Hooke contributes an article on a newly discovered seventeenth-century poet, Thomas Traherne; Mr. E. E. Elt describes some of the recent experiments with radium; and "Diogenes" writes on attention as a cognitive process, and in the course of his remarks includes the rather threadbare story of the teacher opening a lesson on "trousers." Among other features of the magazine are current educational topics, and impressions of an idle student, which consist of a brightly written commentary on the contents of the educational periodicals of the month.

So much of interest and practical guidance to teachers was contained in the numerous presidential addresses to different sections at the recent meeting of the British Association that there is some likelihood that many valuable expressions of opinion may be quite neglected. Prof. S. J. Hickson, F.R.S., in addressing the Zoological section, referred to the extraordinary current ignorance of the first principles of biological science. The science of natural history is, he said, as a closed book to

most of those who after a public school and university education have attained to positions of trust and responsibility in the government of our country and our cities. Moreover, and this is perhaps the most serious aspect of the question, there are many who have gained a high position as men of science, and whose opinion is frequently quoted as authoritative on questions affecting science in general, who are ignorant of the first principles of the science of biology. It is of importance for zoologists to consider and report upon the necessity for the extension and improvement of the teaching of natural history in schools and colleges. The objections that there is not time for natural history in the school curricula, and that it is not a suitable subject for the instruction of boys and girls, can be met, Prof. Hickson thinks, and overcome. In many foreign countries natural history is a compulsory school subject for all scholars. In Holland, for example, all scholars of the gymnasia during the first and second years devote two hours per week to the study, and in the fifth and sixth years all students preparing for natural, mathematical, and medical science courses devote two hours per week to the science. If time can be found in the middle and upper-class schools for the study of natural history in a country like Holland, where the general education is so excellent, surely time can be found for it here. The time is ripe for a full discussion by biologists of the particular form of teaching and study which is most suitable for schools and elementary university examinations.

THE programme of the examinations to be held in 1904 by the Society of Arts and the examination papers of 1903 have been published together by Messrs. George Bell & Sons. A certain number of copies of the pamphlet are supplied gratuitously to the secretaries of examination committees, other copies can be purchased at threepence. Certain changes have been made in the examinations in the practice of music; the subject of Spanish has been added to Grade I. of the preliminary examinations, and commercial geography (Grade II.) will in future be commercial history and geography, and commercial history will disappear apparently from Grade I.

MR. G. CUSSONS, of the Technical Works, 104, Great Clowes Street, Broughton, Manchester, has just completed an extension of his works and offices and provided a model laboratory and showroom where apparatus is exhibited, fixed and



ready for use, and where tests and experiments can be performed. Types of benches are shown with specimens of apparatus suitable for bench-work. Other apparatus is more suitably fixed to a vertical wall, and as in some instances the apparatus is heavy, it is necessary to have a very rigid attachment. In most schools, both old and new, no structural provision is made for this, and consequently wood plugs or

other means are adopted which disfigure the wall, and are never quite satisfactory. In building the new laboratory, Mr. Cussons adopted a plan of introducing lengths of light H-girder iron flatways into the wall, allowing the flange to project about 1½ inches from the face of the wall into the interior of the room. The girders are built in horizontally at heights of 3 ft., 5 ft., and 8 ft. from the floor level. It will be seen that, having once secured a rigid attachment which lends itself to the use of hook-bolts, clamps, &c., vertical boards or plates can now be affixed to the girders, and other horizontal boards introduced which will give a wide range of position for the apparatus. Various convenient brackets are also designed for suspending wires or for experiments—bending, elasticity, &c. The accompanying illustration shows a portion of the laboratory wall, with some apparatus in position. One great advantage of the arrangement is that apparatus can be easily moved from one position to another.

SCOTTISH.

THE resignation of Lord Balfour of Burleigh, Secretary of State for Scotland, has been received with regret by men of every shade of political opinion. In all the departments of public administration in Scotland, Lord Balfour has shown himself a strong, self-reliant man. But it was in the Department of Education that he found the greatest scope to play the rôle of the masterful man. It is no exaggeration to say that during his eight years' term of office the whole system of Scottish Education has been remodelled and reformed to its infinite gain. Payment by results, with all its attendant evils, has been abolished, and freedom of classification has given an elasticity to the whole system of elementary education, in marked contrast to the rigidity and cast-iron type of the old régime. But great as is the indebtedness of the elementary schools to Lord Balfour, that of the higher-class schools is still greater. When he assumed office, higher schools were in a state of inanition through lack of funds; they were ill-equipped and inadequately staffed, and unable to contend with the higher elementary schools with the resources of the public funds at their back. Lord Balfour educated the nation to see that higher education was a national question, and persuaded local authorities to recognise that higher schools have a first claim upon all funds allocated for secondary education. Throughout his whole period of office Lord Balfour has striven, and not unsuccessfully, to restore Scotland to the foremost place in the educational race. For this he deserves the honour and gratitude of all Scots.

MR. GRAHAM MURRAY, who has been appointed Secretary for Scotland, to succeed Lord Balfour, will be remembered for his brilliant exposition of the educational policy of the Department in introducing the Scotch Education Estimates. This appointment should secure the continuity of Lord Balfour's educational policy, which has already been fruitful of so much good to the country. Mr. Graham Murray has already declared himself opposed to introducing the principles of the English Education Bill into the long-looked-for Scottish measure. "Lord Balfour's great idea," with which he said he was in complete accord, "was that the measure should be thoroughly Scottish in its character, and should be adapted to the needs of the Scottish people."

THE annual meeting of the Educational Institute of Scotland was held in Edinburgh last month. Mr. A. T. Watson, M.A., in his retiring address condemned the Education Department for instituting for elementary pupils supplementary courses which bore on their very face the impress of specialisation on a too limited basis of general education. The Department had justified this action by saying that it was necessary to make the months or years added to a pupil's compulsory attendance

practically useful to him. But surely the way to do so was not to give him a smattering of new subjects, but to deepen and broaden his knowledge of the old ones. By this precipitate action the Department had foreclosed the discussion of a problem upon which even the most utilitarian educationists had not yet made up their mind. He recommended "My Lords" to consider well the shrewd and wise remark of Mr. Page, in his contribution to the British Association discussion on School Curricula. "The useful and practical," he says, "may be the end of education, but even so they do not become the best means to secure that end."

DURING the meeting the degree of Honorary Fellow of the Institute was conferred on the Right Hon. R. B. Haldane, M.P. Mr. Haldane, in thanking the members of the Institute for the honour they had conferred on him, said that it was an unwonted pleasure to find himself at a meeting where education was being discussed for education's sake. Usually when there was a crowded gathering on the education question it was in order that the interests of some church might be furthered, or the grievance of some other church redressed. The nation suffered from a lack of interest in education for its own sake. When they got that the casuistries and jealousies of sectarian partisans would have short shrift. The question of national education was going to become a practical one in connection with the industries of the country, and in the matter of inquiry he would press the educational as well as the tariff inquiry. Both would be found to lie at the very root of their commercial and industrial prosperity.

THE Scotch Education Department, in a circular, state that they are now prepared to consider applications for the Examination in Science of pupils in secondary schools, or in the higher-grade departments of elementary schools. Only those scholars who have received instruction in science in recognised schools, according to a curriculum which extends over three years, and provides throughout in every case for experimental work, will be eligible for the examination. An accepted course must embrace, as a rule, a minimum of 480 hours' instruction in science. The examination forms an integral part of the Leaving Certificate examination, but differs from other subjects in being chiefly oral and practical. In each school it will be based on the profession of work of that school, provided it be adequate in amount.

WELSH.

AT the last meeting of the Council of the University College of South Wales and Monmouthshire the plan for the new college was definitely selected. The college building fund was stated to have reached £70,000, but the architect estimates the cost of the whole scheme at over £224,000. It is intended to proceed with the erection of the Arts Department, the cost of which is estimated at about £70,000, the sum already promised.

IN the case of a dismissal of a teacher at the Bagillt National School, it is stated that the school received £420 from Imperial funds and only £6 in voluntary subscriptions. Mr. A. A. Thomas, in a meeting at Bagillt, said that the master was dismissed by "irresponsible persons without any reasonable cause. . . . When the County Council took over the school such injustice would be impossible and no teacher could be dismissed without their consent. No wonder, therefore, the teachers were anxious that the Act should be put into operation."

THE Corporation of Cardiff have proposed a scheme for an Education Committee, according to which all members of that Committee, except the women members, shall be members of

the Town Council. The Town Council wish this scheme to come into operation on November 1st. But meanwhile the Board of Education insist that there shall be outsiders of special knowledge of education co-opted on the Committee. The Mayor is reported to have said that to those acquainted with the Cardiff University College it was absurd to insist upon its representation by the Principal who had already been co-opted by the County. Perhaps so, but there are other persons of special educational knowledge, both in the University College and outside of it, in or near Cardiff.

MR. EDWARD JENKS, Reader in Law in the University of Oxford, and editor of the *Independent Review*, gave the opening lecture of the session to the Law Department in the University College of Wales, Aberystwyth. His subject was "the Myth of Magna Carta." This was a fearless inquiry into the external and internal evidence as to the asserted position that the most sacred rights of freedom and justice are definitely for the first time maintained and settled for all Englishmen by the Magna Carta. The case was strongly put, but, quite apart from any conclusion arrived at by the lecturer, the whole spirit and attitude of the specialist, who is at once an enquirer and a scholar, and who cares more for truth than tradition, made the lecture an object-lesson of investigation and stimulus to thought. All who heard it look forward to this lecture, by being reprinted, having a wider sphere of influence than the Law Department of a Welsh college.

THE discussion in the Conference of County Councils, called at Swansea last month was devoted to a consideration of a Scheme for a Joint Board for Wales which should have oversight of both elementary and secondary education. Such a scheme, if adopted by the Board of Education, would naturally involve the dissolution of the Central Welsh Board for Intermediate Education. Apparently the chief point of controversy was the burning question of the representation of the rural counties. Mr. Humphreys Owen pointed out that the proposed Board of fifty-one elected members was too large for an executive body and too small for a deliberative one, and that there was therefore room for the inclusion of representatives of various interests. Mr. Lloyd George urged that Glamorganshire and Monmouthshire had already made "considerable concessions to the smaller counties." This important point, as it may likely enough turn out to be, was left unsettled by the Conference.

THE Education Committee of Montgomeryshire has got to work. Co-optative members have been appointed by the Council, including eight ladies. The Committee itself has met. The chairman has been appointed. The meetings are to be open to the press. Meetings are to be held monthly and to alternate between the two chief towns of the county.

CURRENT HISTORY.

ON the 1st of September, King Edward in Vienna stated incidentally that he was on English soil, a statement which the Emperor Francis Joseph immediately repeated with implied assent. The apparent paradox is solved by remembering that the words were spoken in the British Embassy. According to the rules of international law, the dwelling place of an ambassador—a person sent to *lie* abroad for the benefit of his country—is technically a part of the possessions of the country he represents. The ambassador *can*, within those limits, exclude the jurisdiction of the surrounding territory. But in these modern days many of the privileges thus held are waived, and it is only in such towns as Peking that the ex-territoriality of embassies is practically important. A hundred years ago it was not so. Till then, ambassadors' houses were often the refuge of

criminals fleeing from the law of their country, and many scandals arose out of the custom. Similar immunity could also be obtained in such outlaw places in London as the "Savoy," the "Fleet," &c. But the "law of the land" now rules everywhere and the privileges of ambassadors are but a survival of such sanctuaries.

SOME ten-year-old correspondence of Cecil Rhodes has recently been published. The letters were addressed to the then Prime Ministers respectively of Canada and New South Wales. It is interesting to note that he found it necessary to say in postscripts that he was the Prime Minister of the Cape Colony, as he thought his correspondents "might not know who he was." The incident presents a curious picture of the British Empire four years after the first Jubilee of Queen Victoria. The responsible statesmen of the component parts of this great whole did not know one another by name. What lesson can we learn from this fact, a fact which will be interesting for the future historians of our Empire to record, or at least bear in mind? Shall we say that events move rapidly and that those who were so far apart as to be mutually unknown ten years ago have now come together in hearty union and are working out an even closer federation? Or shall we think rather that Imperial Federation is still, spite of all the talk, a matter for the few, and that it is not yet adopted heartily by the inhabitants of British dominions either this side or beyond the seas? It was the few that brought about Italian unity; it was not the whole even that brought about the independence of "America." There were "loyalists" who settled at Halifax.

NEW ZEALAND is still progressing in her socialistic and what used to be called "grandmotherly" legislation. Mr. Seddon has introduced a Bill "providing penalties for unreasonable trade competition or for unduly enhancing the prices of articles of common consumption." Till the end of the eighteenth century, county justices in England fixed the "assize" of bread and ale, but we here have long considered such regulations futile and believe (or are we now beginning to doubt?) that such matters are best left to the laws of supply and demand, best even in the interests of the poorest consumers. But quite apart from such obvious contrasts, what is "unreasonable," what is "undue"? Such terms are found in international law, as, for example, in defining the duties of neutrals towards belligerents, because in this department exact definition would be useless, not to say impossible. But New Zealand purposes to appoint three judges to decide the meaning of these indefinable terms in any case that may arise. Will our readers try to imagine the amount of wisdom required of these judges? Will they picture a New Zealander asking, "Please, may I open a shop?"

A PRIVATE letter from Chicago recently stated that "men are murdered every day by the labour unions, that these crimes go unpunished and permitted by the police. You cannot dismiss your cook nor your janitor . . . without discussing the matter with walking delegates." The remark which would rise to our lips on hearing, and believing, this statement would be a comment on the growth of democracy and of wonder what a republic is coming to in these days. But this thought is checked when we read also that in Russia the Minister of the Interior has "notified the employers of labour that all concessions to the working men which might be necessary to prevent strikes and resultant disturbances must be granted. If the employers proved obstinate they would be sent to Siberia." It seems, therefore, that autocratic Russia aims at the same objects as the democrats of the United States of America, and endeavours to attain them by similar means. What can be the explanation of this similarity between two apparently opposite forms of government? Is it that, at bottom, all governments are alike in being

based on public opinion unless that opinion is overawed by armed forces, and that the *form* of government is a matter of comparative unimportance compared with the power that maintains it?

RECENT SCHOOL BOOKS AND APPARATUS.

Modern Languages

Dent's New First French Book. By S. Alge and W. Rippmann. 277 pp. (Dent.) 1s. 6d. net.—This is a completely revised edition of one of the most popular First French books published in England for many years. All teachers of modern languages should be grateful to Prof. Rippmann for introducing Herr Alge's methods into England; thereby the dreary grind of Ollendorff and Chardenal has been almost, if not entirely, abolished. Whether the best results are attained by exactly following the Swiss method, or by an intelligent combination of what is best in the old and reform methods, can be proved only by the experience of time. Mr. J. A. Symington is to be complimented on the excellence of his four pictures of the Seasons, which are far more Gallic than the former copies of Hölzel.

Première Grammaire Française à l'usage des élèves étrangers. Par H. E. Berthon. 167 pp. (Dent.) 1s. 6d. net.—Hitherto, teachers have had to use a French grammar in English, or one in French, written for French-speaking pupils, wherein the peculiar difficulties of foreigners were not explained. Now the Taylorian Lecturer in French at Oxford has compiled a grammar from the English pupil's point of view, only it is all in French. There are two introductory chapters on phonetics, and then the author follows the usual order of parts of speech. In the chapter on the verb, the reader will note that M. Berthon casts away the traditional division of the four regular conjugations, and divides verbs into two classes, the living conjugation and the dead conjugation. To the former (about 4,000 in number) belong the verbs ending in *-er* and *-ir* increasing (as *finir*); to the latter (about 120) the remainder of verbs in *-ir* and all those in *-oir* and *-re*. Another change he makes is in rejecting the old unscientific derivation of tenses, which a pupil has to unlearn when he advances further into the knowledge of the language and discovers that all French tenses have been derived from the Latin and not from one another. Altogether this is a book that every modern-language teacher ought to possess, even if he prefers to let his pupils write their own grammar.

Récitations et Poésies. Edited by Violet Partington. 78 pp. (Marshall.) 2s.—This is even a more delightful book for little girls learning French than Miss Partington's short plays that we noticed some months ago. It contains twenty-seven short French poems for recitation. On one side of the page the pieces are printed in ordinary spelling, and on the other in phonetic transcript. It was a particularly happy thought to include that enchanting French song, "Ma Normandie," which no one ever forgets who has learnt it in childhood. On every page is an illustration by A. M. Appleton that adds much to the attractiveness of this well-produced little book.

Les Français d'Autrefois. By Jetta S. Wolff. 88 pp. (Arnold.) 1s. 3d.—This book, by the authoress of "Les Français en Ménage," contains short stories from French history written in simple language for beginners. Many modern-language reformers have pointed out the advantage of the pupil's reading being confined to French subjects instead of dealing with, say, "A Massacre in China" or "The Story

of a Parrot." The period covered in this book is from Clovis down to Louis XIV. A companion work dealing with France and the French of to-day would, in our opinion, interest boys and girls even more than the present work. There are eight pages of short notes and a sufficient vocabulary.

The Nibelungenlied, Selections from. Part II. Edited by H. B. Cotterill, M.A. 54 pp. (Blackie: Little German Classics.) 6d.—The selections from the great German epic are very apt and should be of much value to the student of German literature and philology. The little book will also be interesting to very many young readers. The notes and vocabulary are ample and exhibit careful research in preparation on the part of Mr. Cotterill.

Abstracts of Impromptu Oral German Lessons. By M. Hermann. vii. + 63 pp. (Hodgson.) 1s. net.—Twenty lessons in German are included in this little volume, each consisting of leading remarks made by a teacher addressing a class. The sentences are simple and their meaning is to be explained to pupils by objects and actions. Fundamental grammatical principles are introduced and many proverbs are used as subjects of remark. There seems to be too much for the teacher to do and too little for the pupil, but with adults the lessons might lead to conversation. The demonstration or pantomime method of teaching a foreign language facilitates the understanding of the spoken word, but it does little to encourage pupils of average capacity to speak for themselves.

Classics.

Sallusti Jugurtha. By I. F. Smedley. xxxvii. + 172 pp. (Blackwood's Illustrated Classical Texts.) 1s. 6d.—With Mr. Summers's "Jugurtha" fresh from the press, it cannot be said that a new edition of this book is needed. Nor can the present editor, so far as we are able to judge from his book, claim a hearing for first-hand study of the text, or any new light he has to throw on his author. The book is a creditable performance, and is not likely to lead readers astray; but we prefer Mr. Summers, who has all that Mr. Smedley has, and more. To pass to the book itself: the only points to note in the Introduction are the sections dealing with the Numidians, and the political consequences of the Jugurthine war, which are clear and useful. The account of Sallust's style is too sketchy to be of any great value. The proper names are collected in the form of an index. As regards the notes, they contain too many matters which are better left for the pupil to find out, or, at least, for the teacher to attempt to elicit. Thus the reason for the subjunctive in *quod regatur* (i., 1) might well be asked for; if it is correctly understood, there is a step taken by the pupil; if not, at least his curiosity may be awakened, and he is no worse off than he was. Placed in the notes, such a thing becomes merely a fact to be got up, probably to be hated from the first, since the curiosity has not been awakened before the answer was given. Editors will never learn *ὅσα πλέον ἤμισυ πάντός*. When the meanings of *ingenium*, *facinus*, *virtus* (more than once), *res*, and other such words are all given plain, what is left? On the other hand, many of the notes are defective; thus, the pupil ought to be warned against using a prepositional phrase for an adjective (x., 1), and should not be left to imagine that *moribus* implies degeneration, as he certainly will do after reading the note on iv., 7. Many of the notes are good, however, and the chief fault of the book as a school book is that it contains too much. The illustrations are useful; they include pictures of arms and armour, and a bust of Scipio.

The Story of Rome, as Greeks and Romans tell it. An Elementary Source Book. By G. W. Botsford and L. S.

Botsford. x. + 328 pp. (The Macmillan Co.) 4s. 6d.—The authors have with much skill pieced together a continuous narrative consisting almost entirely of quotations from Livy, Cicero, Dionysius, Plutarch, Polybius, and other authorities. Only slight additions which are necessary here and there to link the parts together are enclosed in brackets. The book can be cordially recommended as a companion to the school history.

Cicero: Tusculan Disputations. Book I. and The Dream of Scipio. Edited by F. E. Rockwood. xlv. + 109, xiii. + 22 pp. (Ginn.) 4s. 6d.—These two works are well suited to stand together, as dealing with the ancient philosopher's views of a future life. The "Dream" has been edited before, but we are not acquainted with an edition of the Tusculans suited to the needs of those whom Professor Rockwood has in view. The book will not be quite proper for schools, because the notes are printed at the foot of the page, but their character is somewhat elementary. The book, like others of American origin, seems to be aimed at minds more mature than "beginners in Latin" generally are in this country, and the introduction is on a higher level than the notes are, although some of the latter are distinctly good (e.g., on ch. xiii.), and all are admirably pithy. *Defensio* (i. 1), as the editor should know, is not confined to "defence," but like *defendo* may be used of a lawyer maintaining any position. There is no need surely to give short biographies of Hesiod and Archilochus (p. 3); such information is best left to the dictionaries. There is too much translation and the metrical knowledge is faulty; thus the last foot of the line quoted on p. 27 is a bacchius, by a common effect of accent, not a molossus.

First Steps in Caesar. The Expeditions to Britain, De Bello Gallico, IV. 20-36, V. 8-23. By Frank Ritchie. vii. + 95 pp. (Longmans.) 1s. 6d.—The long and complex sentences of Caesar are here broken up and the parts presented separately before combination. The first part consists of selected sentences treated in this way. Part II. contains the text of Caesar with preparatory sentences of the same kind; and Part III., the text without these aids. There is also a sketch of Latin syntax, a few notes, and a vocabulary. The principle is good; and if Mr. Ritchie is not the first to apply it to Caesar, it is fully a generation since we have seen the prototype of his book used in schools. Unlike most school editions, this is a real help to learning and is educational.

Stories from the Latin Poets: The Romance Readers (3). Edited by C. L. Thomson. x. + 176 pp. Illustrated. (Horace Marshall.)—This is an excellent reading-book for young children, and has the same simplicity and grace as the other books which Miss Thomson has edited. The stories, taken from Virgil and Ovid, are well suited to interest children, and may help to enlighten the general ignorance of literature in "modern" schools.

Latin Grammar Rules. By W. H. S. Jones. 43 pp. (The Norland Press.) 6d. net.—Here is a useful little book compiled by the author for use in the Perse School, Cambridge. It is a concise digest of Latin syntax rules, such as might be put into the hands of a boy after his first year of Latin. It contains nearly all the matter that should be constantly kept before him during his second and third years for the purposes of both reading and composition. The rules are clearly and simply stated with sensible examples; but the chief merit of the book is the idea of liberally interleaving with blank pages so that each scholar may make his own collection of examples. Herein—the active coöperation of the taught—is the real educative process to which, after all, the best of teaching is but com-

plementary. Such a neat note-book as this must needs prove alluring—even to the clever boy. Of course the ordinary grammar must be used along with this note book: but it is much to have such a good selection of the essential points. If this selection errs we think it is on the side of brevity: e.g., more of the difficulties which inevitably accompany a boy's early use of the ablative absolute, of the gerundive (especially with *curo docendum filium*), and of *cum* with indicative, might have been indicated. But, on the whole, it is a handy little collection which might well be used elsewhere than at the Perse School, and its price is only sixpence.

Horace: Vol. II. The Satires, Epistles, and De Arte Poetica. With a Commentary by F. C. Wickham. Introduction and Text not paged + 383 pp. (Clarendon Press.)

This volume is a revised edition, substantially the same as that of 1891, as the editor tells us in his preface. In the "Odes" Dr. Wickham found a subject congenial to his delicate literary taste; and, if the subject matter of the "Satires" and "Epistles" does not give him equal scope for his peculiar talent, his treatment is marked by sound judgment and sufficient learning. His Introductions are especially good, and they are a model of clearness and good sense. We note that he places the "Ars Poetica" near the end of the poet's career, which we feel to be the most reasonable view in spite of what has been written against it. Dr. Wickham's critical principles need not detain us here, for the text and critical notes are reprinted from the edition in the Oxford *Bibliotheca Classica*; his interest, moreover, lies in a different direction, and it is as an interpreter that he shines. We are no friends to multiplying illustrations, but we think that a commentator on Horace ought to draw more largely on Plautus and the colloquial writers than Dr. Wickham has done: take *si me amas*, Sat. i. 9.38, and *utne* ii. 5.18 for examples, or the form *surrexe*, i. 9.73, and several metrical licences. The case of *studiorum* (i. 10.21) also needs a note, and the long final in S. ii. 1.82 *condiderit*, whilst there are a number of other passages we have marked where explanation and illustration would be useful. But these are chiefly on points of grammar, in which Dr. Wickham does not seem to be greatly interested. From the exegetical point of view, although we do not agree with all Dr. Wickham says, his edition is on the whole admirable.

Edited Books.

The Moral System of Shakespeare. By Prof. R. G. Moulton. 381 pp. (Macmillan.) 6s. net.—This is a book permeated with the scientific spirit; whether it is more successful than many of the volumes which endeavour to demonstrate scientific principles underlying literature may be doubted. It is, perhaps, inevitable that the scientific tendencies of the age should express themselves in this fashion, and invade the various provinces of art. But Prof. Moulton has managed to write an interesting book, if not a convincing one; he has based his result on a careful study of Shakespeare's plots, and by a process of literary sifting he has managed to co-ordinate certain so-called principles into a "moral system." The volume stands to Shakespeare's plays in much the same relation as a handbook of theology bears to the Bible, only it is so much more interesting. It is suggestive and stimulating, and, to those who love the methods of literary analysis, shows how culture can grapple with literary problems and disclose principles where the ordinary observer only perceives pleasures. Some of the chapters in Prof. Moulton's book richly repay a reader, and attention should be drawn to his frequent comparison of Shakespearean with ancient classical drama; to his discussion of comedy and his analysis of humour; to the elaborate and careful examination of the part played by the supernatural in Shakespeare; and in particu-

lar to his analysis of the character of Macbeth, which is very unlike Prof. Beeching's contention, that Macbeth was conceived by Shakespeare as a poetic figure.

Selected Essays of Bacon. Edited by A. E. Roberts. 76 pp. (Bell.) 2s.—Only eight of these well-worn works are included in the present collection, and most of these are familiar in our mouths as household words, although we do not believe that Bacon wrote Shakespeare also. The edition has been admirably managed from the purely editorial point of view; and the two portions of the introductory matter which deal with the essay form in general, and Bacon's essays in particular, and with the characteristics of Bacon's style, convey a great deal of terse information aptly put. The notes are excellent, and the whole performance is highly praiseworthy. Analyses are appended to the notes; but Bacon's thought is not the easiest thing in the world to analyse.

The Greenwood Tree. A Book of Nature-Myths and Verses. 221 pp. (Edward Arnold.) 1s. 3d.—This is the best of Mr. Arnold's literary readers that has come under our notice. The title is taken from the well-known Shakespearean lyric in "As you Like It," and in this case it cannot be objected that it is rhetorical. It is really a charming collection of admirably edited matter circling round natural objects and phenomena, with a liberal sprinkling of old-world stories thrown in to illustrate to a non-mythical age ancient conceptions of things which to moderns are perfectly dull and familiar. It would be invidious to single out special extracts where all is of all round excellence. It is, however, worth while to note that the names of Landor, Robert Buchanan, Drummond of Hawthornden, and Michael Drayton are included; and in the same liberal spirit so is Psalm cvii. of David.

As You Like It. By Flora Masson. xxiv. + text + xlvi. pp. (Dent.) 1s. 4d.—An edition to which high praise must be given, not so much for the scholarship it exhibits as for the artistic manner in which it is presented. As we have said before concerning this series, it is the very thing to assist most powerfully in creating an enthusiasm for Shakespeare in young minds, because, while the learning displayed is not obtrusive, the illustrations are calculated to fascinate attention; and however much scholarship may go to the making of some editions, this is unquestionably a most attractive one to the eye. The illustrations by Miss Curtis are praiseworthy, and the mainly linear reproductions from old sources which abound in the notes, glossary, and introduction are splendid. The notes and glossary are also worth a word of commendation.

Selections from Longfellow. By A. E. Layng. 32 pp. (Blackie.) 2d.—The poems in this little booklet have been selected from the American poet's shorter works by a careful editor, who supplies brief but happily expressed notes when necessary. The collection is quite in line with others in this useful series, which we have often praised before.

Handbook to the Book of Common Prayer. By the Rev. Prebendary Reynolds. 502 pp. (Rivingtons.) 4s. 6d.—Unqualified praise must be given to this volume. Among many excellent in this series, it is pre-eminently the best. The point of view is of course that which is known as High Church; but whatever is stated is convincing in its tone, as well as sober and practical in its method. It is, indeed, the "practicability" of this volume which constitutes its main feature, and will undoubtedly contribute to its extensive use. To write at length upon Prebendary Reynolds' treatment of so large a subject as the history, construction and devotional use of the English Liturgy would be impossible here, and is quite unnecessary.

Teachers will find in this rather bulky volume a mine of information—all, indeed, that by any chance they can want; and the happiest of illustrations, blackboard-lesson schemes, and explanations also.

The New Testament in Modern Speech. An Idiomatic Translation into everyday English from the text of "The Resultant Greek Testament." By the late R. F. Weymouth. Edited and partly revised by E. Hampden-Cook. xvi. + 674 pp. (James Clarke).—This is a reverent and scholarly attempt to express the chapters of the New Testament in good modern English. With great discrimination the translators have on one hand avoided any approach to slang, and on the other made no use of stilted and unnatural expressions. Read side by side with the authorised and revised editions the book should prove of assistance in enabling the reader really to understand the meaning of the original words. As in the Revised Testament, the division into verses is indicated only in the margin; quotations from the books of the Old Testament are printed in capitals, and the reference follows the quotation in brackets. Well-selected and helpful notes are printed at the bottom of the pages, and the whole system of typing greatly enhances the attractiveness of the volume. The publication of this translation of the New Testament is opportune, and we wish it a wide and increasing success.

History.

The Life of the State. By Geraldine Hodgson. 239 pp. (Horace Marshall.) 2s. 6d.—This little book professes to supplement the ordinary school histories of England by giving an account of the growth and present working of the English constitution in all its departments—legislative, executive, judiciary. Its aim is both educative and moral: educative in that it traces the historic development of English institutions, moral in that it attempts to suggest to its readers the "indispensable duty" which they owe to their State. It is impossible not to admire the spirit and intention of the writer; but there, we fear, admiration must end. The book lacks arrangement. No division into paragraphs, no headlines guide the reader on his meandering way. It lacks proportion. Main outlines are obscured by illustrative examples and lengthy quotations. It lacks style, and so makes heavy reading. Such a sentence as "It is not so easy as it may seem to talk about Freedom or Liberty, for the two words will be used interchangeably in this chapter" is ambiguous. It suggests that the interchangeable use of the two terms is the cause of the difficulty of talking about that which they connote. Again, much in the book is bewilderingly irrelevant. The writer says to the reader, "Our ostensible business is the State in which we live," and yet she treats at length of the politics of Athens and Rome, she attempts a summary of eight centuries of European history, she quotes incessantly from Aristotle, Plato, Marcus Aurelius, and other non-British heathens, and she adorns her pages with much poetry. It is not marvellous that among so many incongruities some errors have crept in. It was in 323 A.D., and not 306 A.D. (p. 74), that Constantine accepted Christianity. Even then he did not "establish it as *the* religion of the Empire," he merely recognised it as *a* lawful religion. Moreover, to talk metonymously of Christianity at that date as "the Chair of Peter" is seriously to antedate the dominance of Rome. The Bishop of Rome was not even present at the Council of Nicæa. Again, the Roman legions withdrew from Britain *not* 401 A.D. (p. 85) but 410 A.D.; the struggles between the kingdoms of the Saxon Heptarchy lasted *not* six centuries (p. 85) but scarcely three; the ephemeral committee established by the Provisions of Oxford was *not* the germ of the modern Privy Council (p. 135); our island has *not* relied for its defence upon its sailors for 1200

years (p. 197), its sailors did little for it from Alfred's day to the day of Hubert de Burgh. Thus, in spite of its admirable purpose, this book is scarcely one to recommend.

The New Cambridge Curriculum in Economics. By A. Marshall. 34 pp. (Macmillan.) 1s. 6d.—Is an exposition by the Professor of Political Economy at that University of the reasons for the Tripos shortly to be established there, and of the course of study to be pursued in connection therewith. That Tripos is intended for those who will occupy leading positions in the commercial and political world, and those of our readers who have the opportunity should bring it to the notice of parents.

Geography.

Philip's Comparative Large Schoolroom Series of Wall Maps. 80 in. by 63 in. *Europe, and Europe Test Map.* (Philip.) 18s. each.—These maps are excellent examples of what one might term pedagogic cartography. Coloured in the orthodox greens and browns to represent lowlands and highlands, with dark-blue river-markings and light-blue sea-gradations, they appeal to the eye as effectively as the excellent Sydow-Habenicht series of the same publishers, of which, indeed, they are markedly reminiscent. Pre-eminently they are maps for the schoolroom. Most practical teachers, however, would vote that of the two the test map is the better adapted for the object of the series. In the ordinary map the very boldness of the red and blue lines (marking land and water routes) seems to overreach itself, and cause confusion; in the test map, on the other hand, all is clearness itself, from the plateaux of Southern Europe to the continental shelf upon which our own islands stand. We suspect some printer's oversight in the curious *sections* of rivers given in Germany (only), and in the arrangement which places hollow circles for towns in the lower quarter of the map, and nowhere else. The result, however, does not militate against the profitable use of the maps (the "oversight" only occurs in the test map), which we heartily commend to all pedagogic geographers.

Handbook of Commercial Geography. By G. G. Chisholm. 4th Corrected Edition. 685 pp. (Longmans.) 15s.—In this new edition of a well-known and justly-esteemed work much has been re-written and much has been added. Fourteen years ago the book first appeared, and during that period has grown into a volume more than 26 per cent. larger in bulk and price than the original "Handbook." To enumerate the new things would require much more space than we can command. Let the curious turn to the maps of India, the three excellent sections on the Trans-Siberian railway, and the able chapter on China, if he wish for typical examples. To our own mind, the masterly account of the commercial geography of the United States appeals as one of the best things in the book. It is a subject which might easily run away with a less level-headed author; but Mr. Chisholm, while omitting nothing of the great developments which in the last decade have put the States in the very forefront of the world's manufacturers and merchants, keeps his subject absolutely under control. All his maps, again, are improved; their striking quality is that of *clearness* attained by suppression of all unnecessary detail. The coal, cotton and iron diagrams of the Introduction and the rainfall types of the chapter on climate are also beyond criticism. Indeed, we know of no other book on this subject that can for a moment compare with Mr. Chisholm's "Handbook." To teachers of *all* kinds, classes, and branches of geography it is simply invaluable.

The World and its People. Asia. vi. + 359 pp. (Nelson.) 1s. 6d.—Messrs. Nelson are giving us a new series of Geo-

graphy Readers, and, if the other members of the series are as well done as "Asia," they will be well worth adopting. The first four chapters give a bird's-eye view of the continent and broadly show the connection between its history and geography. Dr. Hedin's journeys in Central Asia furnish material for a "trip" across Asia, and the continent is next circumnavigated. After a brief sketch of the climate, plants and animals, the political divisions are dealt with, special prominence being given to the British Possessions. One notes, with pleasure, that the best sources of information have been utilised in the writing of the book, consequently it may be thoroughly relied upon. Numerous illustrations, plain and coloured, add to the value of the book; maps, likewise, are in abundance, but we cannot commend the physical maps—they are, as a rule, far too complicated for school use. However, this new Geography Reader is a distinctly good one, and the writer (anonymous) is to be congratulated on his efforts to give us an up-to-date account of Asia.

Australasia. By L. W. Lyde. vi. + 72 pp. (Black.) 1s. 4d.—Prof. Lyde's books on geography are well known and justly admired. The present volume is planned on the same lines as the author's other books dealing with the continents. It includes the geography of Australia, New Zealand, Oceania and the East Indies.

Science and Technology.

Outlines of Psychology. By Prof. Josiah Royce. 392 pp. (The Macmillan Co.) 4s. 6d.—This new volume is well deserving of a place in the teachers' professional library. It should rank with Prof. James's famous text-book as one of the most lucid and illuminating treatises on the subject of psychology. Students of the theory of education will find it of great service. It bears on every page the stamp of a master thinker who knows his subject in its practical bearings upon pedagogy as well as in its relation to modern biology and physiology. We have found its pages so full of freshness and interest, so close in touch with the problems which science is raising and earnest teachers are anxious to solve, so shrewd and wise in its counsel, that it has been a real pleasure to read the book. We shall return to it for guidance again and again, and keep it close to our hand for frequent consultation. If there are any still doubtful about the value of psychology to a teacher, we should recommend them to read Prof. Royce's chapters dealing with the physical and nervous conditions of mind, and to study his analysis of sensory experience and the general laws of docility. Nowhere else is the intimate connection between perception and action so clearly brought out, and the processes of differentiation, assimilation and reasoning seem in these pages to become living things. The conditions of mental initiative are discussed with great insight, and the educational value of persistency and restlessness is illustrated with remarkable clearness. "The most successful of human beings are the men who are in some respects prodigiously restless," and at the same time continuously persistent. This is altogether a most original and valuable handbook of psychology, which we can heartily recommend to all interested in education.

Contemporary Psychology. By Prof. Villa. Translated by Harold Manncorda. xvi. + 396 pp. (Swan Sonnenschein.) 10s. 6d.—Prof. Muirhead, the general Editor of the Library of Philosophy, has done well to include a translation of Prof. Villa's "Contemporary Psychology" in this valuable series of works, a series which includes Erdmann's "History of Philosophy," Bosanquet's "History of Æsthetic," Bradley's "Appearance

and Reality," and Stout's "Analytic Psychology." These books are not easy reading and are not intended for beginners. Nor is the perusal of Prof. Villa's volume to be lightly undertaken. Indeed its value can only be appreciated by those who already possess some sound acquaintance with the subject of which it treats. By them, however, it will be welcomed for its well-weighed and well-balanced opinions, for its conspicuous fairness and avoidance of dogmatism, and for its admirable presentation of the salient problems of psychology in clear historical perspective. As he says in the preface: "The origin of the problems of contemporary psychology, their genetic relation to general philosophy, natural science, and the social and moral sciences, and the different aspects they assume in the various scientific systems of the present day, make up the subject matter of my work. In an age like the present, in which the historico-genetic method is justly considered the best adapted to the solution of scientific problems, it seems advisable to apply it also to psychological questions which, owing to their great complexity and original diversity, continue to present many points of extreme difficulty and uncertainty." That Prof. Villa has been successful in his efforts will probably be the opinion of all who have, by careful training and native breadth of mind, any right to pass judgment on a work which itself shows that both these qualities are possessed by the author.

An Introduction to Nature Study. By Ernest Stenhouse. (Macmillan.) 3s. 6d.—This book is apparently intended as a guide to teachers desirous of introducing simple lessons in Nature Study into their schools. We imagine it is not meant to be put into the hands of the pupils. The course is judiciously selected and might well be employed with students of more tender years than the "intelligent youth of sixteen" mentioned in the preface. The first part consists of botanical, the second of zoological subjects. In each chapter there is a series of well-chosen questions to be answered by direct observation and a summary containing a general account of the object under examination. The method involves a good deal of repetition, which appears to us rather cumbersome. There is a large number of illustrations, some of which appear hardly worth insertion. Many of those of flowers and trees, reproduced from photographs, might with advantage be removed to make room for omissions which the exigencies of space have imposed upon the author. The text is not entirely free from mistakes—there is an obvious slip on p. 108 in the statement that "in pin-eyed flowers the style is short," while the remarks on the cuckoo and on the first sound of the heart are too dogmatic. Such mistakes as do occur will be readily detected by any person with a knowledge of biology, but might well be accepted as fact by teachers without this training. The chapters on domestic animals are capital and well worth reading by anyone. A very complete index adds greatly to the usefulness of the book, which is sure to be welcomed by a large number of teachers throughout the country.

The Wonderful Century. The Age of New Ideas in Science and Invention. New edition. By Alfred Russel Wallace. xii + 527 pp. (Swan Sonnenschein.) 7s. 6d. net.—Dr. Wallace has made many additions and alterations in the new edition of his now well-known book. The chapters on locomotion, photography, and chemistry have been greatly extended, and chapters on electricity, the solar system, the sun, and the stars have been added. The long essay on vaccination has been omitted. These changes add greatly to the value of the work as an interesting history of the development of science during the last century.

Elementary Practical Chemistry Part I. General Chemistry. By Frank Clowes and J. Bernard Coleman. Fourth Edition. xv. + 198 pp. (Churchill.) 2s. 6d. net.—The publication of the General Chemistry in this popular “Elementary Practical Chemistry,” apart from the chapters dealing with qualitative analysis, provides science masters in secondary schools with a course of practical chemistry which will suit their particular requirements excellently. The book of which this is a part is already so well known that an extended notice is unnecessary.

The Arithmetic of Elementary Physics and Chemistry. By H. M. Timpany. 74 pp. (Blackie.) 1s.—Teachers will find in this little book a good selection of numerical exercises on specific gravities, moments, centres of gravity, specific and latent heats, and the calculation of weights and volumes of substances taking part in chemical reactions. But many parts of elementary science which lend themselves to numerical treatment are not included. Pupils have now to buy so many books that we suspect few teachers will require the purchase of this volume by their students.

Mathematics.

Elementary Geometry. Theoretical and Practical. By C. Godfrey and A. W. Siddons. xi. + 355 pp. (Cambridge University Press.) 3s. 6d.—The recent discussions on geometry are now bearing fruit in the form of text books that neither are nor profess to be editions of Euclid. Last month a short notice was given of “A New Geometry” by Messrs. Barnard and Child; now we have another book which can be cordially recommended to the consideration of teachers. Part I. (pp. 1-59) is entitled “Experimental Geometry” and consists of an excellent course for beginners in geometrical drawing. The section has been written with great care and contains much more matter than the comparatively small number of pages it occupies would indicate. The inclusion of a brief discussion of the simpler solids is much to be commended; the numerical examples seem to be varied and well chosen. The greater portion of the book (pp. 63-355), forming Part II., is devoted to theoretical geometry, the treatment following the lines of the new syllabus adopted by the University of Cambridge. All the essential theorems of Euclid’s first six books are included, but the exercises contain problems of a practical kind that introduce ideas (for example, the notion of an envelope) that lead to results outside the scope of Euclid’s Elements. It is certain that the subject of geometry is presented in this book in a more interesting way than in Euclid and that the logical training the course here developed provides is not less thorough than that of the ancient geometry. Doubtless the test of time may reveal imperfections; some portions seem to us not so good as they might be made. But teachers have now ready to hand two excellent works, and we may reasonably hope that the newer methods will get a fair trial. The real test of these methods is to be found in the results obtained by applying them in the schools of the country. Criticism of details is at present of less importance; if the broad outlines are well planned, defects in details will soon be put right.

Theoretical Geometry for Beginners. Part II. By C. H. Allcock. ii. + 123 pp. (Macmillan.) 1s. 6d.—This Part contains the substance of Euclid’s third Book, Props. 1-34, and fourth Book, Props. 1-9; but several additional propositions, of the type usually given in the more recent editions of Euclid, are also included. Towards the end numerical applications are given, but the treatment of the subject is essentially on Euclidean lines, though Euclid’s order is departed from. The arrangement is generally satisfactory, and the exercises, which

are very numerous, and in many cases very easy and instructive, should help to develop the geometrical powers of the beginner.

Junior Algebra. Examination Papers. By S. W. Finn. vi. + 87 pp. (Methuen.) 1s.—The Papers are stated to be designed especially for candidates for the Oxford and Cambridge Local examinations, and for the College of Preceptors examinations. There are seventy-two papers, each containing ten questions, and for the purposes which they are intended to serve they seem very well drawn up; they include questions ranging from the first four rules to the binomial theorem, a few even bearing on the convergency of series.

Elementary Algebra. Part I. By Chintamani Mukerjee. ii. + 205 + 34 pp. (Allahabad: The Indian Press.)—The first eleven chapters (1-102 pp.) treat in a clear and simple manner the four fundamental rules and equations of the first degree in one and two variables. The exercises are numerous and well within the reach of beginners. (Quite naturally, since the book is meant for beginners, the laws of operation are illustrated rather than discussed; the introduction of fractional indices on p. 44 and of negative indices on p. 58 can hardly, however, be considered very suitable, at least in the scrappy form actually adopted. The statement, “Thus a negative index means just the reverse of what the corresponding positive index means,” can hardly be accepted as satisfactory. The remaining chapters, XII. to XX. (pp. 103-205), contain a good deal of interesting and well arranged material on the transformation of algebraic expressions: factors, identities, symmetry, substitution. The book would be improved by the introduction of graphical methods; applications to geometry and mensuration would also lend variety, though the absence of such applications has the sanction of the home text-books.

Arithmetic for the Standards. Scheme B. Standards I.-V. By C. Pendlebury. (Bell.)—When the books on a particular subject have reached the circulation obtained by Mr. Pendlebury’s works on Arithmetic criticism is superfluous. We have before us a set of text-books written to meet the requirements of each of the Standards I., II., III., IV., V.; each book extends to between fifty and sixty pages or thereby, and is issued both in stiff paper covers and in cloth at the price of 2d. or 3d., or of 3d. or 4d., according to the cover. The books consist mainly of collections of exercises, but explanations of rules and hints to young teachers are also given. The printing is admirably done. But what a burden our system of weights and measures imposes on teachers and pupils alike; surely when reform is in the air a determined effort might be made to relieve the children of the load their fathers have had to bear. It is an aggravation, not an alleviation, of the difficulty that the metric system is taught in addition to our own barbarous aggregation of weights and measures.

Commercial Arithmetic. A complete Manual of Applied Arithmetic for Senior Classes. xii. + 211 pp. (Oliver and Boyd.) 1s.—The application of arithmetical methods to business transactions is stated to be the specific aim of this book. So far as we are able to judge, the pupils who master the book are ready for the work of the counting house, so far as their knowledge of arithmetic is concerned. The methods of actual business, where these differ from the usual school practice, receive due attention. A large number of rules, adapted to special types of calculation, is given; these are no doubt valuable in the particular cases for which they are designed, but, it is to be hoped, they will not to any great extent find their way into ordinary school work, however suitable they may be in such a book as this.

Miscellaneous.

Aristotle on Education, being Extracts from the Ethics and Politics. Translated and edited by John Burnet. 141 pp. (Cambridge University Press.)—This is an excellent book. Still, we should hesitate to introduce it widespread among "Schools and Training Colleges," in the Pitt Press Series for which it appears. Prof. Burnet himself supplies the reason. He says: "The student who is to follow with intelligence a course of lectures on what is right and true, and on politics generally, must have been trained in good habits." It is rather for the more advanced who have thought much and deeply on educational questions. The classical scholar would find it highly attractive. We should urge the reader of Plato and Aristotle to study this book. For him—it will appear that the book is not only simple, but also highly suggestive and stimulative. For the student in training who has gone through a philosophical course intelligently this book will be a delight. It is a scholarly production, with keen insight into, and sympathy with the teaching of Aristotle for the modern educational thinker and worker. It is to be hoped that the relation of philosophy to education in the writings of the greatest thinkers will receive increasing exposition. The work of a specialist, such as Prof. Burnet, on Aristotle will help to drive home the conviction that for the satisfactory training of the teacher it is necessary, if the student's mind is to be given to such study, that he should not be an undergraduate studying a number of other subjects concurrently with his professional studies, but a post-graduate student. Such students will come to their own in Prof. Burnet's book, and great will be their joy under such a leader.

History of Philosophy. By William Turner, S.T.D. (Ginn.)—This history has been written with the purpose of setting forth the succession of schools and systems of philosophy so as "to accord to scholasticism a presentation in some degree adequate to its importance in the history of speculative thought." It states briefly and concisely the main ideas of oriental philosophy, and discusses with great lucidity the development of thought in the Greek and Roman world. The early philosophy of the West was but a *praeparatio Evangelica*—a preparation for the Gospel of Christ. Christianity, according to the author, divides the history of philosophy as it divides the history of the world. The philosophy of the Christian era is considered under three sections, viz.: patristic philosophy, extending to the end of the fifth century, scholastic philosophy, from the ninth to the fifteenth, and modern philosophy from the fifteenth century to our own time. It is for the middle period that the book will be found specially valuable, but throughout its analyses and criticisms are eminently fair. The author has presented in a comparatively brief space a clear compendium of the thoughts of the world's great thinkers which will be found useful both by students of philosophy and by all who desire a convenient book of reference on the philosophy of ancient and modern times. The volume should prove particularly acceptable to Catholic readers.

Encyclopaedia Britannica. Vol. XXXIV. vi. pp + 124 maps + 498 pp. (Black and *The Times*.)—This is the tenth of the new volumes of the "Encyclopaedia Britannica" and completes the supplementary issue of that work. About one-half the volume consists of maps, and the other half is an index to them containing no less than a quarter of a million entries. For educational purposes the maps are of little use; they are too crowded with names, and physiographical features are not represented. Moreover, fifty-two maps are devoted to the United States, and North and South America have altogether sixty-seven maps while ten less than this number are considered sufficient for the

rest of the world. This want of proper proportion suggests that the atlas has come to us from the other side of the Atlantic, and that an Encyclopaedia Americana would be a more appropriate place than the Encyclopaedia Britannica for the collection of maps. The index, however, appears to be new and carefully compiled, and will be found valuable for reference.

Fratribus. Sermons preached mainly in Winchester College Chapel. By John T. Bramston. xi. + 208 pp. (Arnold.) 5s. net.—"It is not the professor or the lecturer or even the schoolmaster who is needed in the school pulpit, but the man who will speak to them (the boys) as brothers, who has tried to enter into their view of the serious side of life," says Mr. Bramston in a short preface to these sermons preached from time to time by him to Winchester boys. Mr. Bramston, as these sermons show, clearly has a good knowledge of the limitations and peculiar difficulties of boy-life, and he knows how to address youngsters so as not to talk down to them, nor yet to express himself in language too difficult to be understood. Schoolmasters who wish to be guided as to how to give boys useful hints in the matters of conduct along strictly orthodox lines will do well to secure and study this volume.

Junior General Information Examination Paper. By W. S. Beard. vii. + 72 pp. (Methuen.) 1s.—This is a useful collection of seventy-two graduated papers, each consisting of ten questions on a variety of subjects. Though the range of the questions is fairly wide, some questions might with advantage have been included on such things as common drugs, useful minerals, railway journeys, and other similar every-day matters; many quotations in frequent use, often thought to occur in the Bible, might have been included, and the introduction of more of the common characters in English fiction would have increased the interest of the papers. At the same time, it is impossible to please everybody, and teachers will have no difficulty in making good general-knowledge papers with the help of Mr. Beard's questions.

Crude Ditties. A Collection of Limericks. By S. C. Woodhouse. With 24 coloured illustrations by Augustine J. Macgregor. 103 pp. *The Grump. A Story in Pictures.* By Gerald Sichel. With text by S. C. Woodhouse. 109 pp. (Sonnenschein.) 1s. net each.—Two quaint little picture books which will highly amuse young children.

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.

Cheap Ordnance Survey Maps.

MAY I call the attention of teachers to an important concession which has recently been made to schools by the Board of Agriculture? Most teachers know how necessary Ordnance Survey maps are for sound class-teaching in local geography, but the price has hitherto been prohibitive. In response to memorials from various sources, the Board of Agriculture has now issued instructions that special editions of the one-inch maps be supplied to educational authorities at the following prices:—200 copies, £1 5s.; 500 copies, £2; 1,000 copies, £3; 5,000 copies, £12. For larger numbers the estimated price would be £2 per 1,000 copies. The only stipulation made is that on no account are the maps to be sold. It is universally agreed that all sound geographical teaching must begin in a study of the home region, and it is, therefore, to be hoped that

most teachers will avail themselves of the facilities so generously granted, either individually, or by making application through the local education authority. Further information may be obtained through the Geographical Association.

A. J. HERBERTSON,

Hon. Sec., Geographical Association.

School of Geography,
Oxford.

Available School Wall-Maps.

I HAVE read with interest Mr. Wethey's paper on "Available School Wall-Maps," which appeared in your September number. One could have wished that the writer had laid greater stress on the desirability of having wall-maps absolutely without names. For elementary classes this seems to be almost a necessity. But for all class-teaching surely the map to be aimed at is one which shows very boldly the physical features (*e.g.*, the "Sydow-Habenicht" or the "Comparative" Series), the position of important towns and the political boundaries.

Teachers may, if they like, supplement this by the same map with all names inserted, but the pupils may, more satisfactorily, get the names from a hand atlas.

A wall-map on which the names, or even the initial letters of the names, are given leads to slack preparation on the part of both teacher and pupils.

RICHARD PHILPOTT.

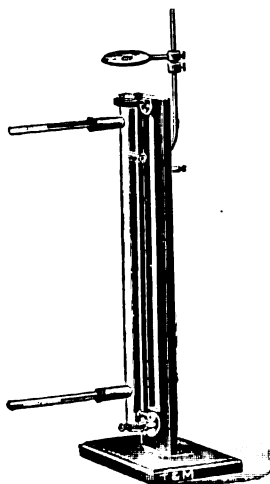
I AGREE absolutely with Mr. Philpott's remarks on wall-maps. He makes two points: (1) The desirability of having wall-maps without names. (2) The need of maps which show very boldly the physical features, the important towns and political boundaries.

Quite so. Both these points are emphasised in my article: *vide* first paragraph, p. 325, and third and following paragraphs, p. 324. That I did not lay greater stress on them followed from the nature of my subject, which was not "How to teach Geography," but "What are the relative merits of the maps on the market?"

E. R. WETHEY.

A New Extensimeter.

I HAVE designed a cheap and accurate instrument for ascertaining the coefficients of linear expansion of metal rods. A



steam-jacket surrounds the rod, half a metre in length, and a spherometer is used to measure the total expansion. The jacket is held in position by two brass rings secured to a wooden

frame, the lower ring being provided with a screw to hold one end of the tube fixed. The temperatures are registered by thermometers inserted in the jacket. A dry cell and small electric bell may be used for greater accuracy to denote contact with the end of the spherometer and the metal under examination. A brass disc having a hole in the centre supports the spherometer. This disc is turned aside when the steam is entering the jacket. The instrument gives very accurate results. Messrs. Townson & Mercer, of 34, Camomile Street, London, are the sole makers, who supply to purchasers full directions as to how the instrument is used.

G. B. LAVELLE.

Christian Brothers College,
Waterford.

The Drying of Flasks.

HAVING found the drying of flasks internally extremely difficult for young students, I devised a simple piece of apparatus which works very well indeed, the flasks being dried quickly and properly and many breakages avoided.

A piece of iron tubing is closed at both ends with corks. Through one end a connection is made with a foot-bellows by means of a piece of glass tubing and rubber. The other end has a connection of rubber and glass tubing also to allow free entrance into the flask which is to be dried. The iron tube is heated underneath with a Bunsen or, better still, a Ramsay burner, and a current of air is driven through the tube. The air is very warm when passing into the flask, and causes quick and complete drying.

WM. O'KEEFFE.

St. Flannan's College,
Ennis, co. Clare.

Correspondence Club for the Study of Pedagogics.

IN accordance with the scheme for the formation of small clubs for the purpose of the study of educational problems, and the interchange of opinions among members of the clubs by correspondence, I am able to report that one club has been completed and is now at work. The first book chosen for study is Thring's "Education and School."

I have received, since the completion of the first club, the names of two or three other teachers who would like to join a similar circle. If I receive the names of a few others willing to co-operate, it will then be possible to form a second club.

22, Elmstone Road, S.W.

A. T. SIMMONS.

The School World.

A Monthly Magazine of Educational Work and Progress.

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The School World

A Monthly Magazine of Educational Work and Progress.

No. 60.

DECEMBER, 1903.

SIXPENCE.

THE INSPECTION OF SECONDARY SCHOOLS.

By A HEADMASTER.

THE question of inspection is looming large before us, and we are looking forward with interest, not unmixed with amusement, to its advent. We headmasters are an autocratic race, and we are all prepared to greet the Inspector with open arms, knowing that if he approves our work—well; if not, he knows nothing at all about it. This is rather a dangerous frame of mind, by the way, for it sometimes turns out that the one who “knows nothing at all about it” is found in the opposite direction.

“First catch your hare”; first get your inspector. How is the inspector to be appointed, especially as he must be a compendium of the virtues which Archibald Forbes ascribes to the ideal war-correspondent. The inspector must have had considerable school experience: this is so self-evident that it would seem hardly necessary to state it, only that we have known, and not unfrequently, inspectors who had no such experience whatever. Dare we even whisper that headmasters have been appointed without previous school experience?

The first inspectors will probably be retired headmasters, and in appointing them it will be better to look out for headmasters who have impressed some individuality upon their school, and have not been content to follow the multitude, or to measure their success by the number of “passes” or “honours” gained in some “University Children’s Test.” The man who has tried to discover and to correct in his own school the faults of the existing system will be more likely to give valuable advice to other schools. This individuality in schools, however, can only be discovered by inspection, so that we are brought once again to the difficulty of the owl and the egg, but it will probably work out all right in practice. To recruit further the ranks of the inspectors, every headmaster should be asked to mention quite privately the names of two or three on his staff whom he considers suitable for inspectors, and the work of such men should be specially watched by the Board of Education.

Turning to the work of the inspector, his first enquiry will be into the financial position; and he will have to report, not only that good value is obtained for money spent, but that money has been spent on the right objects. A word of advice, possibly of warning, to a school which had been erecting flagstaves or fancy iron railings, while leaving its assistant-masters with miserable salaries, might be useful. We know a school where a candidate for the headmastership was asked if he would be able to supplement out of his own pocket the very meagre allowance which the Governing Body made for assistant-masters. Yet another school of our acquaintance showed the following appreciation of the value of public money. The authorities of the school ascertained that money could be obtained from the County Council to build laboratories; what the school wanted, however, was not a laboratory, but a chapel, so all wits were set to work to devise a very large hall with chemical benches round it, sufficiently like a chapel to be used for that purpose, and sufficiently like a laboratory to get the money out of the County Council.

Another very important enquiry which the inspector will have to make with reference to a day-school—and the future of middle-class education will be to the day-school—is the extent to which it is studying the demands of the neighbourhood. A school in a small provincial town, supported by the retail tradespeople and the farmers, would be failing in its duty if its chief work were directed to University scholarships, whatever the headmaster’s inclinations or the ancient traditions of the school might be. A school in a manufacturing district should not neglect engineering and technical work, while a school in a London suburb, with 95 per cent. of its boys going into city offices, could not afford to neglect commercial education. These matters should be carefully considered in the report of the Inspector.

A kindred matter is the extent to which specialisation is permitted or encouraged, and here we find room for very considerable differences of opinion. It is not uncommon to hear headmasters speak in praise of a general education as opposed to any specialisation. Such a headmaster usually means by a general education putting every boy through a mill of classics and mathematics just as

hundreds of pigs are put into one end of a machine which turns them out at the other end in thousands of identical sausages, and by specialisation he means that study of solving mathematical conundrums which is required for a University scholarship. It is quite possible to combine general education with some degree of specialisation on wider methods: in fact, that boys shall specialise not in single subjects, but in groups of subjects. Such a school would have a "literary side," on which languages, both ancient and modern, form the staple; a "technical side," on which applied mathematics and all kinds of science predominate; and a "commercial side," on which modern languages, geography, &c., are the principal studies. Subjects other than those mentioned on each "side" are not excluded, but are of smaller importance. We should not consider a school to be doing its duty unless some effort were made to discover tastes and capacities of different pupils, and to modify the curriculum accordingly.

The inspector will also have to enquire and report upon the size of classes. It is too much to hope that an inspector can at once inaugurate a reform in this matter; that can only be done by public opinion, but there can be no doubt that our classes are too large. There is an idea among educational authorities that one master can teach thirty boys; he can't, he can only drill them. Even if thirty boys of the same standard of knowledge are made into a class at the beginning of the term they will progress at such very different rates that after the first fortnight the master must neglect either the top or the bottom of his form. An inspector finding the classes limited to a dozen or fifteen should certainly mention the fact with commendation.

It is, however, when he comes to the class-teaching that the greatest tact on the part of the inspector will be required. Human nature is so constituted (we not having been consulted in its construction) that it is more prone to see defects than excellences. Every headmaster knows that if he visits another school he is sure to see something of which he would not approve in his own, and yet possibly the very plans which he would suggest have already been tried and rejected.

The inspector, therefore, will have to be present at the class-teaching of most of the masters, but he will have to be on his guard against attaching too much importance to what he hears in class. Not only does the presence of a stranger produce an artificial atmosphere in the class-room, but it is extremely difficult to form a fair notion of a subject from a single lesson taken at random in the middle of it. The stranger visiting a class-room cannot tell how the subject has been approached, how much of it is new, and how much they have heard before, how often the master has attempted to approach the same point from other directions, whether the boys have been through the lower part of the school, or are mostly new. He is, in fact, criticising the game without having seen the deal, possibly without even knowing the trump card. He will gain a much better idea of what the form

can do by a careful study of the books used, of the exercises, and especially of the notebooks written by the form during the part of the term already passed. Nothing is easier than for an inspector to make a lengthy report filled with personal criticisms of the masters, and to award any amount of undeserved praise or blame. Personal criticism of the masters should be communicated privately in the first instance by the inspector to the headmaster and discussed with him, but should only be introduced very sparingly in a report to the governing body or to any board or department.

The point, however, from which we hope to gain the greatest benefit from the visit of the inspector is from his enquiry, his criticism, and his advice upon the questions of *method*. Since we came, perhaps reluctantly, to the conclusion that the methods by which we were taught the dead languages were not the best for teaching the more extended subjects of a modern curriculum, we have been seeking for better methods, but have worked much in the dark, and frequently independently of each other. The visits of the inspector, like the use of the rope on Alpine crags, will be to extend the experience and protection of the stronger to the weaker members of the profession.

The following suggestions are not intended to be exhaustive, but merely to indicate some of the questions of method which must be discussed between the headmaster and inspector.

In arithmetic, are decimals taught from the very commencement? Are practical and graphic methods used in teaching every branch of mathematics?

In English literature, is any attempt made to give the boys some general notion of the literature of their own country, or do the lessons consist in cramming up for an examination the history and the archaisms of a play of Shakespeare or a poem of Scott?

In geography, is map construction and map-reading made the basis of the teaching, or is it learning proper names from books? Does the old divorce of physical and political geography continue?

In modern languages, is conversation and reading at sight encouraged?

In science, is the ridiculous separation between theoretical and practical science continued? Is science taught entirely by practical work without the use of books for younger boys, and with books used only as works of reference for elder boys?

And, generally, is there a universal desire to learn, to discover, and especially to invent new and practical methods for teaching every subject?

Should examination accompany inspection? It should certainly not be excluded, and, as we believe that headmasters and inspectors will work together harmoniously, we suggest that it should be left to these two functionaries to decide how much examination is necessary; but, for goodness' sake, do not let us permit inspection to degenerate into an additional examination. Within the past decade or so we have seen the county councils, the Universities

of Oxford, Cambridge, and London, and the Chambers of Commerce, wake up to the idea that they might do something for education. They have said, "Go to, let us make brick and burn them thoroughly, and let us build an educational tower, whose top may reach unto heaven, and let us make us a name," and they have each produced—an additional examination! Would that the Board of Education armed with the powers of the Elohim, might say, "Behold, they have all one language, it is the language of those who set examination papers, let us go down and confound their language, that they may think of something else." The introduction of inspection might pave the way for a complete reform (and abolition of two-thirds) of our examination system. Instead of boys being prepared for examinations, the examinations might be prepared for the boys, according to the work they had been doing. This is one of the few points in school work in which we might learn something from Germany, where the teaching staff set questions which are submitted to the inspector before the examination papers are made up.

Lastly, the inspector should enquire into the athletic and physical side of school-life, and especially into the provision made for providing the youngest boys and the lazy boys with healthful exercise. The success of athletics in a school is not to be judged by the performances and the matches of the first team, but by the numbers taking part. It is not generally recognised that it is much harder to get boys to play than to work, and there are many day schools where the great majority of boys do not know what it is to join in a school game.

Besides playing fields, the inspector must insist upon the provision of proper gymnastic appliances (a specially built gymnasium is quite unnecessary), and upon a properly graded course, first of calisthenics, and secondly of gymnastics for every boy. A school should not be permitted to confine its gymnastic instruction to the visit of an instructor once a week to teach ten or a dozen of the best gymnasts. He should also see that heights and weights are periodically taken, and eyesight tested, so that short-sighted boys may be provided with spectacles.

A few words may be said about the formal report of the inspector. This should be communicated to the governing body, to the headmaster, and the Board of Education; but nothing is to be gained by issuing it to the general public, or attempting to make an advertisement of it. The public will mistake helpful suggestions for blame, and will not consider it a good report unless the word "excellent" occurs in it as often as "sanguinary" in the vocabulary of the bargee. Any real fault pointed out with a view to amendment will be stereotyped for many years as characteristic of the school, and after all, not even the youngest inspector is infallible. It will, therefore, be better to leave the headmasters to bring their own schools before the public in the way they think best, whether they do so by sending

little Tommy in at eleven years of age for a public examination, by putting him up on a platform to act plays or recite Shakespeare, or by making him in a quiet and unassuming way stick steadily to his work.

SCHOOL REPORTS.

WITH SPECIAL REFERENCE TO BOYS' SCHOOLS.

WE have studied with considerable interest the School Reports sent in answer to our request, and we desire to express our heartiest thanks to those schoolmasters and schoolmistresses who so kindly forwarded copies of their forms. After a careful survey we gladly acknowledge the great pains and skill which their construction reveals, and the sincere desire which is evident on the part of headmasters and headmistresses to communicate very fully to the parents the particulars concerning the work and conduct of the pupils entrusted to them. We must confess also to a feeling of astonishment at the considerable amount of work which falls upon the form masters and mistresses at the end of each term—work willingly undertaken and discharged in the interests of the pupils and of the schools.

Three principles are involved in the construction of the reports generally issued:—

- (i) Information as to the place in form occupied by the pupil during the term.
- (ii) His place at an examination held at the end of the term, and
- (iii) His attendance, progress, and conduct.

The first and second are generally denoted by numerical marks earned for work done, and the third is expressed in general terms, such as "excellent," "good," "fair," "moderate," or "bad." In one school an exactly opposite course is taken. For conduct the best mark is 1. Higher marks are given for talking, inattention, and general unsatisfactory conduct. For "order" the best mark is 1. Higher marks are given for books or work forgotten or left lying about, and for general disorder. In mathematics, English, and languages, 1 and 2 are good marks, 3 and 4 fair marks, and 5 and 6 are bad marks. So the problem the boy has to face is not to earn marks, but to escape them, just as the Rugby football player on entering a school where Association rules prevail has to use all his efforts to avoid handling the ball, no difficult task at first for an enthusiastic sportsman. The severity, however, of this scheme is modified by adding the marks earned during the week, and only entering the average in the report form. Not all teachers, however, report on the pupil's position during the term. All give a final report as the result of an examination, but the terms in which the report is given vary. It is probably inadvisable to report on the position taken during the term. There are so many factors which interfere with the equation, and yet which do not represent the

normal condition of the child, such as loss of marks for temporary illnesses, varied home circumstances, and the fact that some children, though slow in the "uptake" or at the beginning of the term's work, yet somehow increase their pace towards the end, and yield a very good average result. And, after all, it is a grand thing in a school to give the repentant sinner a chance without allowing some delinquencies in the third or fourth week to be registered against him, and to appear like Banquo's ghost in the first week of the holidays. On the whole the framers of reports will lose nothing by omitting the position taken during the term.

On the other hand, the position of a boy in his class, as tested by a skilfully-conducted examination in which the chance elements are nearly all eliminated, should be most carefully registered and communicated to the parents. This communication should be as clearly expressed as possible, and for this purpose we recommend that the actual number of marks earned are quoted, together with the average number of marks gained, and also the number of marks given to the best paper. Percentages are not advised, and the subjects should be grouped into classes, as in the following table:—

class, and the highest marks earned by the most successful boy. That the average mark is necessary is shown by the following case:—

	Marks gained.	Average mark of the class.
i. Geography ...	25 ...	30
ii. Geography ...	25 ..	24

In Case i. the pupil has done badly compared with those who have received the same teaching; in Case ii. the result is satisfactory, and the pupil can be commended.

A column for full marks is not necessary, owing to the variety in the examination papers set. It is not a record of the progress or condition of the scholar in all cases. An outside examiner may set a paper few can do, in which case all will get low marks, or the paper may suit the general intelligence of the class, and in this case a high mark will be earned. For the teacher this column is of value, but not for the parent.

Many of the school reports are arranged to show a line for remarks in each subject. This, if filled in generally, must be a serious task for the teacher, and if only filled in exceptional cases it need not be arranged for. An excellent plan for drawing attention to weakness is a circle in red ink round

RESULTS OF LAST SCHOOL EXAMINATION.

Subjects.	Marks gained.	Average Mark.	Highest mark gained.	Subjects.	Marks gained.	Average mark.	Highest mark gained.			
ENGLISH.	Grammar			SCIENCE.	Chemistry					
								Literature	Physics, &c.	
								Composition		
								Geography		
								History		
Order of Merit				Order of Merit						
MATHEMATICS.	Arithmetic			DRAWING.	Freehand					
								Algebra	Model	
								Euclid		Geometry, &c.
								&c.		
Order of Merit				Order of Merit						
				French						
				German						
				Needlework						
				and so on.						

Religious Knowledge } Use phrases for these, not marks.
 Work in Chemical Laboratory..... }
 Work in Physical Laboratory }

Place in Form

The subjects should be arranged to suit the school work.

By stating the order of merit in each group of subjects the parent is able to determine in some slight measure the bent of the child, and very often the report may act as a guide for his future occupation.

Three columns at least are necessary; the number of marks the boy actually gains in each subject, the average mark obtained by the whole

the low mark, or a phrase in the space for general remarks at the foot of the page. And here may a plea be urged for the unhappy boy. For instance, an uncle, who was also a schoolmaster, was called upon to interview an unfortunate nephew whose form-master had written somewhat scanty praise against his performance. His parents were seriously-minded people, who generalised

[School Crest.]

NAME OF SCHOOL.

[Senior Division.]

REPORT for Term ending Christmas, 1903.

Name.....
 Form No. in Form
 Average Age of Pupils in Form.....

RESULTS OF LAST SCHOOL EXAMINATION.

Subjects.	Marks gained.	Average mark.	Highest marks gained.	Subjects.	Marks gained.	Average mark.	Highest marks gained.
ENGLISH {				SCIENCE. {			
Order of Merit				Order of Merit			
MATHEMATICS {				LANGUAGES. {			
Order of Merit				Order of Merit			
				Other subject			
				" "			

Religious Knowledge
 Work in Laboratory
 Any other form of Practical Work

Place in Form

Number of times absent.	Home lessons.	Conduct.

Progress during Term.....
 Remarks.....

.....Form Master.
Head Master.

The Next Term begins on January 12th, 1904.

speedy ruin from his particular instance, and a most unpleasant quarter of an hour the poor boy had had. The phrase meant little or nothing to the teacher, but to the parents it seemed disaster. A professional explanation was given, the silver coin was not withheld, and joy once more reigned. The fact is, great caution is necessary lest a slight school breach is unduly magnified into a serious and grave offence. Masters vary in their power of expressing opinions, and so a vigorous censorship of phrases is always necessary. In this respect certain forms fail by having the headmaster's name printed or lithographed on them. As the report is an official communication between the master and the parents, and as the latter

always think of their children as represented to them by the headmaster, it is not only desirable but courteous that the name be an autograph.

Part of a school report should refer to a pupil's attendance, conduct, and general progress during the term, and it is in the space allotted for this that much can be done to enlighten the parent by a discreet master. Sometimes the abbreviations, *ex.*, *v.g.*, *g.*, etc., are used, and sometimes phrases or short sentences. The former are open to the charge of vagueness, but very often they sum up all that is felt about the boy, and if space is allowed for both, and either used at option, a good work may be done. Number of times late in a term is not necessary. If lateness is persistent, a letter during

the term is the most satisfactory method of curing it, but to total it after many weeks is an unnecessary reference and will do very little to prevent it recurring next term. The number of times absent should be given, and the manner in which the home lessons have been worked and the progress made during the term generally are fit and proper sub-

school. There is a tendency to print many notices and much advice to parents on the forms. Beyond the announcement of the beginning of the next term all notices should be given on a separate sheet of paper, which can be enclosed with the report.

To sum up, we want to inform parents of the

[School Crest.]

NAME OF SCHOOL.

[Junior Division.]

REPORT for Term ending Christmas, 1903.

Name.....
 Form No. in Form
 Average Age of Pupils in Form.....

RESULTS OF LAST SCHOOL EXAMINATION.

Subjects.		Marks gained.	Average mark.	Highest marks gained.
ENGLISH ...	{ Reading			
	{ Grammar			
	{ Writing			
	{ Composition			
	{ Spelling			
	{ Geography			
MATHEMATICS	{ History			
	{ Drawing			
	{ Arithmetic			
	{ Algebra			
FRENCH	{ Geometry			
	{ (a) Oral			
	{ (b) Written			

Religious Knowledge..... Place in Form.....

Number of times absent.	Home lessons.	Conduct.

Progress during Term

Remarks

.....Form Master.

.....Head Master.

The Next Term begins on January 12th, 1904.

jects for remark. The word "generally" is advisedly used, for details only bewilder parents, and very often give them a handle for dissatisfaction with the school if they desire it.

It is the practice in some schools to make the report forms very complete by publishing the physical measurements of the boys. This is to be recommended to the headmasters of boarding schools where the pupils are away from home for lengthened periods, and where opportunities for accurate measurement are readier than at a day

condition of their children at the end of the term, and, as much of this information must be from the competitive point of view, it must be the result of an examination. It should never be forgotten that parents are most anxious to learn how their child stands in the real world of children and not his qualities as an isolated being. We also want to inform the parents of the conduct and progress of the child as an individual. We also want—and this is most earnestly pressed upon headmasters and headmistresses particularly — to reduce the

amount of writing and mark-keeping which must fall upon the assistants at the end of the term, and must make the reports an irksome drudgery instead of a responsible duty. Just as in the world of work we seek for labour-saving machines, so in the world of school we ought to do our utmost to diminish the number of wheels in our machinery, and finally, we do not want in our reports to register and to announce the petty offences and small peccadilloes of our young friends, for whom, after all, we have a tender corner in our heart when we have dismissed them for the term.

The reports which we have examined suggest the forms given on pp. 441 and 442 as containing everything that is necessary for the full information of parents.

NOTES ON THE SUGGESTED REPORT FORMS.

Fresh Report Forms should be printed for each term, so that "ending Christmas," "next term begins," and similar phrases, are not written.

The order of the subjects and grouping are left to each master's judgment.

In the Junior School Form the order of merit in subjects is omitted.

The Form should be printed on very good white paper, (Turkey Mill is recommended, foolscap size), and they should be posted in foolscap envelopes.

THE REFORMATION OF THE OFFENDER.

By C. W. BAILEY, M.A.

Principal of the Sefton Park School, and Assistant in Method, University of Liverpool.

ONE of the supreme aims of the teacher is to help the child to learn to take his place in the world as an individual doing right and avoiding wrong; and it is by the child's subsequent individual and responsible acts that the effectiveness of this part of the teacher's work must be judged. It is, therefore, necessary to train the child's will, and to give him the impetus to do the right for its own sake. Yet it is possible for this all-important matter of motive to be lost sight of in the many details of conduct itself. We may be so much concerned with the movements of the hand of the watch upon the dial that the main-spring may be forgotten. Teachers are so close to matters of conduct that they may professionally ignore motive, and thus make all their will-training ineffective. School offences may, according to their determinable motive, be more or less morally grave or merely inconvenient. If we are to implant right motive as the guide of conduct we must be careful to make motive the important factor in determining the amount of wrong-doing in any offence coming within our jurisdiction.

It is, indeed, very easy for us as teachers by an error of judgment to put the merely inconvenient offences into quite a wrong position in a motive-value scale of offences, and quite natural for us to

fail to place adequate stress on grave moral faults which cause us less immediate inconvenience, although the latter are so potential with regard to the future of the child, and the former so unimportant. The unscientific conditions of some teachers' work and the unwieldy size of the classes of many primary schools are the most fruitful causes of many existing devices which are not easy to defend from an ethical standpoint, but without which much of the work now done would be practically impossible. It should never be forgotten by authorities and parents that small classes make reasonable devices possible and large classes produce bad methods. A diminution in the size of the classes means an immediate lessening in the number of the school offences, especially those of the inconvenient kind, the punishment for which is least likely rightly to affect motive. When large numbers of children are grouped together it is often necessary to single out offenders and treat their comparatively light offences with severity to coerce the others into that restraint which will enable the teacher to go on with his work.

Further, offences may, to some extent, be created by the teacher. We all know that an incompetent teacher or weak disciplinarian is the fruitful cause of increases in school offences. Sometimes even a capable teacher may make himself the cause of such an offence as lying being committed by putting too great a strain on a child's moral courage. The teacher may conduct enquiry in the presence of the class with regard to a matter which involves the confession of some serious offence. The offender may hesitate publicly to confess and bear the extreme punishment of the contempt of his fellows which would ensue; he, therefore, adds to the original offence the further offence of a lie. The teacher may often with a little tact and private enquiry render it easier for the truth to be told.

With some teachers, also, failure of the pupil to secure some definite school proficiency is regarded as an offence, apart from the effort displayed or the ability of the child. With completer knowledge of our children we can more readily apportion the individual responsibility for failure. It is further true that insanitary conditions of work, badly arranged time-tables and unscientific curricula are largely responsible for a number of minor school-offences.

What the exact responsibility of the offender is in serious offences, how far these offences are the result of hereditary predisposing tendencies, bad environment, or mental weakness, is a far more difficult problem. It is certainly the fact that offences of this serious class are often found to run through whole families—suggesting, strongly, predisposition as the first factor in the creation of the offence. It would be a great help to us teachers if in difficult cases we could have the help of a doctor's advice and could in the worst cases have always the right of refusing to accept for instruction, with others, those children whom we have discovered to have strongly-marked evil tendencies, and who require special and separate treatment.

Every offence committed makes the commission of another offence more easy by the law of habit. Every offence omitted, therefore, is a distinct gain to the individual pupil, the school and the community. The first practical step, therefore, in the reformation of the offender is that every possible care should be taken to *reduce the number of offences to a minimum*. It is probable in this connection that what the community would have to pay for more effective teaching and smaller classes it would gain afterwards in the diminished cost of criminal law administration.

So far one anticipates we shall be agreed; like the doctors with regard to disease, we shall all unite in urging prevention if possible. Where we are likely to disagree is, as they do, in the practical treatment of cases of admitted specific unsoundness.

Doubtless, it is agreed that we must make wrongdoing unpleasant. "The way of the transgressor is hard," and he must feel the stony path even while at school. Unless we do this we may be doing the child a great injury, teaching him that he may do wrong and escape the just consequences. Again, it will be admitted that we have the right in school to inflict such punishment as shall take the place of discipline of natural consequences, and be a kind of accelerated natural consequence. No doubt, the nearer the punishment we inflict is in its nature to natural consequence the more scientific it will be. Corporal punishment is found in practice to be a convenient form of making wrongdoing immediately disagreeable, and it uses pain in nature's way, viz., for purposes of inhibition.

There are, however, certain conditions under which any punishment to be effective as a reformatory agent must be given. It must be established beyond doubt that the offence has been committed by the pupil concerned. The guilt must be proved. To punish the innocent is to cause all respect for your "sanction" to vanish and is to act in opposition to the whole moral force of the universe. Insubordination is nearly always produced by a sense of some injustice. The schoolmaster may be a beast, but it is essential, if he is to be respected, that he be a "just beast." This points to the advisability of making in each instance an enquiry into the circumstances of any reported offence and giving the accused the opportunity of stating his side. We must wait before judging. The value of the necessity of "stating a case" is thus apparent, and it is principally in this direction, as establishing a sort of court of appeal, that the custom is valuable which almost universally fixes the responsibility for awarding severe punishment with the head teacher. It gives opportunity for a serious case to be reviewed, for the accused to be heard, for any extenuating circumstances in the school history of the accused to be considered. With regard to the infliction of the punishment, that is not, one holds, in the same position, and it will be found that there are many cases where the authorisation by the head teacher of a definite punishment to be inflicted by the

teacher of the pupil concerned will, by increasing the authority of the class teacher, tend to diminish the number of school offences committed. The first condition of reformatory punishment is, therefore, due precaution in order that the accused be justly condemned before the punishment is given.

The second condition is that in assessing the amount of guilt the motive of the offence should be taken into consideration. This constant regard to the underlying motive will be found a most important factor in making the punishment really reformatory. The child will see that the teacher habitually lays stress on the goodness or badness of the underlying principles of action, and will learn to ask himself, before doing a questionable thing, whether or not it will receive the approval of his own better nature. Children have quite early this notion of right and wrong motive.

The next condition one would urge is that the judgments should be consistent. Assuming that our standard of right motive remains constant, we should be consistent in our appeals to it. What is an offence to-day must be an offence to-morrow and always. We must not let our attitude towards offences vary with our caprice or with our health, or the child will have no abiding sense of the true significance of wrongdoing. The operation of our justice should be as regular and orderly as possible, and the wrong-doer must, if possible, never escape. One capricious act of letting off a batch of offenders without proper investigation may ruin the discipline of a class; and it is of this that sometimes the class teacher has most bitter causes of complaint against the head teacher. A child will calculate to a nicety the chances of escape from disagreeable consequences of ill-doing and will act accordingly. The teacher with an intermittent conscience will never impart conscientiousness, and weakness is never kindness in the long run.

Again, punishments must be suitable to the offender. The aim is to make the offender reform. It is only by tact and experience that a teacher may determine the kind of punishment to be employed to this end. Of two punishments equally severe one may be quite unsuitable to the individual concerned. Even of any one punishment, its severity will vary with the individuals to whom the same measurable amount is employed. To write lines may be a cruel torture to one pupil, while to cane another may be to cause him little bodily pain. It is probable that on the whole, where punishment to children must be given, there are less practical objections to corporal punishment than to most others; but it follows from the conditions urged that it should never be given unless the teacher believes that this is the form of punishment most suitable to the particular offender. It is not a "panacea," and it lends itself readily to careless, frequent, and even cruel use.

But there was oil as well as wine in the ministry of the Good Samaritan—"wine to cleanse the wounds and oil to assuage their smart and to bring gently their sides together," and the *positive side* to the reformation of the offender is the tenderer and

the nobler. To inhibit the bad is necessary, but the good motive must take its place if the offender is to "save his soul alive."

The worst feature of punishment is that it is a deadening thing, destroying action, blocking the way of construction because it causes the individual to lose confidence in himself. It is a fall from a bicycle while one is still learning to ride.

Practically one would say that, having punished the offender and made the wrong-doing disagreeable, the next step is to forget. The doctrine of "the clean slate" is invaluable here, it makes subsequent good writing possible. If the offence is not forgotten the offender is labelled and may live up to his label. Teachers are prone to have well-marked distinctions between the white and black sheep of their flocks, and generally to regard the black sheep as dyed in fast colours. Are we not all somewhat streaky? There is some good in every child if we can find it, and we must forget as soon as we can any badness we may have heard of.

In school one hesitates to adopt any system of continuous reports with observations on the character of individual pupils to be handed on to successive teachers, which would be very useful from the scientific standpoint of treatment of cases, because one feels that in the hands of some members of a staff the knowledge of a pupil's guilty past would bring with it present prejudice. Only a teacher can realise what a full and generous promise was the Hebrew prophet's to the repentant sinner, "All his transgressions that he had committed they shall not be mentioned unto him."

Not only must the offence be forgiven and forgotten, but we must show the erstwhile offender that we believe in him and in his power to do the right thing. Here a genial optimism seems the best equipment a teacher may have, and, if there is a "genius of first quotation," there is surely an inspiration in the first discernment of possibilities of good.

Further, we must show the offender how he may by good deeds make reparation for the past and in this way restore his character. To do this we must find the pupil's *sound place*, that particular *interest* or *talent* or *affection* which rightly used may be his veritable salvation. He must, however, do something, not merely refrain from doing; there must be a path as well as a notice board to "keep off the grass." In this connection one would welcome as valuable any means by which the dominant interest of the individual may be discovered.

And, lastly, can we not imagine that an offender may reform because he feels that his teacher is a warm-hearted friend who has stood by him in trouble, believed in him in circumstances of black suspicion, and whom he would be sorry to grieve by his misconduct? Cannot children "play the game" of life and give good deeds for kindness as we grown men and women do, and shall there not be a traffic in kindness in the schoolroom as well as in the world?

ENGLISH LANGUAGE TEACHING IN FRANCE.

By DR. H. SCHORN.

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IT is only during the last few years that the teaching of modern languages has taken the place in France that such an important branch ought to occupy in the schools of any nation of the present age. In fact, for nearly half a century this study, which is so essential to a liberal education, was entirely neglected. The teachers of foreign languages were recruited, for the most part, from men who had failed in other careers, or those thrown out of their sphere whom chance had enabled to acquire a smattering of English or German.

Better than a theoretical dissertation, the two following anecdotes will give an idea of the wretched position of the instruction in living languages at the French colleges, about the middle of the nineteenth century.

In a pamphlet dated 1872, on the teaching of modern languages, M. Chasles relates how difficult it was, in his youth, to meet with a good English or German teacher. During his education in the "Lycée" at Bordeaux, he says, the old professor of foreign languages suddenly died. The headmaster was in great straits. No other master in the school knew English or German enough to replace him. The Minister of Public Instruction had none to send, although the teaching of living languages was on the syllabus. Fortunately, some soldiers of a foreign army corps passed through Bordeaux, on their way from Algeria. Amongst them was found a Swiss who knew a few words of German and English. His comrades suggested him as a teacher, and the poor soldier was only too happy to change the uniform of his corps for the gown of a professor and an annual stipend of fr.900 (£36).

Still more characteristic and entertaining is the second anecdote. It would seem almost incredible, had not a man so trustworthy and distinguished as Inspector Michel Bréal related it, in a lecture at the Sorbonne. It was in 1832, when some Polish refugees came to Paris to seek protection and a means of support. They were well received in the capital. The French were then full of enthusiasm for the Polish cause, as there appeared to be a chance to restore the kingdom of Poland. One of these refugees had a letter of introduction to the Minister of Public Instruction.

He was well received, and after giving his name, he asked if some employment could be found for him.

"Yes," replied his Excellency, "we require a teacher of foreign languages, especially German, for a little college in the south of France."

"Alas, your Excellency," modestly replied the candidate, "I can only speak Polish and a little French."

"You are too modest, sir," answered the Minister.

"Pray excuse me, your Excellency, but I have never learnt German."

"That is no obstacle. You must try. We shall arrange that; I shall appoint you."

And this good Pole, in spite of his scruples and hesitation, thanked him and retired.

Some days after, he received his appointment as "teacher of modern languages and literature" in the college in question. What was to be done? In fact, he knew neither German nor English. He was too old to learn a new language with his pupils. Then he said to himself, "Is it not better to teach Polish, which I know, than German, which I do not know"? He ordered some Polish books. He taught his native language with the utmost enthusiasm, and the pupils, catching the master's spirit, became interested in their tasks, thinking they were learning German. No one detected this dexterous trick, until one day an inspector came to examine the school. He wondered, knowing himself a few words of German, what German dialect he heard. He inspected the copies, the books of the pupils, and was unable to solve the problem. At last he took the teacher aside and demanded an explanation.

"Do not betray me," pleaded the trembling Pole. He then related the manner in which he had been appointed. "I am old," he added, "and I shall soon gain my pension; I beg of you to have patience with me until then."

The inspector was not stonehearted. He promised not to betray the old professor; and until the latter retired the children of the little college learned Polish, thinking that they learnt German.

If such was the position of the teaching of foreign languages in France, about the middle of the last century, it is obvious that the question of method could only play a secondary part. All the efforts of the teachers were often merely directed towards maintaining order in their classrooms and teaching a few words in common use, as well as the most important grammatical rules.

After the Franco-German war of 1870 the study of living languages received a new impetus. English, and especially German, increased in favour. But a scientific method is not produced in a few years. The German and English professors, left to themselves, nearly all followed the method they themselves had practised when studying Greek and Latin. Their scholars wrote exercises and translations and learnt numerous grammatical rules. They were also forced to translate continually, from one language into another, certain words and sentences without ever arriving at a true knowledge of a foreign language.

However, little by little, the deficiencies of this system became manifest to the professors of modern languages. They recognised the necessity of learning a foreign language in order to be able to converse in it. They sought to give to the studies of English and German a more practical character. They began to teach the most usual locutions. They assigned to conversational English and German a more important place.

The systems of MM. Gouin and Berlitz pointed out the way. The first insisted on the fact that the child should *see with his mind's eye* the objects of which he was to learn the foreign names. This system was for a long time almost unknown in France, and the author, not finding a publisher who would bear the expense, had the rare courage to set up the types for the composition of a work of 400 pages on the "Art of Teaching and Studying Languages."¹

Curiously enough, this work was not appreciated in France until the *Review of Reviews* commended it in England and published an important article, in which Mr. Stead testified to the remarkable progress his five children had made owing to this method.

The Berlitz system had a more rapid success, partly due to its intrinsic advantages and also to judicious advertisement. It wished to imitate the "maternal method," and taught a foreign language in the same way as a mother would teach her child to speak, that is to say, without having recourse to another language. If the Gouin method recommended the sight of the objects by the mind's eye, the Berlitz system sought to show them as much as possible in a concrete manner. Both systems combated the ancient custom of always translating one language into another, and their efforts were directed towards the direct intuition of the objects. Such is the principal cause of their success and influence.

Direct intuition of the objects is also the most essential point of the new method that the recent ministerial instructions introduced into the official teaching in the French "lycées," colleges and other State schools. It was necessary to give up the old methods of instruction in dead languages, to abandon the false custom of continually translating words and phrases from one language to another; it was indispensable to free the scholar's mind from the restricting intermediary of the maternal language being constantly interposed between the words and the object. In a word, it was necessary to borrow from the Berlitz method the direct view of the concrete object, and, where these concrete objects are wanting, it was judged useful to have recourse to the method of M. Gouin, that is to say, to the intuition of the mind's eye. In these two cases it was the direct view of the objects or the ideas without the intermediary of the maternal tongue which must be realised. That is the reason why this way of teaching foreign languages is called in the new programmes "the direct method."

And to-day it seems beyond dispute, and it is now universally admitted in France, that all the efforts of teachers of modern languages should tend above all towards the following end: *to see directly the objects while thinking of the English or German words, and to avoid the fastidious translating word by word from*

¹ The last edition appeared by Fischbacher with the following title: "Essai sur une Réforme des Méthodes d'Enseignement. Exposé d'une nouvelle méthode linguistique. L'Art d'enseigner et d'étudier les langues." Par François Gouin. Paris, 1893.

one language to another, which wearies and fatigues the pupil. This great principle of direct intuition is also directed to one great end, that is, to think in a foreign language. Let us now see how it is hoped to realise this very difficult task.

In the first lessons it is prohibited to translate foreign words or expressions into the mother tongue. One is obliged to show the objects while pronouncing the English or German names. The pupil should make the movements of which he is learning the foreign designation. In the lower classes coloured pictures are shown; they are orally explained and become the objects of easy conversations. As much as possible, the pupils should be taught to sing easy songs in a foreign tongue. I have noticed, among other songs in one of the most widely circulated books in France, some of the most popular English songs, as Thomas Moore's "The Last Rose," or Robert Burns' "My heart is in the Highlands." These singing exercises have an excellent effect upon the pronunciation of the pupils, and especially excite the children to catch the English tonic accent, which the French find very difficult to acquire. The rhythm, the rhyme are impressed upon the ear so accurately that I have myself heard with real pleasure charming English songs in classes where English had only been taught for some months. The young girls are especially apt in this exercise and arrive at excellent results.

According to the new ministerial instructions, this essential oral teaching ought to be employed during the first two years. In the meantime, every book is nearly useless, and the grammatical teaching should be reduced to few elementary rules, the essential point being to accustom the ear of the pupil to the foreign language, and to make him learn the usual vocabulary.

During the two following years the instruction becomes more theoretical. The grammar takes a more important place, but the rule must always follow the examples given instead of preceding them. The greatest portion of the time formerly devoted to written translations is given to-day to much reading of interesting and even amusing works. I have been much surprised to see in the French syllabuses a great number of modern and recreative works little known in English schools, but which are easier to understand than the greatest part of classic authors, and more suited to the minds of young children.

After these two years of theory and reading, the new ministerial instructions order two years of deeper studies and literary compositions. The scholars, being already familiar with ordinary terms, and accustomed by the direct method to think in a foreign language, will commence to write English or German compositions and study the best English or German styles. In the exercises and translations, they do not write word for word as heretofore, but deliver a suitable version of the text in accordance with the spirit of the languages.

The culmination of these studies will be the *Baccalauréat Examination*, which will consist, in the

"Sections of Foreign Languages,"¹ of an essay in the modern language. The subject will be chosen among the topics of everyday life rather than from the history of literature. A few lines giving the scheme and supplying the fundamental ideas of the subject will be dictated in French, and a foreign dictionary, *without French translation*, will be authorised, to make the pupils proficient in the handling of English or German books.

Eight or nine years was the time allotted for the attainment of a less high end in the old syllabus, but now the pupil will be expected to arrive at a better result after six years' study with five hours a week.

An English traveller visiting our renewed lycées and colleges will be agreeably surprised in a few years to see an English class transformed, according to the new official instructions, into "a little England." Moreover, our teachers must endeavour to bring their pupils into touch with English customs and manners, so that they may be able to enter into the conceptions of life, ideas, and feelings of the nation whose language they learn. The French class-rooms will be ornamented little by little with engravings of English landscapes, towns and monuments. The best new English school-books contain already a few geographical maps of England, Scotland, or Ireland, and many views of London, Edinburgh, Dublin, or other large towns.

People seem to have at last grasped the fact that the principal object in teaching modern languages is not to acquire the art of indifferently translating a few lines from one language into another, but to instil into the pupils' minds the customs and ideas of foreign peoples.

Thus the new French method of teaching the English language, whose most essential points we have briefly characterised, will contribute to strengthen the friendly feelings of two neighbouring nations, enabling them to understand and to appreciate each other more and more.

THE aim of the teacher of a living foreign language should be to secure to his pupils, with regard to the new language, all the utilitarian and educational advantages which are placed within their reach by the command of their own. Where a due proportion of school time is allotted to his subject, a thoroughly qualified teacher may reasonably hope to set his pupils so far on their way that they are able at the end of their school course,

- (a) to understand readily the spoken foreign idiom,
- (b) to express thought unhesitatingly and correctly therein,
- (c) to read with ease and intelligence prose or verse of ordinary difficulty written in the foreign language,
- (d) to express themselves correctly, in writing, in the foreign idiom.—Dr. F. Spencer in "Aims and Practice of Teaching" (Cambridge University Press).

¹ It is the "Latin Section with a more developed study of the Living Languages," and the "Section of Modern Language combined with the study of Sciences." Cf. our article in THE SCHOOL WORLD on "Recent Reforms of Secondary Education in France" (July number, 1903, pp. 242-245).

APPARATUS FOR THE MEASUREMENT OF THERMAL EXPANSION.

By E. S. A. ROBSON, M.Sc.
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BEFORE proceeding to the description of apparatus suitable for use by students of practical physics, it will probably be well to give a general idea of the principles involved in its construction. By this means teachers who intend making their own apparatus will observe the essential parts which require careful and accurate attention, while, on the other hand, those who intend to purchase apparatus will be better able to appraise its value from a working point of view.

In all cases of thermal expansion, where a quantity of matter, Q , expands by an amount q for a rise in temperature T° , the mean co-efficient of expansion (c) between the limits of temperature is given by the equation.

$$c = \frac{q}{Q T}$$

In the case of liquids c will represent the apparent co-efficient of expansion. Now, suppose that the errors due to the measurements of q , Q and T are respectively α , β , and γ , fractions of the above quantities. The co-efficient of expansion now becomes:

$$= \frac{q(1 \pm \alpha)}{Q T(1 \pm \beta)(1 \pm \gamma)} = \frac{q(1 + \alpha + \beta + \gamma)}{Q T} \text{ approx.}$$

The value of the maximum error is $\pm(\alpha + \beta + \gamma)$, and in constructing the apparatus this value should not exceed a certain limit, to be determined upon beforehand. For example, suppose that we wish to construct an apparatus for the determination of the linear expansion of solids, giving results correct to 1 per cent.

In this case the quantity Q represents the original length of the metal rod or tube; q will be the increase of length, and T° the rise of temperature. Suppose we decide to make the rod or tube 50 cm. in length; it will be quite easy to measure this length with a good metre scale to within 1 mm., *i.e.*, the value of the possible error (β) is one part in 500, or 0.2 per cent. The temperature can be estimated with the eye to 0.1° C., so that, when using cold water and steam as limits of temperature, the value of T would be about 80° C., and the error (γ) would be one part in 800, or 0.13 per cent. As, however, the thermometer may not be calibrated, and the varying pressure of the steam makes the upper temperature reading slightly inaccurate, it would be safer to estimate the value of γ as 0.2 per cent.

We must now carefully ascertain the best method of measuring the increase of length, which might be roughly calculated, *e.g.*, in the case of brass the expansion would be about 0.8 mm. for a length of 50 cms., and for a rise in temperature of 80° C. Suppose we decide to use a spherometer of $\frac{1}{2}$ mm. pitch, with 100 divisions on the graduated head, thus giving 160 divisions for

the required expansion. If the spherometer reads accurately to one division, the error (α) would be 1 part in 160, or 0.6 per cent. The total maximum error of the apparatus will be just ± 1.0 per cent.; the total minimum error will be ± 0.2 per cent. With a more accurate spherometer of $\frac{1}{4}$ mm. pitch, and 500 divisions on the graduated head, reading to one division, the value of α would be 0.2 per cent., thus giving a total maximum and minimum error alike of ± 0.2 per cent. The reader may apply these principles to the apparatus to be described.

EXPANSION OF SOLIDS.

For comparative work some form of *Ferguson's pyrometer* may be used (price £1 15s., from any apparatus maker). In this apparatus one end of the rod rests against a fixed screw, while the other end is free to move and pushes against a movable pointer. Avoid using methylated spirits as the source of heat and substitute a gas burner consisting of a brass tube closed at one end and with holes drilled at intervals along its upper surface. Bend the tube so as to lie parallel to the rod and fix it with iron staples to the wooden base.

For accurate quantitative results we may classify the apparatus according to the method used in measuring the expansions.

(1) Using a *graduated wedge* faced with glass and sliding along a vertical support. This apparatus, designed by Mr. W. Rheam, B.Sc., of the Liverpool Institute, is sold by Messrs. J. J. Griffin and Sons, London (price 17s. 6d.). The slope of the wedge is 1 in 10, so that a difference of 8 or 9 mms. is measured on the vertical scale.

(2) Using a *spherometer*. In the apparatus sold by Messrs. F. Jackson and Co., Manchester, the tubes are about 60 cm. in length and supported in a vertical wooden stand. A glass plate fits over the top, and through a central hole the spherometer screw touches the top of the tube. No steam jacket is necessary, as the fall in temperature along the tube is negligible. The price is £1 2s. 6d., with 5s. extra for each tube. In Messrs. Townson and Mercer's form of apparatus (Fig. 1) the metal rod is heated by means of a steam jacket, and the stand adjusted by three levelling screws. The price is £1 3s. 6d. The same firm also lists a newer and improved pattern known as *La-velle's extensimeter* at £1 7s. 6d., which is probably the best of this class of apparatus.

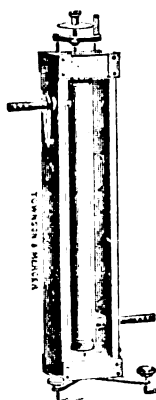


FIG. 1.—Spherometer method for the determination of the linear expansion of a solid rod.

(3) *Microscope method*. In this method the metal tube, supported horizontally, is clamped at one end, and steam is passed through at a temperature presumed to be the same as that inside the steam heater. A scratch mark is made near

the free end of the tube and the expansion measured either with a reading microscope or with an ordinary microscope fitted with a graduated eye-piece. The usual form of Vernier microscopes, reading to $\frac{1}{20}$ mm., are unsuitable for the experiment, seeing that the total expansion of 50 cm. of tube will only be about 0.4—0.8 mm. Messrs. Harvey and Peak, London, list a good and accurate reading microscope, reading to $\frac{1}{100}$ mm. (price £4 10s.), which would give a result accurate to 0.5 per cent. When using an ordinary microscope the graduated eye-piece may be calibrated with a stage micrometer of 1 mm. divided into 100 parts. The glass micrometer for the eye-piece costs 6s.; the stage micrometer 5s. (Max Kohl).

(4) Using *two micrometer gauges*. In Weedon's form of apparatus (Fig. 2) (price £6 6s., Messrs.



FIG. 2.—Determination of the linear expansion of a solid rod by means of two micrometer gauges.

J. J. Griffin, London) the rod is heated in a water tank, and is free to expand at both ends, the expansion being measured by means of accurate micrometer screws. The expansion can thus be measured for small differences in temperatures, and by substituting glycerine for water its use might be further extended.

(5) *Telescopic method*. In this method, first used by Dulong and Petit, the solid rod on being heated actuates a lever having a small circular mirror fixed to its upper end, the expansion being read by a subjective or objective telescopic method (price £7 10s., Max Kohl; agents, Messrs. Isenthal and Company, London). The lever may also be arranged to move the observing telescope, which is focused on a metre scale fixed to the ceiling of the laboratory. The latter method is much used in German laboratories, where one also notices a vertical plane arrangement for a galvanometer lamp and scale.

EXPANSION OF LIQUIDS.

For the determination of the *apparent expansion*, use either a glass bulb tube of known volume and fitted with graduated tube (price 3s., Jackson) or as an alternative a specific gravity bottle may be recommended. For advanced students the weight thermometer and pyrometer will suffice. Weighings may be determined to the nearest centigram; the water in the heater should be kept well stirred and the instrument should not be withdrawn until the water has been boiling for at least five minutes, otherwise the containing vessel will not have attained its full expansion.

In the case of the *absolute expansion* of a liquid the best method is a modification of Dulong and Petit's apparatus. A piece of $\frac{3}{8}$ -in. glass tubing is bent into a U shape having a flat base. The two limbs are then fitted with large rubber stoppers and surrounded with $1\frac{1}{2}$ -in. stout glass tubing, the open ends of the U tube just appearing above the upper stoppers. Four short lengths of glass tubing are bent at right angles and fitted into the four rubber stoppers, thus allowing for the inlet and outlet of water in one tube and steam in the other. The U tube is best filled with some liquid, e.g., aniline, having a large coefficient of expansion. The difference in level is read off by means of a reading microscope, or by means of a simple cathetometer reading to $\frac{1}{10}$ mm.

The temperatures are measured by means of two thermometers placed in each tube. The price of the apparatus is £1 1s. (Mr. G. Cussons, Manchester). In the case of mercury the expansion is rather small, and the neatest method of measuring the expansion is to fix over each tube a spherometer having a long screw to the instrument, so that it comes into contact with the surface of the liquid.

Another simple and accurate method for the expansion of a liquid is the *areometric* or *Mathiessen's method*, in which a closed glass bulb weighted with lead or mercury is suspended in a bath of the liquid by means of a fine wire attached to one pan of a balance.

The latter is placed on a wooden shelf about 18 in. above the desk and a hole drilled in the shelf to allow the wire to pass through. Starting with the two weights of the bulb in the air, the tank of liquid is placed on a tripod underneath and the apparent weight of the bulb is determined when immersed in the liquid at two known temperatures. The weighted bulb may be constructed from an old air-thermometer. The complete apparatus, with shelf, balance and tank, costs £2 5s. (Cussons); the weighted bulbs cost 7d. each (Griffin).

For those who have a Reimann's patent specific gravity balance with an iron base (Messrs. F. E. Becker and Co., Birmingham, £3), the bulb alone will be required.

In order to illustrate the very important point of the maximum density of water, Hofmann's arrangement (price 10s. 6d., Jackson or Max Kohl) will be found very suitable (see Fig. 3). The thermometer B is fixed to the centre of the bulb A containing distilled water, while the rise or fall of the water is easily distinguished by means of a fine glass capillary tube C. A tank of water, cooled by lumps of ice, serves to lower the temperature. A hard rubber stopper D having a piece of thin glass rod pushed through the centre serves to close the glass bulb, and the necessary amount of water is forced up the capillary by pushing in the glass rod more or less. A small quantity of mercury should be placed at the bottom of the glass bulb in order to eliminate the contraction of the glass itself.

EXPANSION OF GASES.

To illustrate Boyle's law, the simplest form of apparatus consists of a thistle funnel connected by pressure tubing with a closed glass tube, mercury being poured in to supply the pressure. By fixing the two tubes on retort stands and raising or lowering them, the law may be demonstrated both above and below atmospheric pressure. A more

pneumatic tyre valve let into the rubber stopper. The heights of the columns of air and mercury are then read on a metre scale placed behind the tubes. A strong form of this apparatus costs 15s. (Cussons).

With regard to the proof of the Gay-Lussac Charles' law, most teachers are familiar with the horizontal barometer tubing, closed at one end and with a column of air inside, enclosed by means of a plug of mercury. An alternative method consists in using a two-stoppered gas sample-tube of about 200 cc. capacity (price 2s.), and heating it by immersion in boiling water, one stopper being open and slightly above the level of the water. Having allowed the air to expand, close the stopcock and transfer the sample tube to a vessel containing cold water. Now open the lower stopcock and the water rushes in to fill the place produced by contraction of the air. Again close the stopcock, dry the outside, and weigh the tube, with its contents, thus obtaining the amount of expansion. From the weight of the tube filled entirely with water the amount of air which has expanded may be obtained.

The relation between the pressure and temperature of a gas at constant volume is best proved with Joly's form of apparatus, small size, price 15s. (Pye), large size, price £1 15s. (Cussons). An apparatus (Fig. 4) to prove all three laws, and suitable for experiments on vapour tension, will cost £4 15s. (Messrs. Philip Harris).

In describing Dulong and Petit's apparatus for the expansion of liquids, mention was made of a cheap cathetometer as a means of measuring the difference in height. The writer has recently devised an instrument which will serve to measure accurately small distances either horizontally or vertically. It is a modification of a Vernier microscope designed by Mr. A. Adamson of the Manchester Institute of Technology. On a wooden upright (Fig. 5) 1 metre in length are fixed two boxwood scales divided into tenths of inches and centimetres respectively. Between the two scales is a V-shaped longitudinal groove in which a rod or tube may be calibrated. The arrangement for reading is similar to that of the cursor on a slide rule. On the thin piece of celluloid is marked a fine straight line, so as to be exactly over the object under observation. The readings on the scales are taken by the aid of two verniers (Fig. 6) attached to the under surface of the plate, each vernier having ten

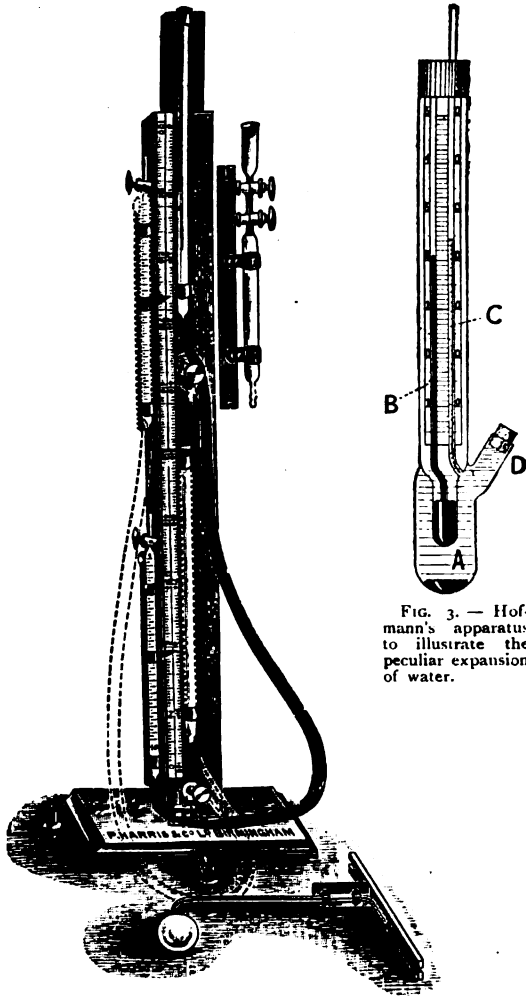


FIG. 4.—Apparatus designed to illustrate the chief gaseous laws.

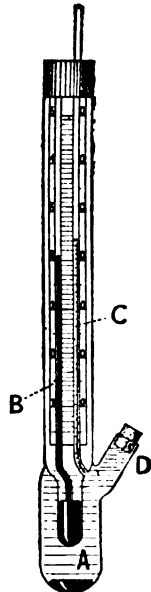


FIG. 3.—Hofmann's apparatus to illustrate the peculiar expansion of water.

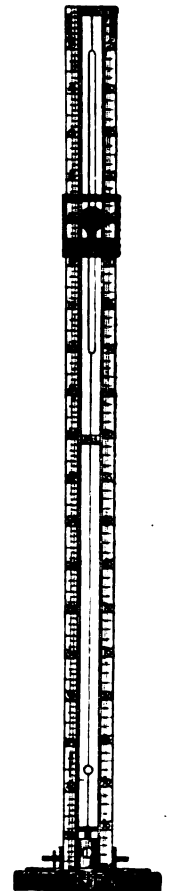


FIG. 5.—New form of simple vernier microscope-cathetometer.

elaborate form costs £1 5s. (Messrs. W. G. Pye, Cambridge). The ladder type of apparatus, in which the two tubes work in steps cut in a wooden upright, will stand rough usage well (price 18s., Cussons).

A neat form of forced pressure apparatus to prove Boyle's law at high pressures consists of a strong glass bottle fitted with a rubber stopper and two pieces of barometer tubing, one, the shorter, being closed and containing the air under test; the second and longer tube being open and acting as a manometer. The bottle is half filled with mercury, and air is pumped in through

divisions corresponding to nine scale divisions. The observations are made through a simple reading microscope (Fig. 7) carried by the sliding frame, the lens being supported at a suitable height above the scale, and the eye is placed

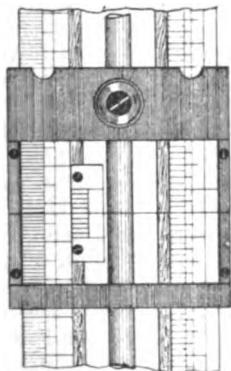


FIG. 6.—Enlarged plan of vernier arrangement. (Metal rod in the groove.)

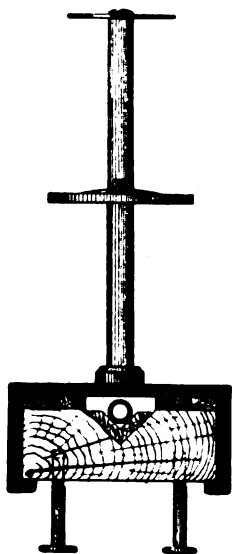


FIG. 7.—Section of reading telescope and wooden stand.

in diameter with india-rubber "push-on" attachments will cost 2s. 3d. (Messrs. David Baxter, Todd Street, Manchester). To protect the exposed part of a thermometer use a length of asbestos tube having an inside diameter of about $\frac{1}{4}$ in. and outside diameter $\frac{3}{8}$ in. (price 6d. per foot, United Asbestos Co., Billiter Street, London).

NEGLECT of discipline is a greater evil than neglect of culture, for the last can be remedied later in life, but unruliness cannot be done away with, and a mistake in discipline can never be repaired.—Kant.

THE ASSOCIATION OF TECHNICAL INSTITUTIONS.

TEN years ago educational associations were in existence which were entitled to speak for first and second-grade secondary schools, elementary schools, higher grade schools and many other educational interests; but there was no body which could voice the average opinion of those institutions engaged in the work of technical education. This arose probably mainly from two reasons: first, the comparatively small number of



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technical institutions in existence at that time, and, secondly, the variety of their character. For, while some of the institutions were technical colleges giving the highest kind of technical education obtainable in this country, others were mainly secondary schools of a modern type with evening classes for artisans; while a third variety provided nothing but evening classes.

In 1893, however, it was felt that the time had come when those engaged in the work of technical education ought to put themselves in a position to speak collectively when necessary, and a circular was therefore issued by Prof. Wertheimer, the Principal of the Merchant Venturers' Technical College, Bristol, making preliminary enquiries as to whether

or not it was desirable to form a society which should be able to formulate the views of those engaged in directing and organising technical education in this country. Sufficient replies of a favourable character were received, and a preliminary meeting was held at the Manchester Municipal Technical School in November, 1893, at which there were present the principals of the technical institutions at Bolton, Bristol, Chester, Keighley, Manchester, Sheffield and Stockport, and the secretaries of such institutions at Ashton-under-Lyne, Bradford, Glasgow, Huddersfield, Leigh, Preston and Rochdale. London was represented by delegates from the East London Technical College and the Borough Polytechnic. Besides those present at the meeting others sent letters expressing a desire to form an association, and among these were Mr. F. G. Ogilvie, then principal of the Heriot-Watt College, Edinburgh, and now Chief Assistant-Secretary of the Board of Education for Technology; the principals of the technical institutions at Plymouth and Wigan, and the secretary of the Goldsmiths' Technical Institute.

The result of this meeting was that it was resolved to form an Association of Technical Institutions which should consist of representatives of such institutions appointed by their governing bodies. As a rule, each institution is represented by two persons, one of whom is a member of the governing body and the other the principal of the institution. In this way the Association has avoided becoming anything in the nature of a trades' union; indeed, no question affecting the rights or remuneration of officials has ever been brought before the Association.

In addition to the towns mentioned above there were at the first annual meeting, which was held at the room of the Society of Arts, London, representatives of the following towns: Bath, Birmingham, Hull, Leeds, Lincoln, Portsmouth and Wolverhampton. It was decided that the objects of the Association should be: (a) To provide a medium for the interchange of ideas among its members; (b) to influence, by combined action where desirable, parliament, county councils, and other bodies concerned in promoting technical education; (c) to promote the efficient organisation and management of technical institutions, facilitate concordant action among governing bodies, and aid the development of technical education throughout the United Kingdom.

Alderman Martineau, of Birmingham, was appointed Treasurer of the Association, and Prof. Wertheimer, of Bristol, Hon. Secretary, and among the members of the first council were Sir Philip Magnus, Principal Ogilvie, of Edinburgh, Prof. Ripper, of Sheffield, Mr. Reynolds, of Manchester, and Mr. Alderman Ward, of Portsmouth. The Treasurer, the Hon. Secretary, Principal Reynolds and Alderman Ward, are the only original members of the Council who still hold office; the first two after ten years' service are retiring in January next.

Mr. W. P. Sawyer, the clerk of the Drapers' Company and a representative of the East London

Technical College, was the first chairman of the council, and for several years was one of the most active members of the Association. At the second annual meeting it was decided to appoint a president who need not necessarily be a member of the Association, and thus the help of many distinguished men has been secured. The annual addresses of the presidents have been published in the "Proceedings" of the Association, and have formed important contributions to the educational literature of the country, as will readily be understood from the names of the presidents which follow in the order in which they have held office: Sir William Mather, M.P., the late Right Hon. A. J. Mundella, M.P., the Right Hon. Henry Hobhouse, M.P., the Right Hon. Sir Bernhard Samuelson, Bart., F.R.S., the Right Hon. Earl Spencer, K.G., Sir Swire Smith, the Right Hon. Sir William Hart Dyke, Bart., M.P., the Right Hon. Lord Avebury, D.C.L., F.R.S., and Sir John Wolfe Barry, K.C.B., F.R.S. The President-Elect for 1904 is the Right Hon. Sir John E. Gorst, K.C., M.P.

It would need more space than is available to describe with any fulness the work which has been done by the Association in the last decade, but a few of the most important steps it has taken may be enumerated.

Perhaps the greatest service it has hitherto rendered has been the collection of statistics as to the number of adult day-students in technical institutions in the United Kingdom and the comparison it has made between these numbers and the numbers of similar students in corresponding institutions in Germany and the United States. The results of this enquiry were widely circulated in the form of a pamphlet entitled, "Are our Industrial Leaders Efficiently Trained?" which had a very large sale, and has been extensively used by nearly every writer on the subject since its publication. In this pamphlet it was shown that not only is the number of day students of technology in this country absurdly small when compared with the numbers for the nations which are our two leading industrial competitors, but our students pursue shorter courses of study, commence their studies at an earlier age and with less preparation, and are taught in buildings the equipment of which is inferior. Moreover, the teaching staff is much less numerous, and each teacher has to cover such a wide range of knowledge that he is not able to specialise in the same way as the professors and lecturers in the American and German technical high schools.

Another important work undertaken by the Association was its opposition to the Secondary Education Bill introduced into the House of Commons by Colonel Lockwood in 1898. The Association from the first was anxious to do everything in its power to secure the improvement of secondary education in this country, not only for the sake of secondary education itself, but also because higher technical education of the best sort can only rest on a basis of sound secondary education. But the Association could not support Colonel Lockwood's

Bill because it proposed (*a*) to separate technical from secondary education, instead of following the opinion of the Royal Commission on Secondary Education, which lays down the view that the two forms of education ought to be regarded as necessary parts of higher education generally; (*b*) to create new local authorities dealing specially with secondary education only; and (*c*) to provide for the financial needs of secondary education, not by further monetary grants, but by taking away from technical education part of the money allotted to it.

Another important work of the Association has been an attempt to do something towards lessening the enormous number of examinations of various sorts under the burden of which education in this country groans. With this end in view it approached the professional bodies which deal with engineering, architecture, &c., and tried to secure increased recognition for the teaching work done in technical institutions. It was successful in securing concessions from the Institutions of Electrical and Mechanical Engineers and from the Royal Institute of British Architects; the latter body agreed to accept the certificates of the Board of Education in certain subjects in lieu of the examinations conducted by itself. There is much more useful work of this kind to be done, but it is doubtful whether any body less strong than Parliament itself can deal effectively with the numerous and powerful vested interests concerned in the many examinations which now hamper British education.

The Association was very successful in its efforts to secure modifications in the original draft of the Education Bill, 1902; for the Bill was amended in accordance with suggestions of the Association in the following directions:—(*a*) the Government deleted the clause making it optional for the county and borough councils to undertake the supervision of elementary education; (*b*) it made compulsory the application for the purposes of higher education of the residue under the Local Taxation (Customs and Excise) Act, 1890; (*c*) it decided to provide from the national exchequer larger sums for educational purposes than were mentioned in the original draft of the Bill; and (*d*) in the case of county boroughs, it removed the statutory limit to the amount to be expended on higher education.

Many concessions have been obtained from the Board of Education by the Association: among the most important may be mentioned (*a*) block grants for secondary schools; (*b*) simplification of the methods of registration for evening classes; (*c*) simplification of the rules in accordance with which grants are made to evening classes; (*d*) the inclusion of technological subjects in the list of those for which grants are given to evening classes; (*e*) special grants for day classes for adult students in technical institutions.

The Association has naturally come in contact repeatedly with the City and Guilds of London Institute; through the medium of the Board of Education it has obtained for technical institu-

tions representation on the Examinations Board of that Institute, but it is still without representation on the Examinations Committee. As matters of importance appear to be frequently considered by the Committee without reference to the Board, the representation thus obtained is not as serviceable as might otherwise be the case. The Association has pressed the Institute to recognise advisory committees in connection with the various industries, so that the examinations which the Institute holds for artisans engaged in these industries may be of the greatest possible service to the nation. The Institute has in certain cases acceded to the request of the Association, the latest instance being the establishment of an advisory committee in connection with the leather trades' industries, which will probably become an accomplished fact in the course of the next month or so.

The number of institutions which now belong to the Association is sixty-six, and practically every town in the United Kingdom which possesses a technical institution of any considerable size is represented. On the Council for the current year the different parts of the country are well represented, for the members include representatives from the following towns:—Birmingham, Bristol, Glasgow, Huddersfield, London, Liverpool, Manchester, Northampton, Portsmouth, Rochdale and Salford.

While the Association holds its meetings in London only, the Council meets in the different towns containing the institutions forming the Association: members of the Council thus obtain that intimate knowledge of the conditions prevailing in the institutions in different parts of the country which is necessary to enable them to form opinions as to the policy most likely to be of general service.

Quite apart from the work mentioned above, the Association has been of inestimable value in other directions. Before its existence those engaged in the work of technical education were in many cases more or less isolated from their fellow-workers: the Association has provided opportunities for intercourse and exchange of ideas, and there is probably no institution which belongs to it that has not gained some valuable suggestions from discussions by its representatives with those of other institutions in regard to the many difficult problems which must be solved, if technical education in this country is to be raised to the same or a higher level than prevails in Germany and the United States.

THE Local Examinations and Lectures Syndicate of the University of Cambridge announce that, in the Higher Local Examination to be held in June, 1904, arrangements will be made so that students can be examined both in political economy and in French history, although these two subjects were placed at the same time in the time-table, as originally published.

A NEW SCHEME OF STUDY IN THE HUMANITIES.

By T. E. PAGE, M.A.
Charterhouse.

THE tendency of education in recent years has been to give a continually larger place to the study of science. Nor is this fact to be wondered at. The Victorian age was pre-eminently a scientific age. Within the limits of a single reign science by its giant growth changed almost all the conditions of individual, social, and national life. It has laid bare deep secrets of nature which had been hidden from the foundation of the world; there is hardly a department of human industry which it has not revolutionised; it has altered the very possibilities of thought, while along every path of material progress it has established itself as the sole and sure guide. Accordingly it is only natural that in education scientific studies have continually been advancing while what may be called "the Humanities" have been continually receiving less attention; and this change has been welcomed with exultation, though, in fact, it affords some ground for sober and serious concern. For scientific study, even though it has become an essential, perhaps the most essential, part of education, is none the less only a part, and when it is pursued too exclusively, so as to dwarf or destroy other studies, education becomes stunted and illiberal. Moreover, the teaching of science has always a tendency to degenerate in character, because the very fact that science has a high commercial value involves a constant danger to its use as an instrument of education. It is constantly exposed to the risk of being regarded as something which it will "pay" to learn, as something the use of which is not so much to strengthen and enlarge the mind or add to the interest of life as to secure for its possessor larger wages. When thus degraded the study of science can hardly be called "education," for the acquisition of merely technical skill in some particular subject obviously does not imply the possession of any of those higher qualities which are the proper distinction of humanity. Finally, too, even the commercial value of "technical" instruction in science seems to be extremely doubtful, for with the immense advance of scientific knowledge clearly it is only a very few exceptional men who can attain scientific results which have an exchange value in the market. Science, in fact, is in this respect becoming curiously like poetry. An interest in it and a love for it make a man mentally richer, but those who wish to make money by it will find that there is no demand for mediocrity.

But if what has been said be true, or if it be in large measure true, then it would seem that the outcry for more and more technical education needs rather to be repressed than encouraged. In some crafts, of course, individual skill must always be necessary and highly valued, but the general trend of industrial development is to make the

individual only a highly specialised part in an extremely complex mechanism, and to require from him in the performance of his task chiefly a certain empirical dexterity. For the vast army of workers their work must in the main be monotonous and mechanical, and it would seem to be almost the first business of education to bring to these dull, drudging lives some possibility of becoming brighter, more dignified, and, in fact, more human. For, after all, in spite of economic or scientific thinkers who prefer the phrase "a tool-using animal," there is truth in the Hebrew dream that man is "made in the image of God," or even in Hamlet's mad description of him as "noble in reason" and "infinite in faculty."

Accordingly it is impossible not to welcome with the warmest approval a scheme which has recently been put forward by the University of London—a University in close touch with the pressing needs of modern life—by which it hopes to encourage "study in the Humanities." The scheme is arranged, in connection with University Extension work, for the help of "students engaged in various occupations during the day," and, after referring to the fact that "large" opportunities for "the study of science in its technical aspects" are already afforded, the preamble states, in words which deserve close attention, that "it is desired in the interests of a liberal education that some effort should be made to encourage studies in the department of history, literature, and art." The general plan is to provide (1) certain "Central Lectures" in which large periods of history will be handled broadly so as to form a sort of setting or background to special work; (2) a large number of "Local Lectures" dealing with particular literary, artistic, and historical subjects; and (3) tutorial supervision of "paper-work" done in connection with the lectures, and also with "some definite course of reading" approved by the lecturers. This course will extend over three yearly sessions of 25 weeks each, but in the fourth year there will be a course dealing with "the Fundamental Principles of Evidence and Reasoning," in which it is proposed to examine, not by "formal logic" but "by means of concrete examples," how great scientific generalisations or great principles of law are established, while in a fifth session there will be study of a more advanced type, the subjects being either (1) General History and English Literature "as a subsidiary subject," or (2) the British Constitution and Economic History. At the end of each session the University will officially award "sessional certificates" to successful students; at the end of four sessions "the Vice-Chancellor's certificate" may be obtained, and, finally, "a new Advanced Certificate" with regard to which it is stated that "its name and the privileges it may confer are still under consideration." It is added that the course is intended to suit not only "general students" but also "teachers in elementary and secondary schools, instructors in science and technology, art teachers" and the like, nor can it be doubted that many teachers will find these certificates practically valuable; but the

primary importance of the scheme consists in its recognition of the fact that "the Humanities" form a necessary part of all true education, and that at the present time the study of them distinctly needs encouragement. It is a pronouncement of the greatest weight put forward at a critical period, and, though the exact form of the proposed science may be at present tentative and experience may suggest many alterations, the principle and purpose which underlies it is wholly sound. That man "shall not live by bread alone" is a law not only of revelation but of nature, but of late years education has been largely directed towards that training which only fits men to supply their material needs. Such training is necessary, but it is not enough. It leaves the higher side of human nature wholly neglected, and unless supplemented by other studies must be counted imperfect and even ignoble.

EDUCATION IN THE NEW REPUBLIC.¹

By F. W. HEADLEY, M.A.

Haileybury College.

MR. WELLS in his preface frankly confesses that he has no great knowledge of biology, and claims that "irresponsibility and an untrained interest may permit a freshness, a freedom of mental gesture, that would be inconvenient and compromising for the specialist." As his book is highly interesting I am not prepared to resist his contention. To judge by his occasional wildness, he is not a specialist in educational matters any more than in biology. He has a "down" on schoolmasters. "Scolding the schoolmaster, gibing at the schoolmaster, guying, afflicting and exasperating the schoolmaster in every conceivable way, is an amusement so entirely congenial to me in every way that I do not for one moment propose to abandon it." He owns it is no good, but he cannot help it. How many men there are who find this foolish practice delightful! Mr. Wells, unlike most of these critics, has his kindlier moments when he is all sympathy for all schoolmasters except clerical headmasters. Moreover, again unlike most critics, he is full of ideas, some of which are helpful, and in one passage he traces the doubtless very annoying conservatism of schoolmasters to excess of work and worry. Here he seems to be getting nearer to facts than most men who write on education. Certainly he is going the right way to break down this brick-wall of conservatism.

Some of his remarks on the education of children are worth considering. The kindergarten system is meant more for the home than for the school. A child should learn its own language well rather than a foreign language. It will very soon forget a foreign language in spite of the popular theory to the

contrary. The foreign governess for the mere infant is a most undesirable institution. English must somehow be taught to infant and boy and girl. Not only is Mr. Wells wise in this, but he sees the difficulty. How is English to be taught at school? The man who discovers this will have solved one of the great problems of education. There must, of course, be essay writing, and there must be reading, a great deal of reading. Pronunciation must be well taught. Grammar is not counted for much. It is of high importance to have a large vocabulary if only that Mr. Wells may not be hampered in writing by the thought, Will the long word that I am using be intelligible to most of my readers? "The pressing business of the school is to widen the range of intercourse," and here he has got hold of something that should be laid to heart. A boy's vocabulary is miserably small, and how are we to enlarge it?

Modern languages, other than English, are to be learnt, not for culture but because of their practical utility. A great deal is expected of a schoolmaster. He must not be the petrefaction he is—at any rate in Mr. Wells' imagination—now. But Mr. Wells would lighten his burden in some important ways. Too much is expected of him. "We treat the complex, difficult and honourable task of intellectual development as if it were within the capacity of any earnest but muddle-headed young lady, or any half-educated gentleman in orders. We take that for granted, and we demand in addition the formation of character, moral and ethical training, and supervision," &c., &c. There is much truth in this. Moreover, he does not forget that if we are to improve the average man of the coming years, "we must look first to the possibility of improving the tone and quality of the average home." The school cannot do everything. How true, too, is what he says of modern school life—happily not equally true of all schools! "The English schoolboy and schoolgirl are simply hunted through their days. They do not play, using the word to indicate a spontaneous employment into which imagination enters; they have games, but they are so regulated that the imagination is eliminated; they have exercises of various stereotyped sorts."

Teaching must not consist entirely of talking at the pupils while they sit and listen. They must have plenty of good books at their disposal, and for some hours in the week the boys and girls should sit quiet and read them. Here again is good sense. He gives a curriculum of work. The staple subjects are English (the most important of all), mathematics, drawing and painting, "music" (perhaps). About university courses he has much to say. There are the three alternatives (1) science, in the shape of mathematics, physics and the principles of chemistry; (2) biology with evolution as its central idea; (3) history. He grudgingly admits Latin and Greek as a possible fourth alternative. Those who devote themselves to Latin and Greek are "fumbling with the keys at the door of a room that was ransacked long ago." Mr. Wells is strong upon the value of the printed

¹ "Mankind in the Making." By H. G. Wells. viii. + 429 pp. (Chapman & Hall.) Price 7s. 6d.

book. Why lecture when the whole subject is explained in print far better than the lecturer can explain it? The professor would be better occupied in keeping text-books up to date. A good library can do much which a university fancies that it alone can do. Universities remind Mr. Wells of "an absent-minded waterseller bearing his precious jars and crying his wares knee-deep, and going deeper into a rising stream." Naturally he makes much of books. Nature-study, counting the petals of flowers, is a poor thing for town boys. A town boy must observe all he sees about him in the streets and shop windows. No doubt Nature-study may be made a craze. Let us take Mr. Wells' remarks as meant for those who are crazed on the subject.

I have been able barely to touch on the many suggestions in the book. Certainly it repays reading. A schoolmaster will find much good advice in it, accompanied with the mustard of gibe and jeer with which he is familiar.

A NEW LATIN GRAMMAR.¹

THIS book, taken as a whole, is admirable. We are so used in this country to see schoolbooks compiled by persons who have no authority that it is a pleasant change to read a grammar compiled by two well-known scholars; in particular, the co-operation of a philologist is to be commended. The phonetics and morphology of this book are especially well done; the classification of the syntax is clear and practically helpful, although in that part too little prominence is given to the historical side. The basis of classification is logical, and grammar is not logical; logic helps the learner, but the student needs that it should be supplemented by a careful historical treatment. The reader will see in a moment what we mean by examining the classification of the uses of the moods (p. 240). It is useful to have meanings like *natural likelihood* and *ideal certainty* given to the subjunctive; but the student wishes to know how one shades into the other, and from what source, or sources, they came; for which purposes another table is necessary. What need is there, by the way, to coin an ugly term like *volitive* subjunctive for the subjunctive of will? or to use *actuality* instead of fact, which the authors are constrained to put in as an explanation? Other most praiseworthy points in the book are the spelling, the marking of concealed quantity, the insistence that language is a thing spoken, not a thing written, and the importance given to agreement by sense, not form, which is a category by itself.

We add a few criticisms, which perhaps the authors may take into account in future editions.

The vowel sound in *they* is a diphthong, and ought not to be given as equivalent to Latin *e* (p. 3). The statement that "a syllable is also long, even where the vowel is short, provided it ends in a consonant" (p. 143), is misleading as it stands, even with its following explanation; the words might be taken to imply that *dat* is a long syllable. We do not see what is gained by calling the fourth principal part "nom. sing. neut. of the pf. part. pass." (p. 77), instead of the supine. *Admirandus* and similar forms have not exactly the meaning of a future participle passive (106), although they approach it sometimes; at other times they approach the present (as in *voluenda dies*). How can *nescio-quis* be said to have "iambic shortening" (151, note¹)? Both this and the iambic shortening are due to accentual influences, but *nescio* is a cretic. The genitive after *accuso*, &c., is due to ellipse, and needs explanation (182). The "poetical and later prose uses of the infinitive" (322) are all older prose and colloquial uses; many mistakes, as a supposed Greek influence, have arisen from neglecting this fact. So, too, the use of the adverbial accusative *id*, &c. (205) is colloquial, and found in Cicero's Letters. In the remarks on style, whilst the treatment of emphasis and position is good, the implication that Latin does not "complete the thought" in each successive phrase is untrue; the thought is always complete in a word-group, the construction is incomplete. In the lengthening of *-que* by Virgil the Greek influence must be taken into account (352); unlike syntax, the Latin quantitative metre is wholly Greek in origin. In the syntax reasons might often be given with advantage, as the ablative with *opus* and *usus* is easily associated with the instrumental (226).

THE STUDY OF NATURE.¹

By LORD AVEBURY.

THE establishment of such a school as this appears to imply that Nature is worth studying. It would indeed almost have seemed as if this was a self-evident proposition. We live in a wonderful and beautiful world, full of interest, and one which it is most important to understand, and dangerous, if not fatal, to misunderstand. Yet until lately our elementary schools were practically confined to reading, writing, and arithmetic; our grammar schools mainly, as the very name denotes, to grammar; while our great public schools even now omit the study of Nature altogether, or devote to it only an hour or two in the week, snatched from the insatiable demands of Latin and Greek. The result is, in many cases, the most curious ignorance of common things.

Most children are inspired by the divine gift of curiosity, sometimes inconveniently so. They ask more questions than the wisest man can answer, and want to know the why and the wherefore of everything. Their minds are bright, eager, and thirsting for knowledge. We send them to school, their intellect is dulled, and their interest is crushed out; they may have learnt

¹ From an address delivered at the opening of the Cambridge and County School for Boys, October 24th, 1903.

¹ "A Latin Grammar." By W. G. Hale, Professor of Latin, and C. D. Buck, Professor of Comparative Philology, in the University of Chicago. xi. + 322 pp. (Ginn.) 4s. 6d.

much, but they have too often lost what is far more important, the wish to learn.

No doubt both Cambridge and Oxford have admirable science schools. A man can study there with many advantages, and under excellent teachers. But the prizes and fellowships are still given mainly to classics and mathematics. Moreover, natural science is not yet regarded as a necessary part of education. A degree in Science is not given without evidence of some study of classics, but a literary degree, the regular M.A. for instance, may be obtained without the slightest knowledge of even the most elementary science, yet the most profound classical scholar, if he knows nothing of science, is but a half-educated man after all.

Educational authorities often seem to consider that the elements of science are in themselves useless. This view appears to depend on a mistaken analogy with language. It is no use to know a little of a number of languages, however well taught, unless indeed one is going into the countries where they are spoken. But it is important to know the rudiments of all sciences, and it is in reality impossible to go far in any one without knowing something of several others. So far as children are concerned, it is a mistake to think of astronomy and physics, geology and biology, as so many separate subjects. For the child, nature is one subject, and the first thing is to lay a broad foundation. We should teach our children something of everything, and then, as far as possible, everything of something. Specialisation should not begin before seventeen, or at any rate sixteen.

Everyone would admit that it is a poor thing to be a great ichthyologist or botanist unless a man has some general knowledge of the world he lives in, and the same applies to a mathematician or a classical scholar. Before a child is carried far in any one subject, it should be explained to him that our earth is one of several planets revolving round the sun; that the sun is a star; that the solar system is one of many millions occupying the infinite depths of space; he should be taught the general distribution of land and sea, the continents and oceans, the position of England, and of his own parish; the elements of physics, including the use and construction of the thermometer and barometer; the elements of chemistry, geology and biology. *Pari passu* with these should be taken arithmetic, some knowledge of language, drawing, which is almost, if not quite, as important as writing, and perhaps music. When a child has thus acquired some general conception of the world in which we live, it will be time to begin specialising and concentrating his attention on a few subjects.

I submit, then, that some study of Nature is an essential part of a complete education; that just as any higher education without mathematics and classics would be incomplete, so without some knowledge of the world we live in, it is also one-sided and unsatisfactory—a half education only.

In the study of natural history, again, we should proceed from the general to the particular. Commence with the characteristics in which animals and plants agree, their general structure, and the necessities of existence. Animals, again, agree together on some points, as regards which they differ from plants.

A general idea should then be given of the principal divisions of the animal and vegetable kingdoms. In many respects, though animals are perhaps more interesting, plants present greater facilities for study. They are easier to find, to handle, and to examine. Specimens of the principal divisions can be more readily obtained and studied; the structure also can be more pleasantly demonstrated. Almost all children are born with a love of natural history and of collecting.

Far be it from me to underrate the pleasure and interest of collecting. Indeed collections are in many branches of nature-

knowledge almost a necessary preliminary to study. For a collection is a means to an end, not an end in itself. It is like a library, necessary for study, but useless unless studied—unless the books are read. Moreover, we have all access to the great National Museum. Still, private collections are in many ways useful, but not of course unless they are used. Moreover, if I confine my remarks to natural history, plants lose half their interest when they are gathered, animals when they are killed.

In the streets and toyshops many ingenious puzzles are sold in which children, and even grown-up people, seem to find great interest and amusement. What are they to the puzzles and problems which Nature offers us without charging even a penny? These are innumerable.

Take geography and biology alone:—

Why are there mountains in Wales and the Lake district?

What determined the course of the Thames?

Why are the Cotswolds steep on the north-west and with a gentle slope on the south-east?

What are the relations between the North and South Downs?

How did the Thames cut the Goring Gap and the Medway that through the Chalk ridge?

What is the age of the English Channel?

Why are so many of our Midland meadows thrown into ridges and furrows!

Why is Scotland intersected by lines at right angles?

Why are some Scotch lochs so deep?

Why have beeches triangular seeds and sycamores spherical seeds?

Why are beech leaves oval and pointed, and sycamore leaves palmate?

Why are beech leaves entire and oak leaves cut into rounded bays?

Why has the Spanish chestnut long, sword-shaped leaves?

Why have some willows broad leaves, and others narrow leaves?

Why do some flowers sleep by day and others by night?

Why do flowers sleep at all?

Why have roses five petals and veronicas four, and why are so many flowers tubular?

Why are white and light-yellow flowers so generally sweet scented?

Why are tigers striped, leopards spotted, lions brown, sheep grey, and so many caterpillars green?

Why are some caterpillars so brightly coloured?

Why are fish dark above and pale below?

Why do soles have both eyes on one side?

Why are gulls' eggs more or less pointed and owls' eggs round?

It would be easy to ask any number of such questions; some of them easy to answer, others less so.

Many people keep pets, but how few study them? Descartes regarded all animals as unconscious automata; Huxley thought the matter doubtful; my own experiments and observations have led me to the conclusion that they have glimmerings of reason, but the subject is still obscure. I have often been told that dogs are as intelligent as human beings, but when I have asked whether any dogs yet realised that 2 and 2 make 4, the answer is doubtful. The whole question of the consciousness and intelligence of animals requires careful study.

Take, again, the life-history of animals. There is scarcely one which is fully known to us. Really, I might say not one, for some of the most interesting discoveries of recent years have been made in respect to the commonest animals, such as ants, bees, and eels.

Coming now to plants. Any one who has given a thought to the subject will admit how many problems are opened up by flowers. But leaves and seeds are almost equally interesting.

There is a reason for everything in this world, and there must be some cause for the different forms of leaves. In Ruskin's vivid words, "they take all kinds of strange shapes, as if to invite us to examine them. Star-shaped, heart-shaped, spear-shaped, arrow-shaped, fretted, fringed, cleft, furrowed, serrated, sinuated, in whorls, in tufts, in spires, in wreaths, endlessly expressive, deceptive, fantastic, never the same from foot-stalk to blossom, they seem perpetually to tempt our watchfulness and take delight in outstepping our wonder."

Some of these indeed have been explained, but for the differences in the leaves of ferns, for instance, of seaweeds, and many others, no satisfactory suggestion, so far as I know, has yet been offered.

Look, again, at fruits and seeds, what beauty both of form and colour, and what infinite variety! Even in nearly allied species, in our common wild geraniums, veronicas, forget-me-nots, &c., no two species have seeds which are identical in size, form, or texture of surface. In fact, the problems which every field and wood, every common and hedgerow, every pond and stream, offer us are endless and most interesting.

But the scientific and intellectual interests are only a part of the charm of Nature.

The æsthetic advantages are inestimable. How much our life owes to the beauty of flowers!

"Flowers," says Ruskin, "seem intended for the solace of ordinary humanity. Children love them; quiet, tender, contented, ordinary people love them as they grow; luxurious and disorderly people rejoice in them gathered. They are the cottager's treasure, and in the crowded town mark, as with a little broken fragment of rainbow, the windows of the workers in whose heart rests the covenant of peace." But in the crowded streets, or even in the formal garden, flowers always seem, to me at least, as if they were pining for the freedom of the woods and fields, where they can live and grow as they list.

The open air is not a cure for the body only, but for the mind also. I wish there was more open-airiness in our educational system!

Science appeals to some types of mind as no other subject does.

A great deal of nonsense is, it seems to me, talked about the necessity of knowing things "thoroughly." In the first place, no one knows anything thoroughly. To confine the attention of children to two or three subjects is to narrow their minds, to cramp their intellect, to kill their interest, and in most cases make them detest the very thing you wish them to love.

Would you teach a child all you could about Europe, and omit Africa, Asia, and America, to say nothing of Australasia? Would that be teaching geography? Would you teach him one century, and omit the rest? Would that be history?

To teach one branch of science and ignore the rest is not teaching science, and lastly to teach one or two subjects only, however well, is not education. If you think I am drawing too gloomy a picture, let me give you the opinion of a great authority on education, the late Bishop of London, Dr. Creighton. In his "Thoughts on Education" he says, speaking of the new Birmingham Exhibition:—

"In your own regulations for matriculation I am glad to see that science is included. But I am rather sorry to see that the expression is a science, the prescribed sciences being mechanics, chemistry, and physiography. Suppose, then, that chemistry is taken. A man may get a degree without knowing the difference between a planet and a star, or why the moon goes through phases. At this early stage of education should not science be treated as one subject, and a general knowledge of the rudiments be required?"

Again:—

"Since 1870 we have talked about educational progress. I fear

that I am not able to believe that we have made any real educational progress during that time. I am not even sure whether we have not gone back."¹

And again:—

"The more subjects people can study at the same time, the better they will get on with every one of them."²

Of course we cannot expect from everyone knowledge of scientific details, but everyone might have some idea of the principles, and some general conceptions of the interest and vastness of the problems involved. Yet there is no single animal, or plant, which would not well repay—I do not merely say the study of an hour, but even the devotion of a lifetime.

Kingsley used to speak with enthusiasm of the heaths and moors round his home, "where I have so long enjoyed the wonders of nature; never, I can honestly say, alone; because when man was not with me, I had companions in every bee, and flower and pebble; and never idle, because I could not pass a swamp, or a tuft of heather, without finding in it a fairy tale of which I could but decipher here and there a line or two, and yet found them more interesting than all the books, save one, which were ever written upon earth."

The love of Nature, again, helps us greatly to keep ourselves free from those mean and petty cares which interfere so much with calm and peace of mind. It turns "every ordinary walk into a morning or evening sacrifice" and brightens life until it becomes almost like a fairy tale.

May we not hope also that some of the students here will add to the stores of human knowledge?

The late Lord Derby used to say that, considering the marvellous discoveries of the last hundred years, we could not expect so much in the future. To me it seems, on the contrary, that we may reasonably expect even more, and for three reasons.

In the first place, our instruments and apparatus are so much more elaborate and ingenious. In the second place, the students are more numerous. Even now the harvest is plenteous, and the labourers are few, but yet they are more than they were. Thirdly, as the circle of human knowledge widens, the opportunities for research become more numerous! Every discovery opens the way to others—suggests new ideas and fresh researches. We seem to be on the threshold of great discoveries.

There is no single substance in Nature the properties of which are fully known to us. There is no animal or plant which would not well repay, I do not say merely the attention of an hour, but even the devotion of a lifetime. I often grieve to think how much happiness our fellow-countrymen lose from their ignorance of science. Some knowledge of the world we live in would add immensely to the interest of life. Man, we know, is born to sorrow and suffering, but he is not born to be dull, and no one with any knowledge of science ever could be. If anyone is ever dull it is his own fault. Every wood, every field, every garden, every stream, every pond, is full of interest for those who have eyes to see. No one would sit and drink in a public-house if he knew how delightful it was to sit and think in a field; no one would seek excitement in gambling and betting if he knew how much more interesting science is; science never ruined anyone, but is a sort of fairy godmother ready to shower on us all manner of good gifts if we will only let her. In mediæval fairy-tales the nature spirits occasionally fell in love with some peculiarly attractive mortals, and endowed their favourites with splendid presents. But Nature will do all this, and more, for anyone who loves her.

If anyone, says Seneca, "gave you a few acres, you would say that you had received a benefit; can you deny that the

¹ Mandell Creighton, "Thoughts on Education," p. 21.

² Mandell Creighton, "Thoughts on Education," p. 4.

boundless extent of the earth is a benefit? If a house were given you, bright with marble, its roof beautifully painted with colours and gilding, you would call it no small benefit. God has built for you a mansion that fears no fire or ruin . . . covered with a roof which glitters in one fashion by day, and in another by night. Whence comes the breath which you draw? the light by which you perform the actions of your life? the blood by which your life is maintained? the meat by which your hunger is appeased? . . . The true God has planted not a few oxen, but all the herds on their pastures through the world, and furnished foods to all the flocks; He has ordained the alternation of summer and winter . . . He has invented so many arts and varieties of voice, so many notes to make music. . . . We have implanted in us the seeds of all ages, of all arts; and God our Master brings forth our intellects from obscurity."

Those who love Nature can never be dull. They may have other temptations, but at least they will run no risk of being beguiled by *ennui*, idleness, or want of occupation, "to buy the merry madness of an hour with the long penitence of after-time."

Lastly, in the troubles and sorrows of life science does much to soothe, comfort, and console. If we contemplate the immeasurable lapse of time indicated by geology, the almost infinitely small and quite infinitely complex and beautiful structures rendered visible by the microscope, or the depths of space revealed by the telescope, we cannot but be carried out of ourselves.

A man, said Seneca, "can hardly lift up his eyes towards the heavens without wonder and veneration to see so many millions of radiant lights, and to observe their courses and revolutions." The stars, moreover, if we study them, will not only guide us over the wide waters of the ocean, but, what is even more important, light us through the dark hours which all must expect. The study of Nature, indeed, is not only most important from a practical and material point of view, and not only most interesting, but will also do much to lift us above the petty troubles and help us to bear the greater sorrows of life.

THE REFORM OF MATHEMATICAL TEACHING IN THE UNITED STATES.¹

A SPECIAL committee was appointed in September, 1902, by the American Mathematical Society to report upon the requirements in mathematics at College entrance examinations. This committee worked in co-operation with committees already appointed by the Society for the Promotion of Engineering Education and by the National Education Association.

The committee appointed by the Mathematical Society included Prof. H. W. Tyler, of the Massachusetts Institute of Technology (Chairman), Profs. T. S. Fiske, Columbia University, W. F. Osgood, Harvard University, J. W. A. Young, University of Chicago, Alexander Ziwet, University of Michigan. The committee duly considered previous recommendations which had been made by various authorities, carefully inquired into existing conditions in American schools and colleges, and sought and obtained advice from teachers in secondary schools and from other members of the Mathematical Society. It is not implied that all the subjects enumerated in the following report should be required by any one college, or be taught in any one school.

¹ Report of a Committee of the American Mathematical Society on Definitions of College Entrance Requirements in Mathematics. Abridged from the *New York Educational Review*, October, 1903.

REPORT.

The committee understands its duties in the following sense: First: To specify those mathematical subjects which are generally recognised as appropriate requirements for admission to colleges and scientific schools.

Second: To specify details under these subjects in such a manner as to represent the standards of the best secondary school instruction—the word "best" being interpreted in a qualitative rather than a quantitative sense.

Third: The committee understands also that the consideration of pedagogic questions is not primarily among its duties. It has therefore made no attempt to deal with methods of secondary school education in mathematics, or the order of taking up the subjects and their correlation with each other and with other sciences. The order in which the subjects and the topics under them are presented below does not necessarily imply preference of the committee as to the order of teaching either the subjects or the topics. It is the opinion of the committee that these are the subjects and the topics which, according to the best present usage, should be offered for admission to colleges and scientific schools.

The recommendations are not to be interpreted as exhaustive. They represent rather the extent to which, in the opinion of the committee, definite specification should be undertaken by it; it is expected that further details will be determined in accordance with the judgment of the particular college, school, or teacher.

The subjects proposed are based on present usage and standards. In case of divergence between standard text-books and what seemed a more scientific presentation of the subject in question, the committee has endeavoured to make a choice which should not depart so far from current usage as to involve hardship to schools or teachers. The committee is of opinion that no formulation should be considered as having more than temporary validity. No advantages attendant upon uniformity could counterbalance any tendency of the recommendations to retard progress of secondary education in mathematics. It is therefore suggested that if the recommendations are approved, they be revised at intervals, perhaps of ten years.

Subjects.—(1) Elementary Algebra. (2) Plane Geometry. (3) Solid Geometry. (4) Trigonometry. (5) Advanced Algebra.

1. *Elementary Algebra.*—The four fundamental operations for rational algebraic expressions.

Factoring, determination of highest common factor and lowest common multiple by factoring.

Fractions; including complex fractions, ratio and proportion.

Linear equations, both numerical and literal, containing one or more unknown quantities.

Problems depending on linear equations.

Radicals, including the extraction of the square root of polynomials and of numbers.

Exponents, including the fractional and negative.

Quadratic equations, both numerical and literal.

Simple cases of equations with one or more unknown quantities, that can be solved by the methods of linear or quadratic equations.

Problems depending on quadratic equations.

The binomial theorem for positive integral exponents.

The formulae for the n th term and the sum of the terms of arithmetic and geometric progressions, with applications.

It is assumed that pupils will be required throughout the course to solve numerous problems which involve putting questions into equations. Some of these problems should be chosen from mensuration, from physics, and from commercial life. The use of graphical methods and illustrations, particularly in connection with the solution of equations, is also expected.

2. *Plane Geometry*.—The usual theorems and constructions of good text-books, including the general properties of plane rectilinear figures; the circle and the measurement of angles; similar polygons; areas; regular polygons and the measurement of the circle.

The solution of numerous original exercises, including loci problems.

Applications to the mensuration of lines and plane surfaces.

3. *Solid Geometry*.—The usual theorems and constructions of good text-books, including the relations of planes and lines in space; the properties and measurement of prisms, pyramids, cylinders, and cones; the sphere and the spherical triangle.

The solution of numerous original exercises, including loci problems.

Applications to the mensuration of surfaces and solids.

4. *Trigonometry*.—Definitions and relations of the six trigonometric functions as ratios; circular measurement of angles.

Proofs of principal formulae, in particular for the sine, cosine, and tangent of the sum and the difference of two angles, of the double angle and the half angle, the product expressions for the sum or the difference of two sines or of two cosines, &c.; the transformation of trigonometric expressions by means of these formulae.

Solution of trigonometric equations of a simple character.

Theory and use of logarithms (without the introduction of work involving infinite series).

The solution of right and oblique triangles, and practical applications, including the solution of right spherical triangles.

5. *Advanced Algebra*.—Permutations and combinations, limited to simple cases.

Complex numbers, with graphical representation of sums and differences.

Determinants, chiefly of the second, third, and fourth orders, including the use of minors and the solution of linear equations.

Numerical equations of higher degree, and so much of the theory of equations, with graphical methods, as is necessary for their treatment, including Descartes' rule of signs and Horner's method, but not Sturm's functions or multiple roots.

A CONVENIENT FORM OF SMALL FURNACE FOR LABORATORY USE.

THE necessity for a compact and portable furnace, suitable for heating small vessels to a comparatively high temperature, has existed for a long time. The "Midget" furnace supplied by Messrs. Brewster, Smith and Co. fulfils this want to a very considerable extent.

The furnace consists essentially of an arrangement whereby the heat obtainable from an ordinary laboratory Bunsen-burner can be utilised to its fullest extent.

The furnace proper consists of two truncated cones of sheet iron, covered on the inside with asbestos. The lower cone carries three arms of sheet iron, on which may be placed a small vessel, such as a crucible, which is to be heated.

When required for use, the two portions are placed base to base, as shown in the figure, and so arranged that the bottom orifice is supported immediately over the mouth of the burner.



"Midget" furnace with burner.

By this arrangement the inner asbestos coating becomes red-hot, so that, in addition to the direct heat from the burner, the vessel is heated by radiation from the heated asbestos lining.

The furnace is made in two sizes and is supplied with special burners, which are superior in heating power to the ordinary Bunsen burner.

In comparing the efficiency of this furnace with other methods of heating we observed the length of time required to convert completely one gram of crushed marble into quicklime. With gas pressure equal to $2\frac{3}{4}$ inches of water, the following results were obtained:—

Large "Midget" furnace and special burner	...	20 minutes.
" " " " ordinary Bunsen burner	...	96 "
" " " " Teclu-burner	...	11 "
Fletcher's large gas muffle-furnace (working well)	7 "	
Ordinary laboratory Bunsen burner (alone)	...	8 hours.

The small "Midget" furnace occupied about double the amount of time required by the larger size.

It will be seen that under the best conditions, *i.e.*, with the large-size "Midget" furnace and a Teclu-burner, one gram of marble can be completely calcined in ten minutes. This compares very favourably with the bulky and expensive gas muffle-furnace.

THE ESSEX COUNTY TECHNICAL LABORATORIES, CHELMSFORD.

ON October 30th Lord Onslow, President of the Board of Agriculture, opened the new County Technical Laboratories at Chelmsford. During the past ten years the teaching of agriculture, horticulture, and dairying, and the sciences forming the foundation of these industries, has been carried on in an old grammar-school which was temporarily fitted up for the purpose. Valuable experience has thus been obtained, and the arrangement and equipment of these new buildings should merit the attention of those who are connected with technical education in rural districts.

The work of the laboratories is divided into three sections, viz. :—(1) the chemical and agricultural, (2) the biological and horticultural, and (3) the dairying. The new buildings are so arranged that, while the students of each section can attend classes in the others and can use the same common rooms, each department is separate and distinct and under the control of a different responsible head, so that a personal oversight of the students can be better secured and discipline easily maintained.

At Chelmsford the practical study of science in the laboratory forms the basis on which instruction in agriculture and horticulture rests. The principal feature, therefore, of the biological and horticultural department, to deal with this first, is the two large biological laboratories. Each of these accommodates twenty students at a time; they are lighted on each side by windows, under which are lockers for the students' microscopes, and they are provided with ten working-tables, so arranged that all the students face the blackboard and demonstration table. Opening out of the laboratories are bacteriological and seed-testing rooms, while adjoining are the lecturer's private room and class-room, a museum lighted from above so as to secure a maximum of wall space for the cabinets, and a store and dark room. The school garden is within three-quarters of a mile. It is three acres in extent, and is partly laid out in botanical plots and partly in borders for practical instruction in fruit,

vegetable and flower culture. A large students' potting-shed and glasshouses provide for instruction in hothouse work.

In the chemical and agricultural department the principal room is the chemical laboratory, which in dimensions, lighting, ventilation and acoustic properties appears to be excellently planned. The principal feature that distinguishes it from other laboratories is that, as in the biological rooms, all the students' benches face the demonstration-table. This arrangement, while occupying rather more space, has the advantage that the teaching can be carried on by demonstration, experimental work, or revision without the students leaving their benches, a system which might well be adopted in all grammar schools or other institutions where elementary chemistry is taught. There are places for twenty students working at the same time, but each bench is provided with drawers and cupboards for four sets of students, so that eighty students can be accommodated in a term.

The agricultural room serves a variety of different purposes. It contains the agricultural collection, illustrating the source, composition or varieties of soils, manures, crops, foods, &c., and an agricultural reference library, and it is kept supplied with the agricultural journals. Round the walls are diagram frames on which the latest results of the field experiments are exhibited. All this is in addition to the lecture-table and tables in the centre of the room for the students, who thus receive instruction in agriculture while surrounded by the illustrations on which the instruction is founded. The room also serves for the meetings of farmers, which are held from time to time on market days to discuss agricultural problems. The other rooms in this department are a small physical laboratory with dark room adjoining, a laboratory for agricultural analysis, a chemical balance and book-room, a lecture theatre with store and preparation-room adjoining, and the lecturer's private room and office.

The dairying department occupies the basement of the building, an arrangement which secures an equable temperature. It includes a milk receiving-room, a dairy with churns for twelve students, a cheese-making room and a cheese store. This completes an institution on the possession of which the county of Essex may well be congratulated, and it may perhaps serve as an example to those counties which have not yet made provision for technical instruction in agricultural industries.

CORRESPONDENCE CLUBS FOR THE STUDY OF PEDAGOGICS.

By A. T. SIMMONS, B.Sc.

Associate of the Royal College of Science, London.

THE plan which I outlined in a letter to THE SCHOOL WORLD for September, 1903, for the formation of correspondence clubs for the study of the great works on education by acting schoolmasters and schoolmistresses, has by experience been proved to be both feasible and practicable. Two clubs are now at work, and members of the club write to me from time to time that the plan is interesting and useful. Names of teachers anxious to join a third club have also been received, so that it appears to be desirable to explain in more detail the plan which has been found to work satisfactorily.

When I had received the names of six schoolmasters and schoolmistresses anxious to become members of a club such as was described in my first letter to this paper, I forwarded to each member the following sheet describing the lines upon which it was proposed to work.

CORRESPONDENCE CLUB FOR THE STUDY OF PEDAGOGICS.

BOOK FOR STUDY.—Thring's "Education and School." (Macmillan.) 6s.

LIST OF MEMBERS.

(Here was given the list of members, with addresses, the name of the Hon. Sec. being printed first.)

PROCEDURE.

(1) Week by week each member studies the portion of the book selected (see below.)

(2) Any remarks, suggested by the member's experience and reading, on the chapters for the week to be written on sheets of paper—a separate sheet, with the member's name and address, for each subject dealt with. One side only of the paper should be used. Similarly, any difficulty or points requiring further elucidation should be written down.

(3) All such sheets to be posted each Monday to the Hon. Sec., who will add any helpful remarks to all or any of the sheets and post the whole batch to member No. 2. Member No. 2 will keep the sheets not more than two days, add further comments where possible, and post the batch to member No. 3. Member No. 3 adds his remarks in the same manner, and after the same interval posts the batch to member No. 4, and so on. Member No. 6 will return the batch to the Hon. Sec.

(4) The Hon. Sec. will then send each member's sheets to him with the remarks of other members of the club, and for this purpose members should, in sending to the Hon. Sec. on Monday, enclose a stamped addressed envelope.

WEEKLY DIVISIONS OF THE SELECTED BOOK.

Week 1, Chaps. I.-III.; Week 2, Chaps. IV.-V. (to p. 76); Week 3, Chap. V. to end; Week 4, Chaps. VI.-VII.; Week 5, Chaps. VIII.-IX.; Week 6, Chaps. X.-XI.; Week 7, Chaps. XII.-XIII.; Week 8, Chaps. XIV.-XV.; Week 9, XVI.-XVII.

First batch of remarks to be sent to the Hon. Sec. on Monday, October 12th.

In the case of the second club, Mr. G. W. Samson, M.A., of Birmingham, has kindly undertaken the duties of Hon. Sec., and the club is working on the same lines as that first formed.

It is now, of course, too late this term to form a third club, but it is hoped that many schoolmasters and schoolmistresses will like to join similar clubs, beginning work after the Christmas vacation, and I shall be glad to receive names to add to those I have already in hand for this purpose.

Some teachers may consider that the amount of reading suggested in the above scheme for separate weeks is excessive, and may see other directions in which improvement is possible in the procedure given. If in sending their names to me they will make any suggestions which occur to them, I shall be very grateful.

It is proposed during next term to have clubs, each consisting of six members, studying the following books, and I should be glad if those teachers who wish to join would send their names to me, c/o The Editors of THE SCHOOL WORLD, as soon as possible, and state which book they wish to read.

BOOKS PROPOSED FOR STUDY.

"Talks to Teachers on Psychology." By Prof. W. James. (Longmans.) 4s. 6d. Rousseau's "Emile." Translated by W. H. Payne. (Arnold.) 6s. Herbart's "Letters and Lectures on Education." Felkin. (Sonnenschein.) 4s. 6d. Thring's "Education and School." Herbert Spencer's "Education." (Williams and Norgate.) Or any other book six teachers wish to study together.

ITEMS OF INTEREST.

GENERAL.

Now that the reform of mathematical teaching is an accomplished fact, it is interesting to recall the history of the beginnings of a movement which has resulted in the dethronement of Euclid and a complete revision of the requirements in mathematical examinations. Towards the end of 1870 a circular, signed by four well-known mathematicians, Mr. Rawdon Levett (honorary secretary), the Rev. E. F. M. MacCarthy, Mr., now the Venerable Archdeacon, Wilson, and Mr. Robert Tucker, was circulated among mathematical masters, announcing that an Association for the Reform of Geometrical Teaching was to be formed. The objects the Association was to have in view were stated in the circular to be: (1) To collect and distribute information as to the prevailing methods of instruction in geometry practised in this and other countries, and to ascertain whether the desire for change is general. (2) To use its influence to induce examining bodies to frame their questions in geometry without reference to any particular text-book. (3) To stamp with its approval some text-book already published, or to bring out a new one under its own auspices. A preliminary meeting was arranged for January 17th, 1871; on that date, under the presidency of Dr. Hirst, F.R.S., the new Association was duly founded.

At the first meeting, held at University College, of the Association for the Improvement of Geometrical Teaching, as the new society came to be called, several resolutions embodying the intentions and hopes of its founders were adopted. These were as follows: (1) That the main object of this Association is to induce all conductors of examinations, at which pupils who have been trained under different systems present themselves, to frame their questions independently of any particular text-book; and that, with a view to this object, the members present at this meeting do pledge themselves to use every effort to increase the numbers and extend the influence of the Association. (2) That, with a further view of extending the influence of the Association, local secretaries be appointed for different parts of the kingdom, whose office it shall be to collect information, to make the objects of the Association more generally known in their immediate neighbourhood, and to communicate on all matters of interest with the Central Committee. (3) That the local secretaries, *ipso facto*, be members of the committee of management. (4) That all members of the Association shall collect information with regard to text-books and methods of teaching geometry in England and other countries, and that such information shall be forwarded to any secretary or local secretary of the Association. (5) That the committee of management shall, from time to time, print and circulate among others such information as they may consider valuable. (6) That this meeting is of opinion that in any new text-book—(a) the following principles, only partially or not at all recognised by Euclid, should be adopted:—(i) hypothetical constructions, (ii) the arithmetical definition of proportion, (iii) superposition, (iv) the conception of a moving point, and of a revolving line; (b) the following limitations should be removed:—(i) the restriction of the number of axioms to those only which admit of no proof, (ii) The restriction which excludes all angles not less than two right angles; (c) modern terms, such as "locus," "projection," &c., should be introduced.

SINCE such examining bodies as the Board of Education and the Universities of Oxford, Cambridge, and London, have adopted in their mathematical examinations the recommendations of the committees appointed by the British and by the

Mathematical Associations, it will form an instructive task for mathematical masters to compare the demands of thirty-three years ago of the Association for the Improvement of Geometrical Teaching with the requirements in mathematics in connection with the examinations of the authorities mentioned. There is some encouragement here, too, for those teachers who desire, and are working for, reforms in the teaching of other subjects. Though it has taken over thirty years to bring about the present rational methods of mathematical teaching, the task has at last been effected; it may be that the slowness of the reform will obviate any revision of our practice in the immediate future.

THE Advisory Board on Military Education and Training appointed by the Secretary of State for War in April last, has stated some of the conclusions which have been arrived at, and now carry the approval of the Secretary of State. With regard to the selection of the candidates for commissions through Sandhurst and Woolwich, it is proposed to subject them to a twofold test, consisting of a preliminary qualification and a competitive examination. The Advisory Board is of opinion that the subjects covered by the qualifying certificate (which is to be given not by a special examination, but some substitute in the shape of a "leaving certificate") must include:—(1) English; (2) history and geography; (3) mathematics (elementary); (4) French or German; (5) either (a) Latin or Greek, or (b) science. By "science" in this scheme is meant such combination of experimental or natural sciences as the Board may approve; provided always that the sciences recognised shall have been taught in a sufficiently extended course, say three years, involving a sufficient amount of laboratory or field work. In the competitive examination the Board consider that for Woolwich candidates it should consist of three compulsory subjects, viz., English, either French or German, mathematics i., and of any two out of the following:—mathematics ii., science, history, French, German, Latin, Greek. For Sandhurst candidates, they propose that there should be two compulsory subjects, viz., English, and French or German, with any two of the following:—mathematics i., mathematics ii., science, history, French, German, Greek, Latin.

THE Vice-Chancellor of the University of Cambridge has received a letter from the Duke of Devonshire, the Chancellor, calling attention to certain questions concerning the University and its studies, amongst others the expediency of modifying its requirements with respect to the classical languages and of enlarging the range of modern subjects. The need for such changes in the University appears to many to have been increased by the reorganisation of secondary education throughout the country and by recent developments in other universities. In view of these circumstances, the council of the Senate are of opinion that the Senate should be invited to consider whether it is expedient to make any changes in the present system of studies, teaching, and examinations in the University. They accordingly have proposed the appointment of a syndicate with extensive powers of inquiry and discussion, and they have decided to offer the following grace to the Senate:—"That a syndicate be appointed to consider what changes, if any, are desirable in the studies, teaching, and examinations of the University, to confer with any persons or bodies, and to submit a report or reports to the Senate before the end of the Easter Term, 1904."

THE General Board of Studies has made the following recommendations to the Senate of the University of Cambridge:—(i.) That a Board of Geographical Studies be constituted. (ii.) That for five years from Michaelmas, 1903, a grant of £200 be made annually by the University to a fund to be adminis-

tered by that board, provided that an equal annual grant is made to the same fund by the Council of the Royal Geographical Society. (iii.) That the annual stipend of the Reader in Geography be £200, to be paid from the same fund. (iv.) That the appointment of the next Reader be for a period ending at Michaelmas, 1908. A special examination in geography is to be established in connection with the B.A. degree of the University and a diploma for advanced work in geography.

UNDER the auspices of the Association of Headmistresses a conference on educational questions, attended by headmistresses of public high schools and women members of education committees, was held on October 24th at the Haberdashers' Hall, London. The morning session was devoted to a discussion on the administrative side of education opened by Mrs. Sidgwick, of Newnham College. Papers were read in connection with this debate by the president, Mrs. Bryant, D.Sc., on the relation of an education committee to secondary schools; by Miss Connolly on scholarships for girls and women; by Miss Hunt-Cooke and Miss Creak on the true cost of secondary education for girls; and by Miss Mowbray and Miss Cleghorn on the training of pupil teachers for primary schools. In the afternoon Miss Cooper opened a discussion on technical education for girls and women, in connection with which papers on artistic industries were read by Lady Verney and Miss Bayley; on open-air industries by Mrs. George Cadbury; and on domestic arts by Miss Pyecroft. A discussion afterwards took place on the principles of curricula in different types of girls' schools, the speakers including Miss Alice Woods and Miss Burstall.

AT its meeting on October 29th, the London School Board adopted the following recommendations of its School Management Committee with reference to the employment of secondary-school teachers in London Board schools:—That, in the case of teachers registered in column B of the Board of Education's present Teachers' Registration Regulations, who are not also qualified for recognition as certificated teachers under the Board of Education's Code, the conditions attaching to their appointment under the Board be as follows:—(a) Such appointments shall be on special probation for one year, after which, subject to the receipt of satisfactory reports by the Board Inspector on the ability of the teachers to do elementary school work, the appointments shall be made permanent. (b) That the salary paid to a woman teacher while on special probation be that ordinarily paid to a teacher with a degree qualifying for recognition, viz., £80 per annum. (c) That on permanent appointment the salary be £80 plus allowance for satisfactory service in secondary schools, assessed on the same scale as satisfactory service in elementary schools.

THE seventh annual conference of the Parents' National Educational Union was held in London, at the end of October. The union comprises a central office in London, and thirty-three branches, with a membership of about 3,000. The twelfth annual report for the present year records the fact that the organisation continues to expand, and is increasing in numbers, influence, and *prestige*. The conference lasted for four days, during which a great variety of subjects was discussed. Among the numerous papers presented to the conference the following may be mentioned: parents and lessons, by Mrs. Clement Parsons; the habit of books, by Mr. C. F. G. Masterman; how best to study nature, by Mr. J. C. Medd; family life after school age, by Mrs. Creighton; works of art and illustrations as a means of education, by Prof. Gardner; handwork in school life, by Sir Philip Magnus; and living books in the teaching of history, by Mr. R. C. Lehmann. Such opportunities as that

offered by the conferences of the Parents' National Educational Union for the joint discussion of educational questions by teachers and parents are of great value.

LORD LONDONDERRY opened on October 31st a new wing erected in connection with the Edgehill Training College, Liverpool, at a cost of £11,800. In the course of his address, Lord Londonderry said the Board of Education was anxious to offer every reasonable means in its power to encourage the employment of thoroughly trained teachers. All the changes being made in the training-colleges and also in the training of pupil-teachers were for one end—to perfect the equipment of those who taught in the primary schools or who would devote their lives to that end. The hope for the future was that the certificated teacher should attain a standard of education hitherto only attained by the ambitious ones, and by attaining that end it was hoped to see a general improvement in the teachers all along the line. In future the full preparation for the teaching profession would fall into three parts. In the first place, the aspirant must receive a sound general secondary education up to the age of 16 years; then there must be an apprenticeship of two years, during which the general education of the pupil-teacher would be developed side by side with his or her initiation into the art of teaching, and as the crown there must be college training for two years, in the course of which the future teacher would receive the higher education for which his or her early training would have provided an adequate preparation. These rules, Lord Londonderry thought, would conduce to the efficient teaching of the rising generation.

THE Nottingham Education Committee has decided to apply to the Board of Education for permission to convert the People's College, High Pavement, and Mundella Higher Elementary Mixed Schools, and also the People's College Girls' School, into secondary day-schools (Division B of the "Directory" of the Board of Education) subject to the following regulations:—(1) That admission to the schools be by examination only—a general examination of all scholars, between the ages of ten and twelve, who have reached Standard IV.—successful candidates to be classified as follows: (i.) Honours—Candidates obtaining over 80 per cent. of the possible marks—to be awarded honours free scholarships, and book prizes of the net value of 10s. each. (ii.) Class I.—Scholars obtaining between 50 and 80 per cent. of possible marks to be awarded ordinary free scholarships. (iii.) Class II.—Scholars obtaining between 40 and 50 per cent. of possible marks to be admitted upon payment of fee. (2) That applications for admission during the school year be dealt with upon their respective merits. (3) That the parents of all scholars admitted be required to sign an undertaking to keep their children at school to complete at least four years of the secondary-school course, provided always that a scholarship shall be terminated at the close of any school year, if the holder fails to make satisfactory progress in studies; and that a scholarship may be forfeited at any time for gross insubordination or continued neglect of lessons, including home work. (4) That major (money) scholarships be awarded upon the result of examinations to be held at the end of the second year of the higher school course (when scholars will have reached the close of their compulsory school period under the Education Acts). (5) That the fees shall be as follows: school fees, 5s. per quarter; book fee (to cover cost of all ordinary school books and stationery), 5s. per quarter, payable in advance by all non-scholarship scholars.

IN his first inaugural address, Prof. Findlay, the newly-appointed professor of education at the University of Manchester, said that three main principles must be kept in mind in

the training of the teacher: the possession of the scientific habit of mind and the capacity for careful observation; the supremacy of moral ends in the business of education; and that the teacher must be limited in his range by the needs of the young, and must cultivate the attitude of sympathy which would enable him to become as a little child. The effect of the Teachers' Registration Order was, said Prof. Findlay, to close the controversy as to the value of training. The "born" teacher must henceforth submit to give proof of his birthright before he was recognised for public service.

At the recent annual speech-day at the Harrogate New College, Mr. Victor Cavendish, M.P., distributed the prizes, and, in the course of his remarks, after congratulating the Rev. Dr. Haslam on his report for the year, said he thought everyone recognised the advantages that were given to education, when they found private enterprise anxious and willing to take its part and do its share in striving, on behalf of the Government, to promote educational improvements, and they must express their utmost gratitude to them for what they had done. The Government gratefully recognised the work done by the private schools of this country. He hoped that the principle would be encouraged, and at the same time that a higher efficiency would be insisted upon. They must encourage such institutions as New College by recognising them, that they might keep them as long as it was necessary; but, in future, they must recognise more and more that we wanted increased efficiency, and that we must go ahead. We could not afford to remain stationary.

THE Home Counties Nature-Study Exhibition was held at the offices of the Civil Service Commission from October 30th to November 3rd. It was organised by the Middlesex Field Club and delegates from the Selborne Society. Though not so comprehensive in its scope as the exhibition held last year in the Botanic Gardens, it comprised an interesting series of nearly a hundred exhibits from schools in the home counties where the study of the branches of science concerned with natural objects is encouraged, and from individuals interested in the subject. The objects on view showed that there is still no uniformity of opinion as to what nature-study legitimately includes. Some of the exhibits treated natural objects purely from an artistic point of view, and others seemed to be instances of "collecting" and nothing more. Many exhibits, however, were excellent as evidencing serious attempts to develop scientific methods in young people. The work of the Froebel Institute at West Kensington, of the junior boys at Allyn's School, Dulwich, of the Tiffins' Boys' School, Kingston-on-Thames, and of the Bellenden Higher Grade School at Peckham—is in many directions worthy of imitation. So long as it is not allowed to interfere with the more serious parts of the work of the schools, nature-study deserves encouragement, but there is in some quarters a disposition to claim too much time and attention for a study which must, after all, always be accessory in primary and secondary schools. Lectures and conferences were arranged in connection with the Exhibition, the success of which was largely due to the honorary secretary, Mr. W. M. Webb.

THE Modern Language Association has arranged for a series of lectures to be given during the present winter in different parts of London. The first was given at the Regent Street Polytechnic on November 7th. Dr. Emil Reich, the eminent historian, took as his subject, "The National Value of the Study of the Humanities." His address was most inspiring: he showed how nations had been brought to ruin in the past by neglect of the humanities—the basis of all true knowledge.

THE Cambridge and County School for Boys, which was opened on October 24th by Lord Avebury, is intended by the County Council for boys who have been educated in elementary schools up to Standard VI. at about twelve years of age. On joining the new school they are to go through a two years' elementary course leading up to one of three advanced courses—which will each occupy two years—in agricultural science, building construction and engineering, or commercial subjects. Every provision has been made to ensure that all boys shall secure a good general education in addition to this special work which occupies a large portion of their time. Special attention is to be given to practical work, for which ample provision has been made; in fact, we understand that most boys will give half their time to work in the laboratories and workshops.

PROF. HUDSON'S lectures to schoolmasters and schoolmistresses on Saturday mornings at King's College, London, on the teaching of mathematics, are postponed till next term, beginning January 23rd, 1904.

THEIR Royal Highnesses the Prince and Princess of Wales have consented to visit the Battersea Polytechnic on the evening of Wednesday, February 24th, for the formal opening of a new block of buildings in the Women's Department. The occasion will mark the tenth anniversary of the opening of the Polytechnic by their Majesties the King and Queen.

MR. JOHN MURRAY will, on January 1st, 1904, publish the first number of a new sixpenny educational monthly magazine which is to be called *School*: a monthly record of educational thought and progress. The new periodical is to be edited by Mr. Laurie Magnus. "It hopes to find its readers not only among the teachers themselves, but also in the public at large, which is at last beginning to take an active interest in education, and the members of which are connected with it more or less directly and responsibly as parents, managers, or committeemen."

WE have received from the Director of Education for the Transvaal, Mr. Fabian Ware, a copy of the Provisional Code of Regulations for Elementary Schools, with Schedules, October, 1903, to June, 1904, which will govern elementary education in the Transvaal during the present school year.

DR. FREDERIC SPENCER, professor of French in the University College of North Wales, has been appointed Rector of Glasgow High School.

A JOINT meeting of the metropolitan sections of the Teachers' Guild of Great Britain and Ireland was held on November 20th, for the purpose of discussing the question of the establishment of a recognised school-leaving certificate. Mr. R. F. Charles, who presided, said the question of leaving certificates was a new one, and should be carefully discussed. Miss Maitland moved:—"That this meeting advocates the establishment of a recognised school-leaving certificate." She said that such a step as the establishment in England of a recognised school-leaving certificate would be an advantage to education all over the country. Mrs. Woodhouse seconded the resolution, which was agreed to. Mr. G. F. Daniell proposed:—"That the certificate be awarded by a central authority (preferably the Board of Education) upon examinations conducted by bodies approved by that central authority." He said this resolution proposed an authority which would be able to provide for a great variety of examinations and a corresponding variety of curricula. Dr. S. H. Butcher, in the course of a discussion on the motion, said the institution of a leaving certificate was a complicated matter in England, because there were so many bodies already giving certificates, bodies which

had obtained a great hold on the schools of the country and represented a considerable diversity of standards. He thought that the Universities should take up the question of secondary education far more than they had done, and suggested that if the certificates were granted by a joint University board there would be less likelihood of friction between the Universities and the authority at Whitehall. Miss Lees moved, as an amendment:—"That the certificate be awarded by the several Universities acting in conjunction, so as to secure uniformity of standard and conditions." The amendment was carried. A resolution "that it is desirable that the teachers should co-operate with the examining body in granting the certificates" was also adopted.

THERE are 352 centres of instruction under the London School Board, scattered over the metropolis, at which children from the surrounding schools attend to learn domestic economy. In some cases the schools are grouped in sets of three, each containing a different branch of instruction in some domestic subject, in others they are quite isolated, but the instruction given is practically the same throughout. There are 183 cooking, 141 laundry, and 28 housewifery centres. The children in attendance number upwards of 45,000, their ages varying from 11 to 14, and in some cases 15 years. In some districts parents are permitting their girls to remain rather longer at school than they otherwise would in order that they may attend a housewifery centre. The whole scheme of instruction covers a period of three years. For two years the child attends cookery and laundry centres, and for one year a housewifery centre. In districts where there is no housewifery centre the girls attend the cookery and laundry centre for another year, the third year's course being more in the nature of household management than pure cookery or laundry work.

A SECOND edition of the "Students' Handbook to the University and Colleges of Cambridge" has been published by the Cambridge University Press. This edition has been revised to June 30, 1903, and lists of University Professors, Readers, and Lecturers, of lectures on honours subjects given in the University, and of set subjects for special examinations, have been added.

WE have received a copy of the first number of the second volume of *L'Enseignement dans la Famille*, a weekly review designed to assist private students of all ages in the study of a great number of subjects. It is published in Paris at 56 rue Jacob.

THE Civil Service Commissioners have announced that an open competitive examination for not fewer than seven situations as Assistant-Surveyor of Taxes in the Inland Revenue Department will be held in London, Edinburgh, and Dublin, commencing on January 12th, 1904. The limits of age are 19 and 22. Candidates must be of the prescribed age on the first day of the examination, which 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. A fee of £6 will be required from each candidate attending the examination. Applications must be received by the Secretary, Civil Service Commission, S.W., on or before the 17th December, on forms obtainable from him. The scale of salaries of Assistant-Surveyors of Taxes is £100—£110—£120—£130—£140—£150—£160—£170—£180, with prospect of promotion to Surveyorships with salaries ranging from £200 to £700.

SCOTTISH.

LORD BALFOUR OF BURLEIGH, in opening a new wing of George Watson's Ladies' College, Edinburgh, gave an elaborate sketch of the educational progress that had marked his tenure of the Scottish office. In view of the severance of his connection with the Education Department, he humorously compared his speech to a posthumous oration by the corpse itself. The ex-Secretary spoke, however, on questions which are very much alive, and in which, corpse officially as he is, he continues to take a keen and practical interest. The educational policy of the Scottish office, he said, had been assailed, not for its defects *per se*, but because it was embodied in circulars, and minutes, and codes, instead of in Acts of Parliament. But the critics forgot that there was no sphere of national activity where legislative action alone could accomplish so little as in education. He did not underrate the value of legislation, and he thought the time was fully ripe for a Scottish measure, but he warned them that when, after vehement and possibly acrimonious discussion, they had altered the whole system of educational authorities, the work of the schools would go on just as before, and any changes therein would be due to quite other causes than legislative action. He claimed that the minutes of the Department were the expression of a clearly conceived educational policy working towards a definite end. That end was the establishment of well-articulated organisation of national education for Scotland, in which the functions of each class of school would be clearly defined.

THE Report of the Committee of Council on Education in Scotland for the year 1902-1903 has now been completed and issued in a bulky volume of about 1,000 pages. Within the last decade this Blue Book has almost doubled in size, and in this is a fair reflex of the increase of the Education Department's activity during that period. Reference has been made in these columns to the separate parts of the Report as they appeared, yet there is still left an inexhaustible mine of interesting matter from which we can only select one or two specimens. This year's report, even more than its predecessors, will well repay a careful study in the original.

DR. STEWART, H.M. Senior Chief Inspector of Schools, thinks that too much has been expected of pupils regarding complete attendance. For a considerable part of the year, he thinks, children would possibly be better employed in running about the fields or open spaces than in registering their tale of bricks at school. The impression had been growing on him for some time that much of the school time of the children was wasted. Five or six hours a day of study, to say nothing of home lessons, was too heavy a strain for a growing brain. Therefore, except in the case of slum children who were probably happier in school than at home, he would be disposed to limit the attendance to *three* hours in the case of the younger, and *four* hours in the case of the older children. In this way he believes that more real, intense, and thorough work would be accomplished in the shortened period than is at present overtaken in dreary tasks that fill up time uselessly.

IN regard to the training of teachers, Dr. Stewart reports that the abolition of the examination for certificates has created a revolution in the method of testing the attainments of the students in the training colleges. "With the discontinuance of the examinations many evils have disappeared. Written tests are too apt to condition and stereotype the lines of teaching. The stress and strain, the unwholesome excitement and nervousness, the previous cramming, the dread of collapse, and the staking of one's all on one throw, are all things of the past. A much fairer and surer test than the writing of any paper or set

of papers is surely obtained by a review of the student's whole record of work, and by the opinion as to his diligence, intelligence, capacity, and progress formed by those best able to judge, namely, the tutors and lecturers under whom he has studied from day to day."

DR. MORGAN, the newly elected principal of the Church of Scotland Training College, Edinburgh, speaking at a public dinner in his honour, said that the training colleges had made phenomenal progress since gaining their charter of liberty two years ago. Much still remained to be done in the way of introducing greater flexibility into the system of training. It was a very common complaint against the schools that by their rigidity and uniformity of training they were tending to destroy the individuality of the pupils. The only sure remedy for this was to turn out teachers of the greatest diversity of attainments, instead of as at present moulding them all on one type. He would like the Education Department to give teachers time to mature their work, and he hoped that in future they would not launch any large scheme of reform on the country without first introducing these reforms into the training college for a number of years.

AT the annual meeting of the Scottish School Board Clerks' Association Mr. Wm. Hutchison, president, dealt with the question of the supply of male teachers. The steadily increasing inadequacy of this supply was due to the inadequate salaries and precarious prospects that the profession offered. While salaries as a whole had gone up, prospects, owing to the larger schools now being built, had diminished, and the goal of a headmastership could be attained by only a few and after many years of service. The superannuation allowance, instead of being an inducement to enter the profession, was a positive hindrance, as it made retiral compulsory without anything like adequate compensation. A liberal pension scheme would do much to encourage good men to enter the profession. The sole value of the existing pension scheme lay in the fact that the principle had been conceded; but until the pension bore a fair ratio to the salary at the date of retiral it would continue to be inadequate and unsatisfactory and a stumbling-block to entrance to the profession.

IN order to encourage the French courses for foreigners at the University of Grenoble, and to enable Scotsmen to avail themselves of these courses, arrangements have been made with the directors of the Paris-Lyons railway to grant a free ticket for the return journey from Grenoble to Paris to students attending these courses during the scholastic year or during the vacation. This concession is one of the first-fruits of the recent visit of the Franco-Scottish Association to France.

IRISH.

THE following is a summary of the results of this year's Intermediate Examinations. The standard of passing was lowered to that proposed for next year, viz., 30 per cent. on the pass papers, 20 per cent. on the mathematical honour papers, and 25 per cent. on the other honour papers.

	BOYS.				Total.
	Senior Grade.	Middle Grade.	Junior Grade.	Preparatory Grade.	
Number examined ...	341	788	2,843	2,015	5,987
Number that passed with Honours ...	131	220	424	—	775
Number that passed without Honours ...	147	360	1,363	1,004	2,874
Total number that passed ...	278	580	1,787	1,004	3,649
Percentage of Passes...	81.5	73.6	62.8	49.8	60.9

GIRLS.

Number examined ...	100	242	900	680	1,922
Number that passed with Honours ...	36	51	111	—	198
Number that passed without Honours ...	46	118	442	348	954
Total number that passed ...	82	169	553	348	1,152
Percentage of Passes...	82.0	69.8	61.4	51.2	59.9

AT a meeting of the Schoolmasters' Association in October, a series of resolutions was passed dealing with the Intermediate programme. It was suggested that a pass student should not be compelled to select a particular group, and that in marking for exhibitions the two chief subjects of each group should count twice as many marks as the other two subjects; that the higher age limit in the preparatory grade should be abolished; that a permanent system of inspection should be accompanied by a diminution of examination; and that the standard in Greek should be lowered. Several suggestions were put forward for improving the science courses and the conduct of the Department, and, last of all, the Intermediate Board were requested to reconsider their refusal to recognise a consultative committee of teachers.

ABOUT the same time the Catholic Headmasters' Association met and passed several resolutions dealing with Intermediate education and one dealing with the University problem. The chief of the former resolutions dealt with the group system, and condemned it root and branch, and requested the Board to accept a deputation to lay fully before them the reasons for such condemnation. The meeting further urged that coördination of the science courses with the grades should not, at present, be insisted on for honour students, that three examiners should be jointly responsible for drawing up the papers, or that the papers should be submitted to an expert revising committee, and that the programme in music should be made easier. In reference to the University question a strongly worded resolution was carried, dwelling on the urgency of the Government's obligation to provide an adequate remedy for the want of a proper university for large numbers of students every year passing out of Irish Roman Catholic schools.

THIS, and similar condemnations of the group system have led the Intermediate Board to make a concession in the direction of the Consultative Committee asked for. Two members of the Catholic Headmasters' Association, and two members of the Protestant Schoolmasters' Association, were invited to meet the Intermediate Education Commissioners on November 12th, to discuss with them two points: (1) the group system, and (2) the question of set books, about which also there has been much complaining.

SHORTLY after the Catholic Headmasters' meeting, the Roman Catholic Hierarchy assembled at Maynooth, and strongly supported the attitude of the former on the University question. They also adopted unanimously two other resolutions, one dealing with primary, and the other with primary and secondary education. In the first they condemned the attitude and language of the Resident Commissioner of National Education towards the great body of clerical managers of national schools, and requested some official steps to be taken to reassure Catholics, and to restore the relations of managers with the National Education Board to their normal friendly condition. The other resolution was a protest against the rumoured scheme of placing the organisation of primary and secondary education on a footing similar to that of the Agricultural and Technical

Department, *i.e.*, more or less under the control of the County Councils in Ireland.

THE greatest excitement has been aroused by the rumoured intentions of the Government in regard to Catholic University Education. The scheme, as outlined, is to create two new autonomous colleges on equal footing with Trinity College, under the present Dublin University, thus making the latter into a great national university. One college would be Roman Catholic in Dublin, and the other would be the Queen's College, Belfast, which would be essentially Presbyterian. The Government would guarantee Trinity an increase of revenue amounting to £10,000 a year. Queen's College would receive £15,000 a year, and the Roman Catholic College, £45,000. The scheme has already aroused great hostility in Ulster, and is not favourably received in Trinity, where the Board has reaffirmed a resolution passed some time since signifying its willingness to grant to Roman Catholic students in Trinity religious privileges commensurate with those enjoyed by members of the Church of Ireland. This has been explained by Dr. Tarleton, a Senior Fellow, to mean a willingness to allow of a Roman Catholic chapel and the endowment of a chair of Medieval Philosophy. At a meeting of Convocation of the Royal University, a series of resolutions was carried, as proposed by Mr. F. H. O'Donnell: the first was a condemnation of the power by which the Jesuit organisation is enabled to nominate to and dismiss from public-endowed fellowships or examinerships in the Royal University; the others reasserted the ideas set forth in his now well-known book as to the injury inflicted on Ireland by the exclusion of the Roman Catholic laity, male and female, from all positions worthy of educated men and women on the teaching staff of secondary schools, and as to the absurdity of supposing that the Queen's Colleges are detrimental to the Catholic conscience. Roman Catholic graduates of the Royal University have formed an association to watch over their interests in connection with the University question, which, meanwhile, Captain Shaw-Taylor proposes to solve by a conference to be held in the Mansion House, Dublin, early in December, on lines similar to those of the celebrated Land Conference held a year ago.

WELSH.

THE Welsh County Schools Association is well in evidence. They have agreed to join in conference with elementary teachers, in which were to be discussed "Assimilation of Curriculum," "The Teachers' Register," "Entrance Scholarships," and "Consultative Committees." The retiring President, Mr. Lewis, of Llanelly County School, pointed out the falling off in the supply of teachers for secondary schools.

THIS was due, Mr. Lewis maintains, to the low salaries paid in secondary schools. In Wales the average salary paid to an assistant-master is £135. Seventy-five per cent. of the teachers in Welsh County Schools are graduates of some University. Twenty per cent. cannot hope to get a headmastership. How, then, can it be hoped that the career of a secondary-school teacher can be attractive, and without first-rate masters the schools cannot be first-rate. Mr. Lewis expressed the fear lest local authorities should institute a system of educational government by bureaucracies. "Organisation is an indefinite word, but if it means the rigging up of an office and the creation of officials all draining the county exchequer to the tune of £2,000 or £3,000 a year . . . then the schools will be impoverished . . . and it will be a sad bargain for the children of the people."

THE Llangollen School Board have received a letter of congratulation from H.M. Inspector of the district on the highly satisfactory condition of the schools as handed over to the new

authority. "For completeness of equipment," H.M. Inspector says, "they are certainly unsurpassed in my district." Certainly in other respects the schools are remarkable. Of 101 boys on the register, it appears 17 boys have made the full 412 attendances, whilst 40 have attended over 400 times. The average attendance of girls is 95, but 12 girls have made the maximum attendances, and over fifty per cent. have made ninety per cent. of the possible attendances. Of infants 12 have made the possible 412 attendances, and 22 have attended over 400 times. Two boys are reported to have attended over ten years continuously without missing once or having been late once. Llangollen is believed to hold the world's record for school attendances.

WHILST the highly satisfactory account is given of elementary education at Llangollen, at the last monthly meeting of the Governors of the County School it was stated that, though from a scholastic point of view the last year had been very successful, yet there had been a regrettable increase in the number of students who had left the school after a short stay. It was pointed out that children came to the school earlier than formerly. It was suggested that, as Prof. Sadler and Prof. Findlay, of Owens College are to address the parents on an early date, their aid should be asked in bringing this important matter forward.

APPLICATIONS have been made to the Merioneth Education Committee by the managers of the non-provided schools for money to pay their teachers. The chairman explained that as an education committee they had nothing to give save the school grants, as the County Council had decided not to levy a rate for their maintenance, and it was found that the grants would not be sufficient to pay the salaries. It was stated that the Finance Committee had recommended a rate of 10d., but the Council reduced this to 8½d., so as to avoid providing for the maintenance of voluntary schools. It was finally resolved to send the bills from the non-provided schools to the County Council, to inform the school managers of the fact, and to ask the Council for instruction in the matter.

THE Carnarvonshire Education Committee have recently appointed attendance officers for the ten districts into which the county is divided. There were 130 candidates, who were first reduced to 50. Discussion arose as to whether candidates appearing before the committee should be asked if they were or were not total abstainers. It appears that the candidates were asked the question. Mr. Allanson Picton objected to the question. He pointed out that, in his opinion, this was imposing a "new test on candidates not sanctioned by the legislature, at the very time when the country is in arms against the imposition of any test upon public servants."

CURRENT HISTORY.

THE long story of the possibly at some time to be accomplished Panama Canal has recently developed in an interesting manner. The Congress of Colombia having refused to ratify the treaty which had been made with the United States of America by the diplomatists of both countries, that part of the Colombian community which resides in the immediate neighbourhood of the partly-made canal, and which, therefore, is desirous of its completion, has revolted with a view to the erection of a separate State of Panama, and at present seems to be making good its claim. When optimist people say that wars will cease, others not so sanguine point out constantly new reasons for quarrelling, and we are tempted at first sight to regard this as an example of a specially novel reason for conflict. But on reflection, we remember another Darien scheme, now more than two hundred years ago, which was at least one of

the greater causes of bitterness between Scotland and England, and led to the contemplation of complete separation as an alternative to the closer union which was desired and in the end achieved.

AUSTRIA-HUNGARY is still affording us proofs that "home rule" is not a panacea for the mutual dislike of peoples united under the same dynasty. The aged Emperor has been compelled to make an impassioned appeal to the Magyars to avoid the "deplorable circumstances which for months have condemned to sterility political life in his beloved Hungary." But we draw special attention to the following phrase in his manifesto: "In 1867 means were concerted for common defence on the basis of the Pragmatic Sanction between the lands of my Hungarian Crown on the one hand, and on the other the kingdom and lands represented in the Reichsrath." The "Pragmatic Sanction" is our old friend of the middle of the eighteenth century. Note, too, that the Emperor has no name for his non-Hungarian lands. His Empire is "Austro-Hungarian," but what is "Austria"? Is Bohemia part of it? or the Tyrol? or Carinthia? There is no more interesting historico-geographical lesson than to comment on this curious nameless country and to explain why it is thus nameless. Every name as well as the no-name has a history deep in the past of German history and full of meaning for the future.

AN interesting experiment has recently been tried and found successful in Hong-Kong. The Chinese inhabitants objected to European methods of combating plague, and offered a passive resistance to sanitation. Whereupon the Governor handed over a block of the city to the Chinese themselves, gave instructions to a committee and left them to work out their own salvation. They have succeeded. It is a comparatively small matter, and on a small scale. But it illustrates in a remarkable way the eternal conflict between two systems of government. Every thing for the people. All governments, in the long run agree on this as the best and indeed the only possible aim. But by the people? That is the great contest waged at all times and in all places between what we call, for want of better names, the principles respectively of monarchy or aristocracy and of democracy. "Men of light and leading," or *vox populi vox Dei*. Yet here in Hong-Kong, Asiatics, left to their own devices, though, it is true, instructed by Europeans, can, at least in a definite and limited matter, show themselves capable of managing their own affairs. There is yet hope of the world.

CERTAIN French papers have been showing themselves somewhat ignorant of English constitutional methods. They have been saying that King Edward has been intervening in the recent Cabinet "crisis." Of course, it is impossible at present to prove them wrong. Revelation of state secrets is not for the generation in which the events occur. It is only when biographies of dead statesmen are written that cabinet history comes to be known. But it is interesting to notice the way in which our neighbours mention the matter. According to them, "the intervention of the King in the present crisis is contrary to all constitutional proceedings invariably observed since the accession of Queen Victoria." Can we date the epoch more exactly? We know that George III. appointed his own ministers and was supported therein by the constituencies. We know of the objection both he and his son, the Regent-King, had to "Catholic emancipation" and how they for long had their way. We know the struggle over the Reform Bill and the part that William IV. played therein, and finally we should know that in 1834 William IV. dismissed a ministry but failed to get the support of the constituencies. Is it the effect of that same Reform Bill, or only of the sex of our late Queen, that since "about 1837" our constitution is different from what it was before?

RECENT SCHOOL BOOKS AND APPARATUS.

Modern Languages.

Arnold's French Reading Books: (1) *E. Souvestre, L'Apprenti*. vi. + 55 pp. (2) *Eugénie Foa, Richard Whittington*; and *E. Souvestre, Un Conte de l'Abbé de Saint-pierre*. Edited by C. F. Herdener. vi. + 55 pp. (Arnold.) 1s. each.—Mr. Herdener is favourably known as a modern-language teacher of exceptional skill, and these slender volumes give evidence of it on every page. The text of the interesting tales has been divided into sections averaging a little over a page in length, and at the end of the book there is an exercise on each section, consisting of questions (in French) on the text, questions on grammar and word-formation; further, as a concession to many teachers, a short English passage for re-translation. A vocabulary is added, which does not pretend to give all words, and errs (if at all) in giving too many. Pupils reading these texts may well be expected to know the meaning of *devenir, bas, la fin, froid, aider*, and others which are here given. The books are nicely printed, and should be popular.

Blackie's Little French Classics. (i.) *Balzac, Un Episode sous la Terreur*. Edited by Alex. Wright. 36 pp. (ii.) *Th. Gautier, Scenes of Travel*. Edited by W. G. Hartog. 40 pp. (iii.) *La Fontaine, Shorter Fables*. Edited by Arthur H. Wall. 40 pp. (iv.) *Pascal, Pensées (Selections)*. Edited by Alice M. Ritson. 40 pp. (v.) *André Chénier, Select Poems*. Edited by Mary Olivia Kennedy. 40 pp. (vi.) *Kacine, Scenes from Bérénice*. Edited by Alex. Cran. 38 pp. (Blackie.) 4d. each.—A general commendation will suffice in the case of these recent additions to Messrs. Blackie's very convenient series of neat booklets. These are well edited, and slips are rare in the printing and the notes. The "post anterior" (i., p. 32) is new to us. Was *étroit* ever pronounced *étreit* (iii., p. 35)? There are several slips in iv. (e.g., *manifeste* (for *er*) on p. 36, *vieille* on p. 38, *were* for *and were* on p. 39). The notes to vi. are in French; the editor is fond of such terms as *syllèpse, catachrèse, métonymie, synecdoque*, which are now rightly banished. The proof has not been read with sufficient care (*héroïque* on p. 3, *une infinitif* on p. 32, *defer* on p. 34, *relatifs* on p. 38).

J. Lecoq, L'Enseignement vivant des langues vivantes. 103 pp. (Paris: Cornély.) 1 fr. 50.—Though Prof. Lecoq deals mainly with the reform in France, this little book should be of interest to English readers also; for they will see how thorough-going this reform is. As with us, there will be some confusion at first; many will teach in the new way without conviction, still more without sufficient knowledge of English and German; but when the transition period is over there will be a fairly general recognition of the great advantages gained.

W. H. Widgery, The Teaching of Languages in Schools. xi. + 76 pp. (Nutt.) 1s. net.—The older "reformers" are of course familiar with this book, which appeared in 1888, and has been out of print for some time; they will be glad of this re-issue, for it will help to spread the movement. It is a pity that the bibliography was not brought up to date; many important contributions to the teaching of modern languages have appeared in the last fifteen years. Reading these pages again, we cannot but express our profound regret at Widgery's untimely death; but the cause he had at heart is flourishing, and in a sense he may still be regarded as a leader.

Classics.

The Iliad of Homer. Book I. Edited by L. D. Wainwright. 107 + xl. pp., with Vocabulary. (Bell.)—The print of this volume is unpleasant to the eye, the page, too small to begin with, being interrupted by summaries and illustrations, the print poor, and the paper shining. We venture once more to protest against the *format* of this series, and to plead that publishers and editors will spare a thought to boys' eyes. The Introduction (Mr. Marchant's) contains a short summary of Homeric grammar. The notes are simple, and well suited to the beginner in Homer. We have already expressed our opinion that the "Grammatical Appendix" in this series is a mistake. Mr. Wainwright, like Dr. Leaf, still holds the exploded opinion that Homeric armour was that of the Mycenaean; and his illustrations include two warriors, one from a gem perhaps five hundred years older than Homer, and one from the "Warrior Vase," which shows quite a different state of things. The Varvakeion copy of the Athena of Pheidias is actually called "archaic" (p. 35), which implies want of knowledge. Altogether the illustrations from ancient sources range over a period of about fifteen hundred years. Here is a new example for Prof. Gardner when he again writes on archaeology in schools.

Xenophon's Anabasis IV. Edited by G. H. Nall. With map and illustrations. xxviii. + 110 pp. (Blackie.) 2s.—Mr. Nall comes before us with a third instalment of Xenophon's "Anabasis," which is of the same character as the others. The Introduction gives the life of Xenophon and a sketch of the "Anabasis," with a few remarks on the author's style; the illustrations are chiefly of military antiquities. There is a running analysis and a commentary, which seems to assume that a boy begins his "Anabasis" with this book. Some of the notes strike us as needless (e.g., on ἐλέγετο, p. 51; πρὶν, etc., p. 52; πρὸς, p. 53; αὐτῶν, p. 58; τῶν πάλων, p. 86); while a comment would be expected on ἔστιν ἔχον, p. 51. Καὶ γὰρ (p. 68) means "and in fact," which editors always seem to forget; there is no need of an ellipsis. The geographical notes are good.

We may just mention Mr. T. C. Weatherhead's *Junior Greek Examination Papers*, 72 pp., (Methuen), 1s., a useful little book of a familiar type; and *Latin Genders, a practical method of learning them*, by B. A., Cantab., 32 pp., (Kelfe Br. s.), 6d., containing rules, followed by lists of words with meanings, not classified by gender, but by subject, for practice.

Marcus Tullius Cicero. Ten Orations, with the Letters to his Wife. Edited by R. A. von Minckwitz, Instructor in Latin in the De Witt Clinton High School, New York City. xii. + 518 pp. (The Macmillan Company.) 7s.—This is another of the American "Macmillan's Latin Series," of which we have already reviewed two volumes in these columns. The series, as we have before remarked, seems to be designed for persons who begin Latin at a more mature age than is usual in England; and we cannot commend the practice of adding vocabularies to books so advanced in difficulty as this is. We should say the same of the fact that throughout the book all long vowels, including internal quantity, are marked, but that the ignorance of quantity is so scandalous and its neglect so studied in this country that the marking at present forms a distinct recommendation. Both introductions and notes are good, and there are lists of cognate words which will be instructive in a good teacher's hands. There are also a large number of pertinent illustrations mostly taken from ancient remains. The contents of the book are: *In Catilinam*, I-IV., *De Imperio Pompei*,

Pro Archia, *Pro Milone*, *Pro Marcello*, *Pro Ligario*, and the Letters. The last three items are arranged for reading at sight, a certain amount of help being given in footnotes. This is a very useful book.

Rules for Latin Prose. By Rev. P. Morgan Watkins, M.A. (Swan Sonnenschein.) 2d., or 1s. 6d. per dozen.—This is a two-page pamphlet which presents the chief Latin constructions in compendious form, and is likely to be useful as a *minimum* for young students. It is of course very limited, and omits very important matters. Thus the Direct Question is said to be in the indicative, although the deliberative subjunctive is also direct; and under Final clauses we find only *ut* and *ne*, not the relative or the supine.

The Life of Julius Agricola. Written by Cornelius Tacitus. Translated by Sir Henry Savile, 1591. 60 pp. (The Norland Press.) 8d. net.—The new series is intended to be "a comprehensive selection of cheap texts of books which have hitherto been out of reach, and thus to widen the field of study of literature and history. It is intended to include books in various languages, and where this is possible, to reproduce the actual text of the original edition." There are no notes, and the only editorial addition is a brief paragraph on the translator. The idea is excellent, and such a series is greatly needed. The present book is of importance, not only as a fine piece of English, but as a valuable source for the study of English history. We have read it through with the greatest interest, and feel sure that it will be welcome to teachers and scholars alike. In one point only we question the publishers' judgment: the ancient spelling is reproduced exactly. For classical schools this drawback may not be serious, but we fear it will make many teachers, especially those whose pupils are young, shrink from using the book. We wish all success to this adventure.

Edited Books.

Loci Critici. By Prof. Saintsbury. 439 pp. (Ginn.) 7s. 6d.—Prof. Saintsbury speaks modestly of his share in this volume as "porter's work." The volume is, indeed, a compilation, but, as the editor observes, "the work was needed." It consists of passages illustrative of critical theory and practice from Aristotle to Matthew Arnold. The great masters of ancient criticism are included, as was necessary, and then Prof. Saintsbury passes into fields which many English critics know little. Boethius is drawn upon for a short extract, and then comes Dante's turn. From him, indeed, a good deal is extracted, and parallel selections from the Italian critics of the sixteenth century are followed by the earlier Elizabethans. Ben Jonson's "Discoveries" is laid under contribution extensively, and then the point of view changes to the unfamiliar ground of Spain. The French critics of the seventeenth century give way to Dryden, who supplies about thirty pages, and Addison, Pope and Dr. Johnson follow; but, to show the care with which the work has been done, even Bysshe's book, which "is not a work of literature" by editorial allowance, is drawn upon. So are Shenstone, Gray and Hurd, and the German romanticists; so, too, later on is Hazlitt, whose every paragraph has a bracing property even when dissent from his conclusions is pronounced enough. Wordsworth and Coleridge are in these selections by indefeasible right. This rough sketch of what a reader will find in these pages is necessarily cursory, but the book may be honestly enough commended to the delight and study of all who are interested in the criticism of literature.

A First Book in English Literature. Part I., 278 pp. Part II., 256 pp. By Clara L. Thomson. (Horace Marshall.)

2s. each.—Miss C. L. Thomson, whose former books we have felt always constrained to praise unreservedly, has entered the field again with a piece of work which we unhesitatingly pronounce to be brilliant of its kind, and quite the best thing she has done as yet. The idea is a fine one. It is to do away with the current methods of teaching English literature as far as possible by providing children with an historico-literary account of the development of English prose and verse. These volumes are the first stages in what promises to be a most significant attempt. They are not large; they are written with the utmost clearness and simplicity; they are illustrated in an interesting manner; and they cover the whole story from the early Celtic literature through the middle English romances down to Wycliffe, Chaucer, Malony, and the later Scots poets, ending with Lyndsay. Miss Thomson promises us another volume dealing with the Renaissance, which we confess we are anxious to see. If it proceeds on the lines of the two parts of this work now before us, a literary history of English will be available for children, who can therefrom gather a thoroughly clear and vivid account of it from its earliest sources. Having spent many years in loving service of this subject, the present writer fell upon this new method and this brilliant treatment with a sense of pleasure and surprise which was in no way lessened by the admirable helps which Miss Thomson provides for further and higher study, by means of lists of books more pretentious and expensive, out of which she has, however, extracted the essence and embodied it in this complete account of her own. A work worthy of the highest praise and the widest circulation.

Persephone, or The Daffodil. A Play for Children. By Bertha Skeat. 39 pp. (Norland Press.) 6d.—This is a little literary venture which discloses its eclectic and refined nature at the outset, and may be unreservedly praised. It is a play wholly suitable for children, and well arranged in five scenes. Minute directions are also given to ensure a satisfactory performance. Certainly it demands a large number of characters to be provided for; there are four classical personages, four lilac maidens, four daffodil maidens, four winds, and eight ghosts. There is a great deal of music included, and this part of the production costs an additional eightpence. The songs are well selected, and include several selections from Tennyson, Shelley's "Arethusa Arose," and Miss Jean Ingelow's "Persephone." Might we point out that a barn-dance on the field of Enna, which is directed at the start, involves an anachronism of a really absurd kind.

Moffatt's Edition of Bacon's Essays. By Thomas Page. 208 + 30 pp. (E. J. Arnold & Son, Leeds.) 2s.—This edition has been specially revised and brought out for the use of students preparing for "scholarship" examinations. The edition is marvellously complete, and devised upon a thorough-going method. The amount of pains spent on the notes, the language, the proper names, the etymology, and the analysis of Bacon's immortal little works, has been lavishly bestowed. The Antitheta are well done, and some literary notes appended to a short biography of Lord Bacon are evidence of wide reading and sound judgment. Altogether a useful, helpful, and complete edition.

Tennyson's "In Memoriam" with Analysis and Notes. By Charles Manford. xxv. + 228 pp. (Swan Sonnenschein.) 2s. net.—Here is a prettily produced edition of a great poem supplied with an introduction and notes by the late vice-principal of Westminster Training College. The notes are of a kind likely to be helpful to students, though some of them will strike maturer minds as rather obvious.

The Song of Hiawatha. By H. B. Cotterill. 123 pp. English Classics. (Macmillan.) 1s. 6d.—Hiawatha gets in

this scholarly edition a considerable amount of distinguished and critical attention. The volume is full of information from one end to the other. The Biographical Note on Longfellow is too rapid to be quite satisfactory, but the editorial remarks on the poem are exceedingly good. The notes are what notes ought to be, the ideal of scholarly research on matters which too often are dismissed by superficial readers of this poem with scanty attention. Every point worth elucidation is dealt with fully and without clumsiness. The second appendix is worth the attention of advanced students. An edition which does full justice to a subject rarely handled with anything like due consideration.

Lamb's Tales from Shakespeare. Edited by C. D. PUNCHARD. 160 pp. (Macmillan.) 1s. 6d.—To have excluded this delightful work of Lamb's from this very representative educational series would not have been possible. Mr. PUNCHARD has done a real service to educationists in the way he has executed his task. He has kept his own personality rather in the background, as a matter of fact. Only in the introductory matter is there very much to be discerned of the editor; the notes, while always scholarly, could not in the case of Charles Lamb probably ever be evidences of abstruse study: in the present case they are brief and quite to the point. The book is delightful in every respect.

Old Testament History Analysed. By Rev. S. S. STITT. 72 pp. 1s. 6d.—An exceedingly useful handbook to a little volume which, some time ago, we reviewed in these columns, viz., OTTLEY'S "History of the Hebrews," and through that to the History of the Old Testament in general. It is an invaluable manual for those who have read more or less discursively on the subject, or who have "got it up" for examination purposes and want some handy plan of revising their knowledge; and some commencing the study would also find it a great help. It presents a capital conspectus of the subject, and is, indeed, as the author calls it, one of those *Helps by the Way* which are of the greatest educational assistance without degenerating into cram books. Its plan is simplicity itself. Some recent Senate House and Cambridge Preliminary questions are appended.

History.

The Expansion of Russia, 1815-1900. By F. H. SKRINE. vii. + 386 pp. (Cambridge University Press.) 6s.—The history of Russia has, for Englishmen at the present time, a vivid fascination. Whether we regard that country as our rival or our colleague in the civilisation of Asia, we must get to know as thoroughly as possible its history, especially the modern development of that extraordinary growth. It is the story of a people and a government whose ideals are almost the antithesis of our own, and whose success in Asia has equalled the civilising of India. The history of Russia seems to convert students to opinions still strange among us. They come to believe in autocracy and in the utmost rigidity of relations between Church and State, apparently because these have helped Russia not merely to avoid anarchy but to grow. And therefore it is that we commend this latest product of the Cambridge Historical Series to our readers. It is not written so clearly as we could wish. If the author had made a chronological list of events and used it as a guide in writing his story, or at least if he had printed it at the end for the help of his readers, we think it would have improved his book. But we have three very useful maps, an index, and a bibliography, and if the reader will work at the book, he will find much material for thought and reflection as well as a complete mine of information. If he gains nothing else, it will do him good to read European history in the nineteenth century as viewed from St. Petersburg, or rather from Moscow.

Special Method in History. By C. A. McMurry. vii. + 291 pp. (The Macmillan Co., New York.) 2s. 6d. net.—Dr. McMurry writes for American teachers solely. His aim is to teach them how to teach history in the schools of the United States. But the general lessons of his book can be adapted to our own schools. His general thesis is that the history of the native country should have a preponderant share, and that other history should be taught only when it illustrates by comparison or explains origins. As contrary to the old system of epitomised manuals, and specially to the concentric system, he would teach first the history of primitive times, the settlement of the country &c., and then go on to later, more complicated periods, finally reaching those periods necessary for explanation. Thus, for his own public, he treats the settlement of, first, east, then centre, then west, illustrating with early Greek, Roman, and English history. Then he goes on to the years 1660-1760, coupled with the origin of the Reformation, &c. Finally, he takes European history of the seventeenth and eighteenth centuries as explaining American origin, and would tell the story of the American constitution. Specially does he insist on the biographical method, with a warning, however, that the teachers should be equipped with the best and most correct biographies, and should choose the most typical of these. Thoroughness of detail on the best points, rather than epitomes of the whole, is regarded by him as essential. But we recommend the perusal of the book itself to our readers.

Problems and Exercises in British History. Volume II. Part II. England 1066-1216. By J. S. Lindsey. 128 pp. (Heffer, Cambridge.) 2s.—We have in previous numbers of THE SCHOOL WORLD noticed the members of this series as they appeared, and we, therefore, need no more than say that this volume quite equals the excellence of those which have preceded it. We can imagine no more stimulating, more helpful series for use in schools. It teaches not merely information, but how to collect, classify and produce the information. The outfit with which it provides the earnest teacher is complete.

Geography.

Map and Description of Peru. By Consul Eduardo Higginson. (Lima, 1903. London agent, Geo. Philip & Son.)—This work has been compiled by Consul Higginson, hon. member of the Chamber of Commerce, Southampton, under the authority of Don Eugenio Larrabure of Unanue, President of the Cabinet and Minister of Foreign Affairs in the Republic of Peru. The map is drawn to a scale of 1 : 3,000,000, and contains an inset of England and Wales. It is published on the tourist-folder principle, folding into some 37 pages, the backs of which are utilised for a very succinct account of Peru, and especially its advantages from the point of view of the would-be settler. The contents of the short chapters which appeal to the inquisitive immigrant may be judged from some of their headings, to wit, "Public Hygiene," "Individual Guarantees and Local Government," "Law of Coastlands," "Guano," "The Indiarubber Industry," "Fishing, Shooting, and Hunting." For his special benefit, extracts from the "Constitution of Peru, chapter iv.," are given, and he will be interested to learn that "No one is obliged to do what is not ordered by the Law, nor is he prevented from doing what the Law does not prohibit" (Art. 14), and that all property is "inviolable, whether material, intellectual, or artistic" (Art. 26). That the immigrant's "intellectual property" may not raise unworthy suspicions when he reads of these legal guarantees is, we trust, beyond the bounds of Peruvian probability. The map itself abounds in information over and above that of the orthodox type. The forest regions are distinguished, limits of navigation are marked on rivers, falls and rapids are shown, railways actual and potential are indicated, and ports are divided, like the

prophets, into major and minor. Altogether it is an interesting study, notwithstanding the occasional obtrusiveness of a defective register. The letterpress all through is entertaining and trustworthy, if the reader will always bear in mind that he is reading the work of a special pleader. He will, at all events, correct a possible notion that Peru is a mere coast strip after the fashion of Chili, and he will undoubtedly be surprised to note that of the twenty-one departments there are two—Cuzco and Loreto—each of which is larger than the whole of the United Kingdom. In the opinion of many experts, Peru has a great future before it: Consul Higginson firmly believes this and acts up to his belief.

The Geography of Commerce. By Spencer Trotter. xxiv. + 410 pp. (The Macmillan Co.) 5s. net.—No teacher of geography can afford to disregard this book by Prof. Trotter of Pennsylvania. Here are to be found many fruitful suggestions as to how to teach geography in the only satisfactory way, which is to secure the active co-operation of the exercise of the pupil's self-activity. In geography pre-eminently, continual use of exercises to be worked by the student, the solution of which will lay bare some great principle of the subject, is of far greater value than any amount of the most skilfully arranged didactic teaching. By curves and other forms of graphic representation, Dr. Trotter succeeds in showing the learner how to demonstrate for himself the distribution and growth of the world's commerce. By sketch maps with shadings of various kinds the student is led to discover the reasons which account for the localisation of industries in different parts of the world, and the large part played by such factors as rainfall, temperature, contour, and so on, in fitting certain parts of the world for the successful production of various commodities. More than all this, the teacher is shown geography in the making; original sources of information are indicated, and the use which the painstaking teacher can make of these is convincingly displayed. The book is brimful of hints, and though the subject is approached chiefly from the point of view of teachers in the United States, teachers on this side would do well to study the volume.

English Grammar and Composition.

Grammar Lessons. By the Principal of St. Mary's Hall, Liverpool. xi. + 107 pp. (Longmans.) 2s.—A collection of lessons in elementary English grammar that will repay perusal by teachers of the subject. The book is evidently the work of one who loves, and is mistress of, her subject.

Special Method in the Reading of English Classics. By C. McMurry. 254 pp. (Macmillan.) 3s. 6d.—This is the book of an enthusiast in the teaching of literature, and it has the faculty of arousing thought, and also desire to take the line Mr. McMurry indicates. It is rather a counsel of perfection, as English schools go at present; but if this method could be followed there would be an undoubted rise in the standard of intelligence, which might be trusted to transform itself into genuine culture after schooldays; and a corresponding increase in dignity would be attained by the subject of English literature. In English curricula it is hard to imagine sufficient time devoted to this subject to bring forth such results as it is undoubtedly capable of. Nor are the average teachers of English literature by any means on Mr. McMurry's level of knowledge and enthusiasm. To apply this method means that no less should be given by the ordinary teacher than by the author of this book. But it is a stimulating volume to read; and even in the conditions which beset literature teaching now it may be of great service. If it gets into the hands of the right sort of man it will bear fruit, no matter what his circumstances may be as to time or opportunity.

Science and Technology.

Electricity and Magnetism, Theoretical and Practical. By C. E. Ashford. 299 pp. (Arnold.) 3s. 6d.—The preface states that this book is intended to provide, in one volume, the theoretical and practical work from the stage of the beginner up to the standard required for university scholarships. The subject-matter is well up to date, brief sections on electrons, wireless telegraphy, and Röntgen rays being inserted. The volume may be relied upon to give sound and accurate information. It is difficult to find many novel features either in the descriptive or experimental sections; in fact, the sequence in which the subjects are taken is the chief point which attracts attention. The author does not consider it necessary for a student to read any electrostatics before proceeding to voltaic electricity; so the former is relegated to Part III. of the volume for a reason which, though given in the preface, is not quite clear. We therefore find that potential and E.M.F. in the voltaic section are introduced in a somewhat casual manner. In Part III., potential has been treated in two ways: an early chapter gives information based upon the temperature analogy, while a subsequent chapter again discusses it from the fundamental mechanical definition. The author acknowledges "that the elementary theory of electrostatics affords results of great importance and forms a most valuable object-lesson in the application of mathematics to physics." We are of opinion that it also has the great merit of giving a sound scientific idea and definition of potential without the aid of the antiquated thermal and hydrostatic analogies, and that it is difficult to see how the student can derive clear notions of E.M.F. and the simple phenomena of the electric current unless he has previously mastered the principle of potential—the *pons asinorum* of electricity—by means of a study of statical electricity. Magnetism is treated in less detail than is customary; and terrestrial magnetism, as being a branch of navigation, is treated very briefly. The diagrams are numerous and intentionally rough, so that the student may always see exactly to what his sketch should appear similar. The author scorns ornate pictures, and does not realise that a judicious insertion of high-class illustrations, in cases where the diagram is unsuitable, serves other purposes than to increase the selling-price of the book.

Experimental Psychology and Culture. By George M. Stratton. 330 pp. (The Macmillan Co.) 8s. 6d.—This is a good book. Its author sets himself not only to give "an untechnical account of certain groups of experiments in psychology," but also to show something of their significance. It is, therefore, not a mere record of laboratory work, but a book full of suggestions to the thoughtful teacher and the student of mind. An honest attempt is made to show the character and estimate the value of the "new psychology" as bearing upon education and other moral and philosophical interests. After a brief historical introduction and a discussion of the relation of psychological experiments to physiological investigation, Dr. Stratton has some valuable chapters on Mental Measurements, Unconscious Ideas, Illusions and their significance. From an educational point of view, it will be found that the chapters devoted to Memory, Imitation and Suggestion, Colour and the Fine Arts, the Connection of Mind and Body, and the closing pages on Spiritual Implications, are well worthy of careful study. A good teacher must, consciously or unconsciously, be working on psychological lines. This book will throw fresh light on many educational problems, and greatly increase the interest in practical teaching. There is no better field for psychological study than the school, but the work done there will be carried through with greater zest and deeper insight if the teacher has made himself familiar with the experiments of the laboratories

and their interpretation by such an able exponent as Dr. Stratton.

Practical Physics for Schools. By C. J. L. Wagstaff and G. C. Bloomer. I., Mensuration, Mechanics, and Hydrostatics. 72 pp. II., Light and Heat. 80 pp. (Cambridge: Heffer.) 1s. 6d. each.—In these books, which are the shape and size of an exercise book, spaces are left after the different experiments in which the student is directed to enter his results. This plan introduces a serious difficulty. All results should be recorded at the time the observations are made; if this is done at once into books like the present the student will find he has no space for all the experiments he must make before he can obtain good results, and he will be continually thinking of neatness; and if only the best results are entered the teacher will have no idea of the boy's powers of accurate manipulation. On the whole, it is better to have separate books for printed instructions and for written results. The experiments are of the kind usually prescribed for beginners, and the instructions are brief and clear, but there are no illustrations. Hardly any use is made of the tabular form for recording results, no squared paper is included, and there is not a worked example of how to plot a curve. But, since the book has been in use in much its present form for three years, it is evidently a workable course.

Laboratory Physics. By D. C. Miller. 393 pp. (Ginn.) 8s. 6d.—This manual is designed to be a student's handbook for the laboratory, and the grade of work is that of the course in general physics in colleges and technical schools. It is presumed that the student has had a course in preparatory physics, and that these exercises will be accompanied by a full course of lectures: for this reason the text is chiefly restricted to a description of the apparatus and the method of conducting and recording the experiments. The exercises, 128 in number, give a general survey of the experimental work in mechanics, properties of matter, sound, heat, light, electricity, and magnetism. An extensive appendix, consisting of tables of constants, is inserted at the end of the volume. The subject-matter is treated in a sound and accurate manner, and students may rely on the guidance which the volume will afford. Nevertheless, it is well to state that previous text-books cover practically the same ground, and that the volume under review will best serve as a source of information on special experiments. Several experiments of a novel character are described: of these we may particularly mention the determination of (1) specific heat by heating, (2) surface tension by direct measurement, and (3) the errors of an aneroid barometer. Very useful instructions for cleaning and silvering glass surfaces are given. The British reader may be surprised to read of an unfamiliar unit of pressure—the "barye"—which is defined as a pressure of one dyne per square centimetre.

The Sea Shore. By W. S. Furneaux. xviii. + 436 pp. (Longmans.) 6s. net.—It is, as the author remarks, a matter of surprise that of the pleasure-seekers that swarm on various parts of the coast so few take a real interest in the natural history of the shore. In many cases the indifference is no doubt to be explained by the scarcity of books which will show the beginner where the most interesting objects are to be found, and how he should set to work to obtain them. In this respect Mr. Furneaux's book supplies a want. Its first six chapters are devoted to the general characteristics of the seashore and the outdoor work of the seaside naturalist, and give instructions for making and maintaining salt-water aquaria and preserving various marine objects. The succeeding chapters deal with the appearance and structure of the animals and plants likely to be met with. These are interesting and, in the main, trustworthy.

We notice a few minor slips in matters of anatomy and classification, but they occur, for the most part, in passages upon which the young reader is not likely to dwell. The book is illustrated by eight coloured plates and upwards of 300 cuts, which will be of great value for purposes of identification. To naturalists who desire a guide to one of the happiest of hunting-grounds the book may be confidently recommended.

A Country Reader, II. By H. B. M. Buchanan. viii. + 233 pp. (Macmillan.) 1s. 6d.—Mr. Buchanan's second reader possesses all the virtues of its predecessor. Common farm-animals and plants are described in clear and interesting language, and the broad scientific principles upon which agricultural processes depend are explained in a very happy manner. The illustrations are numerous and exceptionally good. The book is admirably planned and will prove of great use in country schools.

Studies in Nature and Country Life. By Catherine D. Whetham and W. C. D. Whetham. 125 pp. (Macmillan and Bowes.) 2s. 6d. net.—The fifteen short essays in this book direct attention to common objects, scenes and phenomena, and they may serve to stimulate children to make friends with Nature and to study her ways. But behind the book there must be a teacher who will see that the young pupil makes observations and experiments for himself, otherwise there will be little development of the spirit of inquiry which should be the aim of all scientific instruction. It may be doubted whether any educational advantage is gained by reading about the constitution of air and water, the nature of heat, light and sound, and the characteristics of our climate, including the Gulf Stream fallacy. Very few children can get clear ideas from such accounts; for the only descriptions and explanations which grip the mind are those which can be referred to personal experience. Some of the essays in the second part of the book, on such subjects as the country and its names, roads, fields and hedgerows, and villages, are more uncommon than those on physical science, and could be made the basis of interesting lessons. There are no illustrations.

Model Answers on Biology for Teachers and Students. Part I. (Illustrated.) By F. H. Shoosmith. 64 pp. (Charles and Dible.) 7d. net.—Mr. Shoosmith presents important botanical truths in a highly concentrated form as model answers to forty questions proposed by himself. Though he shows that the student who had "read and re-read" the answers could have satisfied the examiners in the subject in the King's Scholarship Examination, 1902, and the Certificate Examination, 1903, we are convinced that Mr. Shoosmith would not describe his method as educative in the modern sense.

Mathematics.

The School Arithmetic. By W. P. Workman. viii. + 495 pp. (Clive.) 3s. 6d.—The following extract from the preface explains the nature of the book:—"The School Arithmetic" is an edition of 'The Tutorial Arithmetic' amplified by a large selection of miscellaneous examples arranged in graduated examination papers, a fresh set of examples in approximate methods and a further collection of miscellaneous problems. Two sections have been re-written. Section I. because in an Arithmetic specially intended for schoolboys elaborate explanations of the four rules seemed unnecessary, and Section X. because it included matter outside an ordinary school curriculum. Further, the most difficult matter in both book-work and exercises has been omitted, as also have all the harder problems." The book is of a very high order of merit and provides a thorough course in arithmetic. We should have liked, however, to see a chapter in which the laws of operation were

discussed as a whole: such a chapter would furnish a good logical discipline and would prepare the pupil for the intelligent study of algebra.

Lectures on the Logic of Arithmetic. By M. E. Boole. 144 pp. (Clarendon Press.)—The object of these Lectures may be said to be the "presentation of arithmetic treated as a branch of the art of thinking, founded on the general science of the laws of thought." The method here expounded has apparently been "long used for reviving the faculties of children suffering from mathematical rickets and logical paralysis," diseases "induced by the practice of teaching mathematical processes on a hypothesis about the nature of mathematics directly opposed to that which underlies the original invention and formulation of these processes." That the opportunities afforded by the study of arithmetic for the development of logical thinking are frequently not used as they should be is, we fear, only too true; but at the same time we think there is much sound arithmetical teaching just as there are several excellent text-books which present the subject in as logical and instructive a manner as is done in these lectures. With the desire that is manifest all through the book to get children to think for themselves rather than to acquire mere mechanical dexterity every good teacher will be in hearty sympathy; and, while there is much sound sense as well as good logic in the general exposition, we think there are good grounds for dissenting from several of the statements and conclusions here put forward. But though we do not agree, in their entirety, either with the diagnosis of the "diseases" or with the suggested remedies, we think the book raises many questions that teachers would do well to consider and to answer.

Arithmetical Types and Examples. By W. G. Borchardt. xii. + 367 pp. (Rivingtons.) 3s. 6d.—A large and well-selected collection of arithmetical examples, each set being preceded by a fully worked-out model. Discussion of principles and proofs of rules are usually left to be supplied by the teacher. Two important matters receive great attention—namely, the use of rough checks on accuracy and the employment of abbreviated methods of working. Other good features are the early introduction of examples on areas and volumes and excellent sets of examples to be solved by graphical methods. The collection should be found to be very serviceable.

Elementary Geometry. Section II. By Frank R. Barrell. ii. + 169-284 pp. (Longmans.) 1s. 6d.—This section is stated to contain the subject matter of Euclid, Book III. 32, 35-37, some parts of Books IV. and II., and Book VI., with explanation of ratio and proportion, trigonometric ratios and measurement of circles. The treatment is simple, and, for a first approach to the subject, fairly satisfactory, though occasionally it is rather scrappy. The first page of chapter xiii. is good, but the definition of ratio on page 179 should be overhauled in the light of the remarks on p. 182. The exercises are not so numerous as we are accustomed to in school text-books. The book has several good features, but we think the arrangement of the matter might be considerably improved; when the rearrangement is made, the author would do well to omit the parenthesis after *incommensurable*, p. 185.

Examples in Practical Geometry and Mensuration. By J. W. Marshall and C. O. Tuckey. xii. + 70 pp. (Bell.) 1s. 6d.—In the hands of a capable teacher these exercises should prove both easy and instructive work for young pupils, though we hope the remark in the preface on "the quantity or quality of instruments" will not be misunderstood. The examples are numerous, but teachers will need to be careful not to overdo the merely mechanical processes; a diagram must not be merely drawn and then laid aside. It is quite possible for a course of

practical geometry to be as little of a stimulus as one on Euclid's geometry; the authors seem to recognise this in asking every now and again for proofs of constructions. We think very much would be gained by insisting that the pupil shall state clearly what he has done and by encouraging him to deduce conclusions from comparison of different cases of the same construction made by himself and his fellow pupils. Frequently the class should work at one problem, but not all the pupils from the same data; comparison and discussion of the different diagrams will often yield interesting results.

Miscellaneous.

The Critics of Herbartianism and other matter contributory to the Study of the Herbartian Question. By F. H. Hayward, assisted by M. E. Thomas. viii. + 217 pp. (Sonnenschein.) 4s. 6d.—To Dr. Hayward, as he himself says, "the system founded by Herbart is a moral gospel for men perishing through stupidity and absence of ideas." "It is more important that education should become a 'gospel' than that it should become a 'science,' though when seen through an Herbartian medium it begins to appear as both." In fact, the reader gradually comes to the conclusion that Dr. Hayward would have him believe that a working knowledge of Herbart's system is the whole duty of the schoolmaster. In our opinion, Dr. Hayward's enthusiasm often causes him to speak at random, and more than once we have wished to remind him of what he has written on p. 60. "Now interest in a subject easily degenerates into fanaticism, and when, as with the Herbartian movement, a deep moral motive is present, this fanaticism may take extreme forms." But the author's rather exaggerated zeal notwithstanding, we can recommend the book as one likely to engender thought, promote controversy, and generally to prevent educational stagnation.

The Rubbish Alphabet. By Gerald Sichel. (Sonnenschein.) 1s. net.—A child's alphabet in rhyme is here illustrated by amusing pictures drawn in strong lines, and with the bright colours which appeal to youthful minds. A child who knows his letters could find delight in the pictures and the rhymes they illustrate.

The Education Act of 1902 (England and Wales) and 1903 (London), with Notes for the use of the Members of Councils and Committees and others administering these Acts. With the revised text of the Education Acts, 1870-1899. Edited by G. R. S. Taylor. iv. + 161 pp. (Routledge.)—This volume differs from recent books explaining the new English Education Act noticed in these columns because the editor has been able to include the Education Act (London) 1903. The explanatory notes throughout the book show that Mr. Taylor not only has wide legal knowledge but a thorough appreciation of the difficulties likely to be experienced by members of local education authorities. The edition may be highly recommended.

Dress-Cutting and Drafting. With Illustrations and Diagrams. By M. P. Browne. 46 pp. (Constable.) 6d. net.—This little book is a reprint of the first section of a larger book by the author, to which has been added a preface by the Hon. Mrs. Colborne. If carefully worked through by the students of dress-cutting classes the little book will impart a good practical knowledge of the subject.

The Post Card Collector's Bureau. The English Counties. (The Photochrom Co., Ltd.) 1s. 6d.—The bureau consists of a box divided into partitions on the index file system, separate divisions being given to different counties. The stiff cards separating spaces have printed on them interesting geographical information. By a simple device these can be adjusted to alter

the capacity of the separate spaces. The bureau is constructed to hold 1,000 cards, and affords a methodical manner of keeping a collection, whilst children who collect may be led unconsciously to assimilate some geographical knowledge.

Three Merry Comedies for Schoolboys and such. By C. A. Pellanus. I., Two Clever by Half. 34 pp. II., A New Start. 38 pp. III., The First Day of the Holidays. 40 pp. (Cambridge: Heffer.) 1s. each.—These three plays will interest young people; they are amusing and remarkably void of offence. They can be recommended for acting during the holidays, for the stage directions are simple and the properties easily procurable.

Pocket-Book Classics. With leather pocket-book and diary. (Bell.) 4s. 6d. net and 5s. 6d. net. The volumes separately bound in limp leather, 2s. net.—This is an excellent idea daintily carried out. A beautifully produced pocket-book with a sufficient diary and calendar and a means for carrying in a small compass some favourite piece of literature—at present "The Odes of Horace," "Marcus Aurelius," and Tennyson's "In Memoriam" are available, but other volumes are to be added. The volumes, it should be said, are interchangeable. The pocket-book classics would make an acceptable present to any schoolmaster, schoolmistress, or literary person.

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 Ideal Reading Book.

MAY I add a word or two to the article on the above subject which I contributed to your last issue? The "Temple Readers," the "Romance Readers," the "Stories from Chaucer," mentioned in the article are published by Messrs. H. Marshall and Son, and not by the Norland Press.

The large number of publishers who have for many years sent well-illustrated "Books for the Bairns" into the market rendered it impossible to give more than a few names; but readers who are in any sympathy with the article will readily enough add others: it is the style of book rather than any particular set of books to which I desired to call attention. The opportunity may, however, be taken to say that Messrs. Longmans have published numerous excellent Fairy Tale books.

ARTHUR BURRELL.

Isleworth.

Practical Work in Schools.

MAY I call the attention of your readers to the fact that a committee of the Education Section of the British Association was appointed, with Sir Philip Magnus as chairman, this year, at Southport, "To report upon the courses of experimental, observational and practical studies most suitable for elementary schools," and to solicit their assistance in the important work the committee has before it.

It is very desirable that the committee should be in possession of all available information as to schemes of work that come within the scope of its enquiry, and are at the present time in operation. If teachers who are carrying out original schemes of instruction, or who are acquainted with particularly good efforts in teaching observational and practical subjects, will favour the committee with full details of such courses of instruction, it will be of the greatest possible assistance. The enquiry will cover the following Sections, and will be particularly concerned with

the co-ordination of these with one another and with the ordinary subjects of the curriculum of an elementary school:—

- (1) Practical and experimental arithmetic and geometry.
- (2) Elementary experimental science (fundamental principles of chemistry and physics).
- (3) Nature-study and its relation to botany and geography.
- (4) Domestic science and art, including cookery, laundry-work, housewifery, hygiene and needlework.
- (5) Manual instruction other than in the forms comprised by precepting sections, e.g., kindergarten, "hand and eye" training, drawing, and the use of tools.

Teachers willing to assist the committee will best do so by sending as full details as possible of courses of instruction, conditions of work, time devoted to the subject, methods and organisation, and (if convenient) *average* samples of the work accomplished or note books produced by the pupils. Such samples will be carefully preserved, and when examined will be returned to the source from which they came.

As there is little time in which to make such an extensive enquiry, I wish, on behalf of the committee, to appeal to teachers, inspectors, and others interested in these matters, to send to me at the above address before Christmas, contributions that may be of service to the committee.

W. MAYHOWE HELLER,

Secretary to the Committee.

18, Belgrave Square,
Monkstown, co. Dublin.

Some Common Text-Book Errors in Dynamics.

IT seems to me—I speak in all deference—that Dr. Bryan has only just touched on the unsatisfactory nature of text-book treatment of the parallelogram of velocities. The real point seems to me that it is not so much a device for compounding velocities (as he truly says, a body cannot have two velocities at the same time) as a device for simplifying mathematical calculation by resolving velocities. The whole tendency of treating it in the ordinary way is to foster the idea that a body can have two motions at the same time; and the confusion arising from this is, I think, by no means confined to schoolboys. There is a fundamental misconception arising from the idea that the two compounded motions have each a physical existence. Let me give an example. I heard a University Extension lecturer make the statement that the balls in a ball bearing had a spinning as well as a rolling motion, and that, therefore, there must of necessity be some sliding of the balls against the bearing. In the class afterwards I suggested that theoretically you might so shape the bearings as always to have the contact between balls and bearings in such a position that the motion was pure rolling. Of course the practical application at once becomes extremely complicated and confusing, but the lecturer could not begin to discuss the question, as he was unable to realise that his spinning and rolling had not each a separate physical existence.

It is the old difficulty of science teachers that scientific language is so frequently metaphorical, and therefore, if taken literally, misleading. When we say that Jones major has sixteen marks, we do not expect to find them on his back or the palms of his hands; but when we say that the motion of a ball in a ball-bearing is compounded of a rolling motion and a spinning motion our language, though equally metaphorical, is in nine cases out of ten taken literally.

Gran.mar School,
Atherstone.

ALEX. WICKSTEED.

The Effective Teaching of Geography.

THERE is, perhaps, no subject the teaching of which is more generally distasteful than geography and few subjects which are so ineffectively taught. I say "ineffectively" advisedly, though I

am, of course, quite aware that it is possible in geography to obtain nearly always fair results as far as examinations are concerned. But this fact is anything but comforting when one reflects that it is simply due to the getting up of the text-book on the part of the pupils. And I am sure I shall not be alone in maintaining that mere lists of names and isolated facts do not constitute geographical knowledge. True, they are indispensable adjuncts of it, but that is all. Pupils need vivid and accurate knowledge of each country they study, such a knowledge as will enable them in the future to talk intelligently of other lands. The error in the teaching of geography lies mainly, I think, in a wrong use of the text-book. The text-book, which should be simply a correct outline of facts and a compendium of data for reference, is a book for the pupil, not the teacher. The teacher's lesson must be given on independent lines, and should be the result of careful reading. Naturally, a power of graphic description on the part of the teacher is of the greatest value. But a description which is merely a monotonous reproduction of some book of travel will fail to a certainty. Description, to succeed at all, and to make a real impression on the pupils, must be as vivid and life-like as if the teacher had personally visited the scenes described. Probably some will object that this is a counsel of perfection and impossible to attain generally. Perhaps so, but I am certain that the power *can* be cultivated even by the most unimaginative teacher. And, when geography is taught in the graphic manner I advocate, the educative value to the pupil is great indeed. The pupil whose interest has been once awakened will read up descriptions and details out of school. To take a few examples at random. There are few pupils who, having once formed a picture of the Bad Lands in the lower valley of the Yellowstone River, or of the great cañon river, the Colorado, or of the wonderful asphalt lake in Trinidad, will ever wholly lose the impression.

Pictures, to be pinned on the notice-board, of the places mentioned are of the greatest help to the teacher. Generally speaking, the pupils are very glad to bring such pictures if they happen to possess any. I quite foresee, however, that, in the desire to be graphic and interesting, accurate detail may be overlooked. Pupils must know how to use their maps, be trained to observe always its scale, and to give when required the distance from one place to another or an area, approximately only, as I need scarcely add. Positions of towns, rivers, &c., must be known as exactly as possible, and pupils should be made to feel that a slight misplacement, which means in reality some hundreds of miles, is a serious error.

As to actual map-drawing, this has to do with facility in drawing rather than anything else. There is one thing, however, which is most helpful in the teaching of geography: the pupil should be able to reproduce from memory a country or part of a country with a fair degree of accuracy, and, above all, be able to mark towns and rivers correctly. Perfect accuracy of outline is unattainable except for the few, and should most certainly not be insisted on. And, indeed, it is not really of great importance.

Use may be made occasionally of lantern-slides, but this should not become too frequent, or the geography lesson may come to be regarded as amusement and nothing more.

I have not space in this letter to touch on the teaching of physical geography at all, for that branch is important enough to claim a separate consideration. And, indeed, there is so much to say on the subject of the teaching of geography that I have not attempted to write comprehensively. I have merely tried to indicate briefly the practical lines on which my own teaching of the subject is based.

ESTHER S. THORN.

Camden School for Girls,
London, N.W.

Women Gymnasts at the Nürnberg Festival.

No one could read the article in your October number, on "Women Gymnasts at the Nürnberg Festival" by an English Delegate, without assuming that the only English women gymnasts present were those specifically mentioned as being from the single London institution which is named. The article refers to "the little band of English representatives," whereas there were two bands of such representatives present. The article describes the appearance of "the little band" as though it was the first and only appearance of English girls, whereas two days previously the other band of English women representatives had performed from the same platform. And finally, after a somewhat dramatic and by no means modest description of how the performance of the "little band" was appreciated, the article winds up by stating that "the English women who created this favourable impression in Nürnberg were from 'The Gymnastic Teachers' Training College held at the South-western Polytechnic, London.'"

I have no wish to detract from the credit due to this excellent training College, the able head of which was formerly a valued member of our staff; but, in common justice to the other band of English women representatives who were present, I think I am bound to protest against the inaccuracy or unfairness of "an English Delegate," who attributes the sole representation of English women gymnasts at the festival to the students from one particular college, and credits them with being the only English women creating a favourable impression.

It happens that a band of eight gymnastic teachers in training from this Polytechnic, together with our Instructress, were present at the Nürnberg Festival, and took an official and prominent part in the programme. They appeared on the evening of the Monday, whereas the other band did not perform until the Wednesday, and they certainly created a favourable impression. As I write this, I have before me extracts from two German and two English papers, in which the exercises rendered by this band of students and the impressions they created are referred to in the most eulogistic terms. I refrain from quoting them, in deference to the belief that such a paper as yours is not intended to advertise particular institutions, although this would seem to have been forgotten by your contributor.

I may also remark that whereas "An English Delegate" states that "a sea of upturned faces . . . 100,000 spectators" were present to see the "little band" perform; I read in an article on the Festival in *The World's Work* that this particular performance when "two and thirty thousand people looked on," and in no paper can I see reference to more than 40,000 as the total number attending the festival. In fairness to "other English women," I hope you will find space for this letter.

SIDNEY H. WELLS,

Battersea Polytechnic,
London, S.W.

Principal.

IN answer to the above letter, I must sincerely apologise to the Battersea contingent for not mentioning their performance, which was in every respect admirable, and received the approbation which it fully deserved. At the same time, I may point out that the seeming want of courtesy was quite unintentional. I was writing an article on *educational* gymnastics, of which the display of the South-western team was intended to be, and actually was, an exposition carefully thought out and carried through by *Fraülein Wilke*, whereas the display of the little band of Battersea, excellent though it was, could hardly come under this category. That a gratuitous advertisement was sought for is a most unworthy suggestion, for, beyond the fact of being an old student of the college, I have no other interest in it.

AN ENGLISH DELEGATE.

School Laboratories.

IT has been pointed out to me that my remark in the recent review of Mr. T. H. Russell's book on *Laboratory Fittings*, "That the benches in the chemical laboratories at the Manchester Municipal School were a replica of the earlier ones designed by Dr. Thorpe at the Yorkshire College," is incorrect. Though they resemble one another in general arrangement, there are many points of detail in which they differ. My statement was based upon the verbal information of an official of one of the institutions in question. As, however, such information is incorrect, I hope you will allow me to correct the mistake. I need hardly add that it was never my intention to convey the impression that this type of bench, supposing it had been the same, was adopted by the author except as the result of the previous consideration of other types. As it turns out, the illustration to which I referred is not intended to represent an exact drawing of the Manchester benches, but is a generalised drawing.

YOUR REVIEWER.

The Drying of Flasks.

THE method devised by Mr. O'Keefe has often been recommended, and is sometimes used in large laboratories, but the tube should be of copper and the air *must* be filtered, or the flasks will be dirtier than ever for obvious reasons. It seems out of place in the school laboratory. Twelve CO₂ flasks were dried in my laboratory one morning in less than five minutes by the simple plan of placing them on an iron plate kept hot by a large burner. If the flasks have not very long or narrow necks, no sucking out of air is needed, and very little in any case. This has "worked" for years.

A. H. F.

Trevelyan's Rocker.

CAN any reader who has used Trevelyan's Rocker give any hints as to the precautions necessary to ensure success with it? My own rocker works well after trial, but I cannot depend upon it. Sometimes I have to spend twenty minutes in trials before it is satisfactory. Experiments to discover the cause of failure have so far not resulted in success, and I thought some other teachers might have had a similar difficulty, and be able to suggest a cause.

W. P. WINTER.

The Salt Schools,
Shipley.

The School World.

A Monthly Magazine of Educational Work and Progress.

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