

THURSDAY, MAY 23, 1889.

## THE NEW TECHNICAL EDUCATION BILL.

AFTER the storms which have wrecked so many previous attempts to deal with the question of technical education, it is no less surprising than gratifying to find that on Wednesday, May 8, Sir Henry Roscoe's Bill, representing the views of the National Association for the Promotion of Technical Education, slipped through the second reading stage in less than a minute, with no opposition and amid general cheers. It would be too much to expect that the same easy course lies before the Bill in Committee, but at least it may be said that we are much nearer the settlement of this vexed question than we seemed to be a month ago.

The Bill itself, which we reprint elsewhere, does not differ materially from its predecessor of last year—we mean the Bill introduced last year by Sir Henry Roscoe, not the hapless measure drafted by the Government. There is, indeed, an alteration in the definition of technical education, which now includes, besides instruction in the branches of science and art named in the Science and Art Directory, the working of wood, clay, metal, &c., commercial subjects, and “any other subject applicable to the purposes of agriculture, trade, or commercial life and practice, which may be sanctioned by a minute of the Department of Science and Art made on the representation of a School Board or local authority that such a form of instruction is suited to the needs of its district.” This is an improvement on last year's definition, which gave the initiative in this matter to the central Department instead of the local authorities. The more freedom that is given to localities to adapt their scheme of technical instruction to the diverse needs of their own industries the better.

But the Bill is essentially unaltered, and it ought to meet with the same approbation from friends of education as greeted its predecessor. It is, like all the measures that have been drafted, an enabling Bill; that is to say, it gives powers to localities to provide technical instruction if they think fit. The Bill deals with the case both of elementary and secondary schools. Technical instruction given in the former will be provided by the School Board, and a school will not cease to be a public elementary school by reason of technical instruction given therein. If, however, a School Board fails to do its duty in the matter, the local authority (*i.e.* the County, District, or Borough Council, or the Urban Sanitary Authority, as the case may be) may step in and make the requisite provision themselves. In the case of higher technical instruction, provision may be made either by the School Board or, except in the case of London, by the local authority. Provision is made for the payment of fees of deserving students, the establishment of scholarships, grants for laboratories, apparatus, museums, libraries, &c. Grants may be made to the higher technical schools by the Science and Art Department, and to elementary schools giving technical instruction by the Science and Art Department, or the Education Department, or both.

The Bill was allowed to pass the second reading unchallenged only on the understanding that certain alterations should be made in Committee. Until

the Government amendments are put on paper, it is hard to give an opinion as to the future chances of the measure. It would of course be out of the question to try to revive the clause of the last Government Bill compelling School Boards either to abstain from providing technical instruction altogether, or to make the same provision for voluntary schools as for schools under their own management. It ought not, however, to be difficult to arrange a satisfactory compromise, and so remove what is undoubtedly a defect in the present measure as it stands, *viz.* the absence of any provision for the large majority of children who are educated in denominational schools.

It would, indeed, be pitiable if the settlement of the question were again postponed owing to the endless difficulty of the relation between Board and voluntary schools. After all, it should be remembered that by far the most important part of technical instruction necessarily falls within the realm of secondary, not of elementary education. The ground may be prepared in the primary school, but that is nearly all. In our opinion, therefore, the most important clauses of the Bill are those dealing with non-elementary schools, and at all costs these must be preserved, and, if possible, extended; for, as we read the Bill, it is doubtful whether they give the local authority the requisite powers to build new technical schools. This, however, is a matter which can easily be set straight in Committee.

We do not wish to undervalue the part of the Bill dealing with elementary schools. It is most undesirable that a School Board that wishes to build a workshop, or provide tools for manual training, should continue to run the risk of surcharge by the auditors, and it is right that the work of the so-called higher elementary schools should be formally recognized, and established on a satisfactory basis. But if there are any who expect, as a result of the measure, that a system of distinctively technical instruction will be introduced wholesale into our elementary schools, they are destined, in our opinion, to be disappointed.

We note with pleasure that the present Bill is not hedged round by the cumbrous and harassing restrictions which disfigured the Government Bill of last year. There is no requirement of a poll, no restriction in the amount of the rate; and, above all, no clause restricting technical instruction in elementary schools to children in the sixth and seventh standards. Of all alterations that may be proposed, an amendment embodying the last-named restriction would, in our opinion, be the most disastrous. It would at once cripple the work of the higher elementary school, and destroy science as a class subject and (in the fifth standard) as a specific subject throughout our elementary school system. The representatives of the Technical Education Association will doubtless be on the watch to see that no sinister alteration of this kind is introduced, for it would virtually convert the Bill into a measure for prohibiting the provision of technical instruction throughout the greater part of the elementary school course.

There are one or two criticisms which we may offer on the measure as it stands. In the first place, it does nothing for girls—for instruction bearing on domestic economy can hardly be brought under any of the heads enumerated in Clause 11. This

objection might be met by slightly extending that clause so as to include cookery, laundry work, &c. Another flaw is the omission to provide expressly for Imperial grants other than payments on results of individual examination. It is true that the Bill leaves the mode in which such grants shall be made to the discretion of the Science and Art Department, but something more definite than this is required. It would be a great mistake if payments for technical instruction were made on results, like the present Science and Art grants; they ought rather to bear a certain proportion to local contributions, and a clause to this effect should, if possible, be embodied in the Bill. Lastly, why should School Boards and local authorities be required to confine any entrance examination which they may institute, to reading, writing, and arithmetic?

In spite of these minor defects in matters of detail, the Bill as a whole ought to meet with the hearty approval of the public, and we trust no stone will be left unturned to secure that it shall be passed into law this session. Another year's delay would be most disastrous, as it would have the effect of paralyzing local activity, especially in those centres which have already prepared schemes and collected funds for technical schools, but are waiting year after year to see what form legislation on this subject will take.

#### A TEXT-BOOK OF HUMAN PHYSIOLOGY.

*A Text-book of Human Physiology.* By Dr. Austin Flint. Fourth Edition. (London: Lewis, 1888.)

THE present edition of Dr. Flint's "Human Physiology" is a capital manual of the subject. The book has been re-written from the third edition, which was published nine years ago. As might have been expected from the author of the previous work, the style of the text is always clear and eminently readable. Upon the whole the selection of the matter is good, and the illustrations are almost without exception excellent. Detailed description of apparatus and of methods of experiment has been excluded as unsuited to the character of the book. In the same way digression into the laws of physical and chemical science has been avoided as far as possible, on the ground that such knowledge is already within the possession of the student of physiology, or that to obtain it he can turn with advantage to special treatises.

Amid much that is praiseworthy in the work, one may single out some points for especial commendation. The brief historical introductions to certain chapters are of marked excellence, and notably the sketch relating the progress in our knowledge concerning the functions of the heart and blood-vessels. The discussions of the terms hunger and thirst, and of the value of the various constituents of the urine as indices of the general metabolism of the body, are exceedingly full and satisfactory. Very interestingly given, too, is the account of the uses of water and inorganic chemical substances which pass through the organism; and the probability of the formation of a considerable amount of water within the organism during severe muscular exercise is related with striking vigour and force of argument. As its title implies, the volume is devoted particularly to the physiology of man, and the portion dealing with the special mechanisms for voice and speech is exhaustive. The chapters upon the cranial nerves, upon sight, and upon

hearing, are perhaps, upon the whole, the best in the entire volume. The illustrations to these chapters are particularly deserving of praise.

In a science developing with such rapidity as of late years physiology has done, peculiar difficulties stand in the way of furnishing a text-book that shall pretend to some degree of completeness, and shall at the same time avoid statement of all that is not absolutely worthy of credence. Dr. Flint has to a great degree succeeded in accomplishing this difficult task. But he has done so somewhat at the expense of matter that might, we think, have been introduced into his text-book with advantage. One finds no definite mention in his work of rhythmic contractility as a function of the fibres of the cardiac muscle *per se*, apart from nervous connections they possess. There is no adequate discussion in this manual, consisting of nearly 900 pages, of the phenomenon of inhibition as an exhibition of temporary diversion of cell-activity into channels of anabolism. When treating of uric acid the writer is silent as to the synthesis from urea and glycocholl, although that fact throws a flood of light upon the origin of the acid in the animal body. A long paragraph is devoted to the pineal gland, and finally the remark is made that in structure it resembles the ductless glands; surely such a suggestion is worse than worthless, in view of the discovery of its relation to the dorsal median eye of *Sphenodon*.

On the other hand, when writing of the superficial and deep reflexes, no hint is given of any doubt as to the truly reflex nature of the latter. The balance of evidence is decidedly in favour of the patellar jerk being really of the nature of a reflex, yet an unqualified statement on so important a subject is scarcely fair to the student.

In so excellent a chapter as that on sight, it is disappointing to find hardly one word of mention of the phenomena of colour-sensations. The Young-Helmholtz theory is not alluded to, much less any rival hypothesis such as that of Hering. One hears nothing of three primary sensations of colour, or that colour-blindness is most frequently a defect for the rays of the longer wavelengths. In a physiological work treating especially of man, this ought not to be the case. We are not so poverty-stricken in our knowledge of the functions of the semicircular canals as Dr. Flint would let his reader imagine. No adequate description is given of the symptoms which appear when they are separately injured. No adequate representation is made of the views of the long series of more recent workers on the subject. In the statement of the motor-paths by which nervous impulses arrive at the urinary bladder, no reference is made to the sacral spinal nerves, although the contraction brought about through sympathetic channels is incomparably weaker than that effected along the former route. One must add here, however, that the diagram, from Küss, exhibiting the various forms and positions assumed by the organ in question when distended in various degree, is remarkably useful and well-chosen.

Dr. Flint alludes to, rather than describes, the way in which, by partial superposition and fusion of simple contractions, the tetanic contraction of muscle is obtained. He is far too brief upon the matter, especially as he gives it no pictorial illustration in aid of his text. The student whose grains of knowledge on this head had been gleaned