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. Ruggles, 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.'

temperance reform will therefore practically begin in the normal schools, to spread thence to all the public schools throughout the various states in which these compulsory laws have been enacted. The receptivity of the young mind is greater than most persons are aware of; and while, at first thought, the instructions of pupils of the age of six years as to the effects of alcohol and tobacco would not seem to promise very great results, still more may be accomplished than would be anticipated. Inasmuch as the end aimed at, if reached, would contribute beyond all calculation to the prosperity and welfare of the human race, the experiment is one which should receive every aid and encouragement possible. It would not be strange if the enforcement of the law demonstrated defects: when these become evident, they can be remedied. If legislators passed no law until it was perfect, the country would be deprived of much useful and needed legislation. D.

NOTES AND NEWS.

COMMISSIONER COLMAN of the agricultural department left for St. Louis on Monday to preside over the conventions of the National sugar association and the Mississippi valley dairymen's association, which are to be held this and next week. At the latter convention the commissioner proposes to show the delegates the progress he is endeavoring to make in the investigations of the adulteration of food, especially of dairy products. Professor Taylor, the microscopist of the department, who claims to have discovered an unfailing test for pure butter as compared with the counterfeit article, will be present, and by means of a magic lantern and a series of micro-photographs will explain the discoveries, and make an address. It is understood that the department is not ready to indorse these discoveries as being absolutely without question; but the commissioner thinks that the convention is entitled to such information as he can furnish, and that the country ought to have the benefit of such suggestions as Professor Taylor has to make.

— A letter from Panama, under date of Jan. 24, states that a government commission, consisting of Professor Rockstrock and Mr. Walker, has been sent from Guatemala to report upon the probability of an outbreak of the Pacaya volcano. The report of these gentlemen announces the total destruction of the village of San Vicente Pacaya. Some forty-four tiled-roof houses completely collapsed, making such a cloud of dust as to create a belief that a new crater had opened. The hot springs surrounding Lake Amatillan emit a larger volume of water, at a higher temperature, than usual. The crater of Pacaya remains unchanged, while that of Fuego has been very lively.

— The invention of Mr. Edison for sending and receiving messages on a moving train was successfully tested, Feb. 1, on the Staten Island railroad. The operator sat in the middle of the centre car of the train, before a desk furnished with a Morse telegraphic key. He held a telephone at each ear. Under the desk was a battery. From this a ground wire was connected with the car-axle and the rail. Another wire passed through the key and to the roof of the car, which was connected with the roofs of the other cars by short pieces of copper wire. Parallel with the railroad were the telegraph wires of the Baltimore and Ohio company. The induction between the metal roof and the telegraph wires was sufficient to allow of the reception by telephone of Morse signals.

— Professor Fuchs, in his twentieth annual report on the seismological events of 1884, gives 123 shocks of earthquakes, distributed in time as follows: winter, 57 (Dec., 19; Jan., 28; Feb., 10); spring, 24 (March, 13; April, 7; May, 4); summer, 21 (June, 5; July, 9; Aug., 7); autumn, 21 (Sept., 8; Oct., 1; Nov., 12). Those deserving individual mention are, March 24, in upper and central Slavonia, where in Diakovar and other places numerous buildings suffered injury; April 22, in England; May 13, in Crevassa, where a church and other buildings were destroyed; May 19, on the Persian Gulf, in which two hundred persons fell victims by the overthrow of their houses; Aug. 10, in the eastern United States; and the Spanish earthquakes in December. In regard to the last, Dr. Fuchs believes the centrum was not a point, but a line parallel to the Sierras Tejeda and Almijara; nor does he think they were of greater importance than those of Belluno in 1873, of Agram in 1880, and of Chios in 1881. There was very little volcanic activity throughout the year, and that only in Aetna, Vesuvius, and St. Augustin, in Alaska.

— Mr. R. L. Harris has lately read a paper on two Daft electric motors, used on the Baltimore street-railways, before the American society of civil engineers: he reports both of these motors as being very successful in all weathers and conditions of the track. The grades are very steep for motors, reaching three hundred and thirty feet per mile in some places; nevertheless these motors have at no time failed to pull overloaded cars with perfect ease. These motors do the work of fifteen horses each, at an average daily running expense of $4.62 for fuel and attendance.

— The recent experiments of the Franklin institute, upon incandescent and arc lights, give the