

THURSDAY, JUNE 5, 1879

SCIENCE TEACHING IN LONDON BOARD SCHOOLS

IT was a fortunate circumstance that at each of the three elections of the School Board for London science has been represented. On the first occasion Marylebone gave Prof. Huxley a seat at the board, and at the second and third elections Chelsea has sent Dr. Gladstone as one of its representatives. To the former was due, in great measure, the Code of Regulations in which the subjects of instruction were laid down. To the latter has fallen the task of bringing them into a systematic and practical form. The Committee, of which Prof. Huxley was the chairman, determined that there must be given, in infant schools, "object lessons of a simple character, with some such exercise of the hands and eyes as is given in the Kindergarten system"; and in boys' and girls' schools, "systematised object lessons embracing in the six school years a course of elementary instruction in physical science, and serving as an introduction to the science examinations which are conducted by the Science and Art Department." The time-tables of all the schools under the Board are made to conform to these requirements; the walls of the class-rooms are hung with illustrations in natural history and other diagrams; and in many of the schools boxes of objects are also to be found. Many of the teachers, especially those trained by the Home and Colonial Society, endeavour to carry out the regulations as fully as practicable; but hitherto the scheme has worked very irregularly, and there has generally occurred a break of continuity on the children passing from the infants' departments to the upper schools. The Board's Inspectors, who are required to report in all cases on object teaching, have often had to bear testimony to this defect.

In November last the Store Sub-Committee, of which Dr. Gladstone is chairman, prepared a systematic scheme to supply the deficiencies of the former regulations, which has been adopted by the Board. The syllabus is as follows:—

Infants' School (Non-Standard Children).

Aim.—To develop in the children's minds an interest in the things round and about them; to teach the use of all the senses, and form habits of observation; to impart a correct knowledge of the commonest things; to increase the infants' vocabulary and power of expressing themselves.

Subjects of Instruction.—Objects illustrative of the three kingdoms of nature—animals, plants, and minerals, especially such as the children meet with commonly in their ordinary life. The different parts, qualities, and uses of these objects.

Means.—Diagrams; objects procured by the teacher or supplied from the store, and a small case of apparatus to enable the teacher to perform the simplest operations necessary to illustrate the properties of the objects. Children are to be encouraged to bring the needful objects both in this and subsequent stages.

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Standard I.

Aim.—To carry on the previous training, leading also to the exercise of the judgment, in showing the relations of the different parts of bodies, and how their different qualities fit them for the uses to which they are applied.

Subjects of Instruction.—A somewhat more extended series of objects, with fuller information as to the qualities, uses, and history of common things.

Means.—Diagrams of animated nature, &c., classified—small cabinet of objects, classified for purpose of comparison, with simple apparatus as before.

Standards II. and III.

Aim.—To lead up from the previous training to the "specific subjects" of the Code.

Subjects of Instruction.—Series of objects illustrating the most important manufactures. Geographical distribution of products and means of procuring them. Objects for teaching the fundamental notions of matter and force.

Means.—Diagrams—same small cabinet as before. Loan collections of objects tracing the raw material to the final product (such as cotton, flax, silk, leather, wool, iron, and clay).

Standards IV. to VI.

Aim.—To teach the "specific subjects" of the Code.

Subjects of Instruction.—One at least of the following:—Mechanics. Taught by diagrams and working models (on loan).

Physiology.	ditto	models (on loan).
Physical Geography.	ditto	maps and experiment.
Botany.	ditto	specimens and models.
Domestic Economy.	ditto	demonstrations and experiment.

The practical instruction which, during such a course as the above, will be imparted to the children, is altogether in advance of what is contemplated by the new code of the Education Department. The Government have provided that an annual grant of 4s. per subject be given for every scholar in the Fourth, Fifth, and Sixth Standards passing in not more than two of these "specific subjects;" but they give no grant for any of the preliminary teaching which under this scheme is intended to lead up to these studies. This defect in the scheme has been brought before the notice of Parliament year after year by Sir John Lubbock. The London School Board has therefore decided, on the motion of the Hon. George Brodrick, that an application should be made to the Education Department to get the teaching of the elements of natural science included among the recognised subjects of class examination—history, geography, and grammar; and a deputation will shortly wait upon the Lord President of the Council with that object.

This will manifestly be a step of very prime importance not only to the School Board for London, but to all those in the Provinces, and to the cause of education in general, as the possibility of thus obtaining a grant for the teaching in the lower standards will be the most effective stimulus that can be applied. Whatever, however, may be the result of this application, the London Board will not be deterred from fully carrying out the programme they have set themselves; and they have prepared a circular of instructions to their teachers, full of excellent and valuable suggestions, which is to be

accompanied by a box of apparatus, simple and cheap, to enable the object-lessons to be properly illustrated. Loan collections of models illustrative of mechanics, physiology, and botany, will also be provided; but as far as possible the children are to be encouraged to bring familiar objects, and to make their own models and apparatus. After giving very full directions for the teaching of the infants and the first standard children, which we need not insert in detail, the course prescribed for the upper classes is as follows:—

Standards II. and III.

As the aim in these standards is to lead up to the specific subjects of the Code, the teaching must be more advanced, and should make a larger demand on the thinking powers of the children.

The objects contained in the previous groups should be again employed, but fresh ones should be occasionally introduced, especially for the purpose of comparison.

In the animal group children should be led to compare and classify the different animals, and to notice the chief differences and resemblances between the leading divisions of the animal kingdom. The children should also have explained to them the preparation, qualities, and uses of animal substances employed in the arts, such as leather, silk, wool, and horn.

In the vegetable group such distinctions as that of endogen and exogen should be made clear; the gradual growth of plants such as beans and wheat should be traced; the uses of vegetable substances, such as cotton, linen, starch, sugar, coffee, tea, and india-rubber, with the processes of manufacture, should be explained.

In the mineral group attention should be called to the general properties of metals, iron, copper, silver, gold, lead, tin, zinc, mercury, &c., and the qualities peculiar to each. The iron and steel manufactures, and the making of bricks, pottery, earthenware, &c., may be explained; and the distillation of coal and manufacture of gas, may be experimentally illustrated.

The knowledge of the points of the compass, and form and motions of the earth, which is required by the Code, will naturally be imparted by means of object lessons.

This object teaching may be connected, as occasion offers, with the lessons in geography, and may often be made to illustrate the reading and dictation lessons.

The teacher is not expected to attempt to teach all the subjects mentioned in the preceding paragraphs, nor to limit himself to them, but the Inspector will inquire what particular course the object lessons have taken, and will frame his examination accordingly, taking care that the fundamental facts connected with matter and force are not overlooked.

Standards IV. to VI.

Though in the higher standards one or more of the scientific specific subjects of the Code is expected to be taken, it will be generally found necessary to continue some of the training just described. Thus, in the Fourth Standard, lessons on the principles which are at the foundation of all physical, mechanical, and chemical science should be given; during which clear ideas should be imparted as to size, weight, and specific gravity, as to the laws of motion of solids, liquids, and gaseous bodies, as to the production, radiation, conduction, and absorp-

tion of heat, and as to the difference between chemical combination and the mere mixture of the constituents. Occasional lessons also on the atmosphere and its composition, and the ordinary meteorological changes should be given, and local phenomena of springs, streams, hills, ponds, excavations of the soil, &c., should be observed. Boys as well as girls should be taught something of the laws of health. Domestic economy should not be taught empirically, but the scientific principles involved in the lighting of a fire, in cooking, in the choice of clothing material, in washing, and in ventilation, should be experimentally explained.

The foundations of a "knowledge of common things," as Dr. Lyon Playfair happily called it, will thus be well laid; and the children of the London schools will at an early age acquire the habit of correct observation—no mean advantage whatever may be their future occupation in life. This additional course of instruction will not occupy more than about two hours a week, and will involve scarcely any extra expense, while it will sharpen the wits of the children and freshen their minds for their more literary studies.

NOAD'S "ELECTRICITY"

The Student's Text-Book of Electricity. By H. M. Noad, Ph.D., &c. A new edition, carefully revised, with an Introduction and Additional Chapters by W. H. Preece, M.I.C.E., &c. (London: Crosby Lockwood and Co., 1879.)

IN his introductory note to this new edition of the "Student's Text-Book of Electricity," Mr. Preece informs us that the revision is only partially his own, having been begun by Dr. Noad shortly before his lamented decease. In fact a large portion of the work appears to be reprinted from former stereotyped plates.

In addition to a large number of illustrative cuts, the work possesses a very valuable feature, too rare in elementary books, namely, frequent references to important original memoirs. A judicious use is made of extracts, as, for example, from the lectures of Prof. Fleeming Jenkin on submarine telegraphy, and from those of Sir W. Thomson on atmospheric electricity and terrestrial magnetism. New chapters on telephones, duplex and quadruplex telegraphy, and on the electric light, bring up the scientific information to the present year. As an elementary treatise on the purely phenomenal side of the science of electricity, it is probably the fullest text-book in the language.

Having said this, our commendations must end. Mr. Preece's opening paragraph bears the stamp of being an excuse for the shortcomings of the work; and we must regard it as his misfortune, rather than his fault, if a book which he has had to revise fall far short of what it might have been had it been produced under his sole responsibility. It is unfortunately—in science, at least—the reviewer's duty to be candid on the shortcomings of the work under his notice; and the only way to prevent the repetition of erroneous statements, and to secure their effective correction, is to point them out fearlessly. We are bound, therefore, to undertake the ungracious task of indicating sundry blemishes which it is to be hoped will not be perpetuated in another edition.