

quality has resulted, with a consequent decrease in demand.

The present condition of the sea-fisheries of New England is a deplorable one. Whatever is to be done for their amendment, it is to be hoped that our diplomatists will not suppose that they will profit by the privileges of free fishing in Canadian waters.

ELEMENTARY SCIENCE-TEACHING.

FROM all sides comes the advice to study science. Teach science to children, put it in the kindergarten, double the amount of it at college, and foster it at the universities. The opinion seems to be current, that, by introducing a branch of science on the school curriculum, the magic effect is to be won. To give children objects to handle, to see, to describe, and to puzzle over, is certainly an excellent discipline.

But the far-famed benefits to be derived from science do not centre there, nor is it with the methods of teaching science that fault is to be found. The methods have been carefully worked out: models, diagrams, specimens, excursions,—all are pressed into service; and, though the results of this world-wide scientific movement have been great beyond all expectation, one will readily accept the statement that elementary science-teaching—excepting to elementary learners, children just beginning their school education—is not always gratifying work. To school-children who have already received their formative training,—who have swallowed, perhaps digested to a greater or less extent, the usual doses of book-learning,—whose minds have been set in the rut of an arbitrary bookish study method, the introduction of a science course often brings more pain than pleasure.

A case in point recently came under my notice. At a school for girls, an able and interesting lecturer gave a course in physiology. The lectures were illustrated, and well-directed efforts were made to make things clear. Recently an examination was held, and perhaps it will be worth while sampling some of the more characteristic answers to the questions then asked. The stomach is put 'in the chest,' or 'is covered by a muscular bag called the pericardium,' or 'is mostly on the left side, just south of the heart.' The authority for the last statement also showed an indignant surprise at being told that her heart was nothing but a muscle. Another anatomical fact not yet recognized by the text-books is that 'the scapula has no shape.' 'Capillaries are small particles in the blood,' or 'are depressions in the arteries, and they

change the fatty parts into blood.' Some feats of swallowing and digesting are described. 'The food passes from the mouth through the blood to the stomach,' or 'is attracted downwards, and then your Adam's apple slips over it:' 'it passes first to the small, then to the large, intestine.' The surgery is also peculiar. When an artery is partly cut, you are advised 'to cut it open so as to prevent the loss of too much blood,' or 'to cut it entirely so as to allow it to coagulate.' The terms, too, are caught up inexactly and without definite ideas: 'vains,' 'venus,' 'gaul,' 'color-bone,' 'clerical' (for 'cervical'), 'ablutions' (for 'albumen'), 'humorous' (for 'humerus'). By a peculiar association of ideas, the young lady responsible for the last innovation states that this bone is commonly called the 'crazy' bone.

On the whole, the answers were very good. Those given above are purposely selected for their peculiarity. The girls too, with some exceptions (mostly from twelve to sixteen years of age), took great interest in the subject. Nor is the school to blame. The early training of these girls was entirely opposed to these new methods of teaching. It is not the science that is strange to them; but there is a struggle going on in their minds parallel to the battle between the 'new' and the 'old' educationalists in the reviews. This leads to a confusion of thought, a muddled-headedness, which perhaps is the most characteristic feature of the above answers. The whole moral can be summed up in one phrase. It is not in the direction of science-teaching, but of scientific teaching (and that, too, from the cradle onward), that the future of education is to develop.

With the above experience fresh in mind, I came upon a second example of elementary science-teaching, of a most ingenious kind. It is nothing less than an attempt to give to children an account of the physiology of the brain (Frank Bellew, *St. Nicholas*, February, 1886). The 'firm of Big Brain, Little Brain & Co.' tends to the business affairs of the body. The cerebrum is the administrative department. There the head of the firm, old Big Brain, sits at his desk surrounded by papers and all the appliances of a modern business-office. At one side is a telegraph-key to bones; on the other, pigeon-holes and register cases. Below him, on one side, is Little Brain, (the cerebellum), a little elf tending to the machine; on the other, the ganglia, or gang of five clerks on high stools. These put down the accumulated expenses of Big Brain, and do the book-keeping. One of the little band is in the office receiving an order from Big Brain. In the middle is the Bridge (Pons), keeping up a continual clatter of telegraph-keys, transmitting messages from one part of the brain to

another, in all directions; and still farther down is Medulla. He has charge of the life department, and keeps working the bellows, and running the fire of life. And through this allegory you are to 'know more about the contents of your knowledge-box than you did before.' Only a reading of the article itself, and an enjoyment of the grotesque illustration, will convey an idea of its extreme clearness; and, after such a reading, no excuse will be necessary for calling attention to this effort as an illustration of modern elementary science-teaching.

JOSEPH JASTROW.

TOTAL-ABSTINENCE TEACHING IN THE SCHOOLS.

IN 1884 the legislature of the state of New York, in response to forty thousand petitions, passed an act by which all schools supported by public money or under state control are required to instruct their pupils in physiology and hygiene, "with special reference to the effects of alcoholic drinks, stimulants, and narcotics, upon the human system," and prohibiting the granting of a certificate to any person to teach in the public schools except after passing a satisfactory examination in physiology and hygiene with special reference to the effects of alcoholic drinks, etc. A similar law has been passed in at least fourteen states of the union. This action, it is claimed, is due to the Woman's Christian temperance union.

It was at one time questioned whether such a law was constitutional, and how far it could be enforced. The state superintendent, W. B. Rugles, in a letter to Commissioner Perrigo, at Potsdam, says that it is the duty of the local school authorities to provide for such instruction; the duty of the teachers to give the instruction; and the duty of parents to cause their children to conform to the course of study in these subjects, as in any other studies prescribed under the law. He goes still further, in declaring that a persistent refusal of a pupil to receive instruction in physiology or hygiene may justify the school authorities in excluding such pupil from the benefits of the public schools. A similar question has arisen in reference to the vaccination law in the state of New York, passed in 1860. In that law the legislature distinctly authorizes and directs the exclusion from the public schools of children not protected from small-pox; and, so far as we know, this power and duty have never been abridged or questioned by the courts. It would seem, therefore, that the conditions under which children may participate in the benefits to be derived from being educated at the public expense are lawfully within the power of the legislature to prescribe,

provided always that constitutional provisions are not violated.

The immediate result of the passage of these compulsory laws has been to cause a remodelling of the text-books of physiology and hygiene in order to meet the requirements of the legislatures. Some of these have been but little changed, except to be enlarged by a few chapters on alcohol and tobacco; while others have been entirely rewritten with the special object of making them conform to the new demands. It is the opinion of at least one lawyer, reputed to stand high in his profession, that the main object of these statutes is to provide for scientific temperance instruction in the schools; that the use of works on physiology and hygiene is a mere method of accomplishing this result; and that any instruction which, while making physiology and hygiene its leading feature, only incidentally bears upon alcohol and narcotics, is not a compliance with the law, and therefore school authorities are only justified in using as text-books those which make the effects of alcoholic drinks, stimulants, and narcotics upon the human system their special object. If this opinion is correct, very many of the books which have been recommended for introduction into the schools since these compulsory laws were passed would be discarded, as they are primarily works on physiology and hygiene, and secondarily teach temperance. The number of books which have thus far appeared to meet the new demand exceeds twenty.

One of the most prominent temperance writers thus explains the failure of temperance movements hitherto, and points out what he thinks to be the hope of the future.

"The temperance efforts of the past failed because all temperance decrees proceeded from the sovereign, and were as changeable as his whims and caprices, and also because it was not known that alcohol was always a poison. The modern temperance movement is based on knowledge and on a sentiment of fellowship and fraternity. The great advance made in physiological science has been applied to the study of the effects of alcohol upon the human system, and from this the most beneficial results may be expected. Based upon the statement of Tschokke, that all laws are powerless for extinguishing an evil which has taken root in the life of the people, it is from the people itself that the reform of morals must proceed, but no government is strong enough to bring it about."¹

It is as yet too early to judge of the wisdom of this new departure. The teachers themselves must first be taught; and the movement towards

¹ Gustafson, in 'The foundation of death.'