

THURSDAY, DECEMBER 29, 1870

SCIENCE AT SCHOOL BOARDS

THE country may, we think, be congratulated on the election of School Boards in London and the provinces. Although from our point of view it may be deplored that so few men of Science, or persons having any pretension to understand what Science means, have been elected, it must be felt that the beginning of a great work has taken place in this country, the end of which no one can at present foretell. The nation, for the first time in its history, has taken the subject of education into its hands. The Education Act will be open to alteration and revision in the Houses of Parliament, and from step to step we may hope to see at last a department of Government representing the wishes of the people, dealing alike with the education given in our universities and our ragged schools. The great aim of the country must be to give to every child born in the kingdom the best education adapted to secure its happiness and usefulness in this world. There is no doubt that this will be the feeling that will prompt members of the various School Boards to carry out the powers which have been given under the Education Act.

We exceedingly regret that the various Boards have been elected rather upon a religious ground than upon the general principle of what is desirable to be taught in the schools. As we read the Act, there will be little opportunity left to the Board to increase or alter the conditions of "religious teaching" in any of the schools. It would have been better, perhaps, to have excluded all religious teaching from the primary schools, on the grounds, first that the feeling of respect and even awe which ought to attend the teaching of the Bible, is likely to be diminished by making it a common reading and task-book in schools; and secondly, that the clergy of the Established Church and of the various denominations, who are amply paid for their religious ministrations, ought especially to undertake religious teaching, and conduct it under circumstances that would render it most efficient and useful in the moral training of a child. There is also a third objection, and that is that the rate ought not to take the money of one set of people for the purpose of teaching the religion of another. There are certain moral obligations underlying all the higher religious creeds, to which no parent could possibly object, which ought to be taught and insisted on everywhere in universities as well as primary schools.

With regard to the other subjects to be taught in the schools, we would call attention to the danger there is that any extension of the means of education should lead to an imitation of the system now in existence. That system consists almost entirely of giving lessons out of books and teaching children words independent of the facts they represent. The present Chancellor of the Exchequer has well said, "I think it is more important for a man to know where his liver is seated and what its functions are, than to know it is called *jecur* in Latin and *ήπαρ* in Greek." Of course there is no chance of Latin and Greek being introduced into our primary schools, although if they are such a precious means of developing the mind as they are assumed to be, there seems to be no reason why they should

not. But the substitute for these branches of human acquirement is found in our lower schools in the shape of reading poetry, history, geography, and the like. If the sentiment of the Chancellor of the Exchequer exists in the new School Boards, the time seems to have come when some effort may be made to give up a certain amount of time in all schools to the teaching the facts of the external world. This is what is usually called scientific training, and has been almost universally regarded in our systems of education as something that may be dispensed with. But Science is after all but a systematic arrangement of observed facts by which the laborious investigations of the few may be made the possession of the many.

It may be urged in favour of this teaching that it educates (draws out) portions of the mind which cannot be cultivated by means of words and figures or moral lessons. A boy may be able to read all languages and master all problems in mathematics, and be a moral paragon, and yet commit some stupid blunder, from ignorance of some obvious chemical, physical, or vital law, that may cost him his life, or, what is more important still, may lead to the death of others. Our whole national history is full of terrible instances of punishment for breaking obvious and easily understood natural laws.

That Natural Science can be taught in schools there is no doubt. It has been introduced in a limited way into our great schools, as Harrow, Rugby, and Eton; and, so far as it has gone, it has not only not been attended with any diminution of acquirements of other branches of knowledge, but rather the contrary. In some of the national schools in Ireland, Science has been introduced, and we can bear testimony to the amount of useful information acquired by a class of boys in chemistry at the National School in Sligo.

The most difficult question for the School Boards to determine will be how to begin. In nine cases out of ten they have no men of Science to direct them. There is one comfort in London, that the Board will have a host in Professor Huxley, who, if they will listen to him, is undoubtedly capable of giving good advice. He will be ably backed by Miss Garrett, who, with her medical education, will be fully able to appreciate both the subjects and methods of any attempt to teach Science in our schools. Mr. Lucreft, the working man's candidate, has also advocated the teaching of Natural Science in schools. If the other candidates said anything on this subject, the reports of their speeches have not yet reached us. Still we may hope and we would especially recommend to the reading of all members of School Boards a "Report of a Committee appointed by the British Association on Scientific Education in Schools." It is a parliamentary paper, published in March 1868. We do not think this paper had the attention paid to it demanded by its intrinsic importance; and we are glad to recommend it, as especially adapted for the reading of members of School Boards and of all interested in education.

Without having any cut and dry system to offer to the public, we would advise that some attempt be made to teach some quantum of Natural Science somehow. The present masters will probably be utterly ignorant of any branch of Science, but there are plenty of students of Science who would undertake at first to instruct, perhaps in several schools. They should be instructed to teach

children to observe facts, and lead them gradually from simple facts to the more obvious and easily understood laws of Science. Such classes are formed in Germany, in what are called *Real Schule*, and the system has been introduced into England under the name of Object lessons. Such teaching might be preparatory to taking up any one branch of Science, such as Chemistry, Experimental Physics, Botany, or the elements of Human Physiology.

We are glad to find that this subject has again been taken up by the British Association for the Advancement of Science. A few days ago a deputation of this Association waited on the Vice-President of the Council for the purpose of presenting a memorial on scientific teaching in elementary schools. Their reasons for urging this subject, they say, are three: "Firstly," the memorial says, "we conceive such teaching to be one of the best instruments of education in the sense of intellectual discipline, and in many respects better calculated to awaken intellectual activity than other studies; secondly, we think that a knowledge of the elements of Natural Science has a high value as information; and thirdly, we are of opinion that scientific training and teaching in the elementary schools will afford the best possible preparation for that technical education of the working classes, which has become indispensably necessary to the industrial progress of the country." The subjects they propose to be taught are elementary Physical Geography, elementary Physics and Chemistry, elementary Botany, and elementary Human Physiology. They think that by such an education the children of "the poor and necessitous" might be prepared to take advantage of the scholarships and exhibitions which are now only open to the children of the well-to-do classes of society.

E. LANKESTER

THE LEARNED SOCIETIES AND THE PRESENT CONDITION OF SCIENCE AND LEARNING

THE appointment of the Royal Commission on the present condition of Science will naturally turn the attention of many minds to the subject, and its discussion will certainly elicit many suggestions and schemes for the better culture of knowledge. The question is so large, so important, and so difficult, that the freest possible discussion will be necessary for its satisfactory solution.

At present we wish to direct attention to the question as to how we may obtain from the Learned Societies of the United Kingdom the greatest possible aid in the improvement of natural knowledge. The number of these societies is now large. Some of the provincial societies can claim an honourable place even when compared with the associations which are not confined to any one locality in their choice of members. Members of the Literary and Philosophical Society of Manchester, it should be remembered, were the first who were favoured with Dalton's Atomic Theory. Of what we may call the national societies, the number is increasing yearly, greatly to the detriment of real progress. Membership in these societies is coveted because it is supposed to indicate the possession of certain acquirements, it being thought, not unnaturally, that the members have won their spurs as investigators

and interpreters of Science. Nor can we conceive of any better tests than those at present applied to candidates. Examinations are clearly impossible in this case, even if one were fully confident of the certainty of that method for detecting ability. It is evident that, on the whole, the regulations now enforced have been successful in their object, and that membership of a British Learned Society is generally not only a coveted distinction, but one deservedly prizeable.

Year by year these societies gather up the result of patient investigations, of long and careful research. Recording new facts, illustrating old truths, dissecting error, they pursue a course of steady consistent usefulness. Every one who has had to work up some special topic, must have a feeling of gratitude for the aid he has received from their publications. The societies are doing a good share of honest work, and doing it well. Their ranks include the most distinguished and the most ardent investigators in each branch of learning. Still we need not attempt to disguise the fact that they do not contribute so largely to the advancement of knowledge as it is desirable they should do. They have forgotten, or never known, that unity gives strength. They have neglected the great fact, daily becoming more apparent, of the unity of knowledge.

"The divisions which we establish between the Sciences are, though not arbitrary, essentially artificial. The subject of our researches is one: we divide it for our convenience, in order to deal the more easily with its difficulties. But it sometimes happens—and especially with the most important doctrines of each Science—that we need what we cannot obtain under the present isolation of the Sciences,—a combination of several special points of view; and for want of this, very important problems wait for their solution much longer than they otherwise need do. To go back into the past for an example: Descartes's grand conception with regard to analytical geometry is a discovery which has changed the whole aspect of mathematical science, and yielded the germ of all future progress; and it issued from the union of two Sciences which had always before been separately regarded and pursued." (Comte.)

Science suffers not only from the causes indicated in the preceding extract, but also from the dispersion of material in different receptacles, all of which are not accessible to the student. If the number of existing learned bodies be taken into consideration, and also their conflicting claims, it will be obvious that none except rich men can possess all the aid which they can give to the investigator. A paper upon the characteristics of one of our English dialects might appropriately be read before the Royal Society, the Society of Antiquaries, the Philological Society, the Archæological Institute, the Archæological Association, the Royal Society of Literature, the Ethnological Society, the Anthropological Society, and a score or more of the provincial societies. We find a valuable monograph on the Lancashire dialect in the Proceedings of the Philological Society, and another in the Transactions of the Literary and Philosophical of Liverpool, but for information on the eastern variety of that dialect, we must go to the Historic Society of Lancashire and Cheshire. The Cheshire glossary must be sought in the *Archæologia*, the Cumbrian in the Royal Society of Literature.