Institute on this subject is referred to. As the majority of systems make use of heat supplied by radiating surfaces, the author, in chapter iv., very fully explains what is meant by the various terms, and then proceeds to describe the methods of testing radiators at Sibley College to measure the heat discharged. The results obtained are brought together in a table; further tests being given from radiators with extended surface so as to form air-flues.

The remaining portion of the book deals with the practical details and metallic parts of design, and architectural considerations. Much sensible advice is imparted as to the care of steam-heating boilers, and how to avoid boiler explosions, of which statistics are given. We notice many useful rules and formulæ for various purposes when designing a hot-water or steam-heating system. The volume lifts the subject out of the hands of the "plumber," and leaves it in the hands of the "engineer." Prof. Carpenter is to be congratulated on producing a really good book on a subject seldom treated scientifically.

Lessons in Elementary Botany for Secondary Schools. By Thomas H. Macbride. Pp. 233. (Boston: Allyn and Bacon, 1896.)

IN his far-reaching essay on "Education," Mr. Herbert Spencer remarks: "In education the process of self-development should be encouraged to the uttermost. Children should be led to make their own investigations, and to draw their own inferences. They should be *told* as little as possible, and induced to *discover* as much as possible." It is satisfactory to all who are concerned in the progress of science, to know that these sound principles of scientific instruction are being brought more within the region of practical education every day. The present volume is an addition to the steadily growing literature in which the principles referred to are applied. The young students, for whom the book is intended, are led to make their own observations; they are induced to study plants, rather than printed books, and thus to derive their knowledge at first hand from nature. The opening lesson in the book is typical of the fifty-three which follow it. The pupils are told to collect the twigs of various trees or shrubs and to compare them, noting various peculiarities. A single twig is then examined, and attention is directed to the arrangement of the buds and leaf-scars upon it. In the second lesson, twigs are compared with particular reference to buds and their relations to branches, and are grouped according to bud-arrangement. The structure of stems afterwards forms the subject of several lessons, and then the root, leaf, flower, fruit and seed are studied in succession, after which come lessons having for their object the elucidation of the structure and history of individual plants and trees. Much more attention is given to trees than is usual in books on botany. The book is hardly suitable for class use on this side of the Atlantic, but an English edition of it would be welcomed by many teachers of botany.

Vegetable Culture. By Alexander Dean, F.R.H.S. Pp. 136. (London: Macmillan and Co., 1896.)

METHODS and results are what amateur gardeners, cottagers, and allotment-holders want, and this is the book to supply their need in regard to the culture of vegetables. Theirs not the ambition to ask the reason why, but merely to know exactly what to do in order to reap rich fruits of their industry. Very admirably does the author impart this kind of information. In concise language he describes the best methods to be followed in the preparation and after-treatment of the soil, the best varieties of the various classes of vegetables, and the best systems of cultivation. Both the text and the illustrations are instructive, and together they make up a sound and serviceable primer for gardeners.

LETTERS TO THE EDITOR.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of* NATURE. *No notice is taken of anonymous communications.*]

The Röntgen Rays.

IT may interest your readers to hear that, with the assistance of Mr. J. C. M. Stanton, I have succeeded by means of the Röntgen rays in actually seeing the coins inside a leather purse, the metal instruments inside a closed wood and leather case, a coin through a piece of wood half an inch in thickness, and also through a sheet of aluminium.

Photography was not employed, but the shadows of the enclosed objects were made directly visible to the eye by means of a fluorescent screen.

The precise arrangement was similar to that recently described by Prof. Salvioni, of Perugia, whose results, though in accordance with certain experiments of Prof. Röntgen, confirmed, I understand, by Mr. Porter, of University College, have so far been received in this country with a certain amount of scepticism.

The apparatus consisted of a tube of opaque paste-board with a simple aperture at one end, to which the eye was applied. The other end was provided with an opaque diaphragm of double black paper, upon which, on the inner side, was laid a piece of blotting-paper impregnated with platino-cyanide of barium in a crystalline state.

The purse or other object was held against the diaphragm with the Crookes' tube beyond it, so that the rays from the latter cast a shadow of the coins through the leather and black paper upon the inner impregnated screen. The platino-cyanide fluoresced brightly under the stimulus of the rays on those portions of the blotting-paper where no shadow was cast, and consequently the form of the metallic objects was made clearly visible. Non-metallic objects were also clearly seen, though more faintly, owing to their greater transparency to the rays.

Besides being exceedingly interesting in itself, and possibly capable of sufficient improvement to render it of service in medicine and surgery, the appliance will be very useful for the purpose of ascertaining, without the tedious process of exposing and developing a plate, whether any given Crookes' tube is suitable as regards exhaustion and form for photographic purposes.

It can be seen at once whether the tube is working to the best advantage, and is giving clearly defined shadows.

The place on the glass of the tube from which the maximum radiation is proceeding, can also be easily determined, and I may mention as confirming a point previously noticed by myself—*i.e.* that a tube with a well-marked fatigue spot on the glass will not answer satisfactorily for photography—that with the above-described instrument the fatigue spot is visible to the eye through the black paper, thus showing that the glass when fatigued does not transmit the Röntgen rays. A. A. C. SWINTON.

66 Victoria-street, Westminster, February 25.

P.S.—Since writing the above, I have been able to see distinctly the bones in the thick portion of my own hand.

As the hand appears to feel a cold sensation when exposed to the X-rays, an experiment was made with the thermopile to put the matter to the test. This showed that heat was being radiated from the phosphorescent patch in the Crookes' tube; if the current be reversed so as to make the opposite pole the anode, then heat was again radiated, but in a very much smaller amount. The phosphorescent patch becomes very markedly warmed in some tubes. On replacing the thermopile by a lighted candle, the flame exhibited a flickering motion, and was slightly drawn towards the phosphorescent patch; this could be observed at a distance of six inches. The phenomenon was also observed when the candle was placed on the side of the tube opposite the anode, but less markedly. A flame is almost transparent to the X-rays; on taking a shadowgraph of a lighted candle or gas jet, the shadow of the flame is just visible as an exceedingly faint impression, the internal core in the case of the gas flame being slightly more marked than the external.

Edinburgh. DAWSON TURNER.

The Cause of an Ice Age.

THOUGH I have no wish to prolong this discussion, yet I will ask you to spare me space for a few lines.