standing the number of analyses which have been recorded. In the case of the plagioclastic felspars, for example, though the results of many analyses are in close agreement with the hypothesis of the admixture of molecules of albite and anorthite, there are others which deviate considerably therefrom, and are as yet unexplained. The caution of our chemical Nestor is perhaps carried to an extreme. He declines, for instance, to recognise the interchangeability of F and HO, notwithstanding the results independently obtained of each other by Penfield and Sjögren in the case of the Humite group, and by the former in the case of Topaz, and attributes the variations of composition to alteration—to loss of fluorine and gain of water. But in the case of Topaz the angle of the optic axes has been shown to be related to the percentage of the fluorine, and it is difficult to regard the variation of chemical and optical characters to be a result of mere hydration. Every one will hope that the Berlin professor will be spared to issue a third supplement of this standard work of reference. L. F.

Elements of Botany. By J. Y. Bergen, A.M., Instructor in Biology, English High School, Boston. Pp. vi + 275 + 57. (Boston, U.S.A., and London: Ginn and Co., 1896.)

IT IS very seldom that we have come across an elementary book on botany which has impressed us so favourably as the one now under review. It is intended primarily for school use, but the admirable method which is maintained throughout its pages ought to be practised in all grades of class work. A general account is given of the simple morphological and physiological phenomena of plant-life, and the student is encouraged to put the knowledge thus acquired in each section to a practical test. A selected object or experiment is indicated to him, and he is shown how to put his own questions. He is *not*, however, told the answer—that he has to find out for himself as the result of independent observation.

The work is well illustrated with more than 200 figures, and contains, besides, appendices on material and methods, a useful chapter of about fifty pages on the commoner orders and species of flowering plants inhabiting the northern and middle States.

Although the author has naturally paid special attention to the needs and opportunities of American students, his book ought to be well received in this country also, for most of the plants mentioned are readily obtainable here, and from an educational standpoint the book is quite one of the very best we have met with.

Geology. By C. L. Barnes, M.A., F.G.S. Pp. viii + 181. (London: Rivington, Percival, and Co.)

THIS is not a very remarkable addition to the already large number of easy books on geology. When we have said that the volume is readable, and a suitable one to put into the hands of beginners, we have uttered all that is demanded by the text. The illustrations are the least attractive features of the book; none of them are striking, and few, if any, of them are new. A fact to which attention may well be directed, is that the book does not follow any examination scheme.

The New Photography. By A. B. Chatwood. Pp. 128. (London: Downey and Co., 1896.)

THE "new photography" described in this book is not confined to work with Röntgen rays, but includes also accounts of colour photography, psychic photography (retinal impressions) spirit photography, and anaglyphs. The book is, to say the least, a trifle premature as regards work with Röntgen rays; and the title, as well as the shadow of the bones of a hand, printed upon the title-page, is misleading as to the contents.

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.*]

Dr. Ball's Two Letters on the Ice Age.

SIR R. BALL'S last letter is a little embarrassing for those who have accepted his teaching. In it he claims that however faithless his other supporters may have proved, he can still rely on the countenance of Dr. Wallace. What does it all mean? Dr. Wallace is responsible for a theory of the Glacial period which has been before the world for many years, and which is entirely different both in essence and in its consequences from that proclaimed in "A Cause of the Ice Age." Are we to understand that Sir R. Ball has adopted Dr. Wallace's theory, or is it Dr. Wallace who has adopted Dr. Ball's? The differences between us are so important in view of modern geological conclusions, that I may be perhaps permitted to condense a few simple issues in a few questions. I could add more if necessary.

Sir R. Ball says he has not changed his views. Does he still then hold, as he once did, that astronomical causes alone will suffice to produce an Ice Age, or does he now hold with Croll and J. Geikie and Dr. Wallace that they will not, and must be supplemented by other causes?

Does he still maintain, as he maintained in the new edition of his book, the old-fashioned theory as to the laws of radiation, or does he believe in Stefan's law, which entirely alters the whole basis of the case, both as taught by himself and by Croll?

Does he still maintain that the Kabbalistic figures 63 and 37, which represent a constant and invariable factor, whatever variations there may be in the eccentricity of the earth's orbit, and which therefore cannot induce variability of climate, are not only the efficient element in producing an Ice Age, but represent, as he states in his work, the proportions of summer and winter heat received in the latitude of Britain either now, or at any time?

On page 27 of the same edition Dr. Ball says: *Our hemisphere was once covered with ice.* Does he still maintain this, the most extravagant doctrine ever propounded by a Glacialist?

In his first letter to you, Dr. Ball admitted that Mr. Culverwell's calculation of the distribution of the sun's heat over different zones of the earth at present, and during the period of extreme eccentricity, is unassailable, but that the result is affected by convection of heat from other places. How does he reconcile this view, which was Croll's, and is also Mr. Culverwell's, with any part of the argument in his book, which was written, as he says, to enable us to dispense with other than astronomical causes?

Lastly, Sir R. Ball professes to account for *the* Ice Age—that is, the Glacial period of the geologists. In doing this he contrasts the effects of present eccentricity with the effects of the limit of *extreme eccentricity* as calculated by Leverrier and Stockwell. Does he seriously argue that the great Ice Age took place 850,000 years ago? As he well knows, we must go back to that period before we get a disparity of the seasons amounting to thirty-three days, and any time during the last 300,000 years this disparity has been always very much less. Is it either ingenuous or right to treat this extreme variation as a factor in any possible range of speculation on the Ice Age?

As I said, I could add largely to these issues; but they will suffice. The matter is not a private difference of opinion. It is one upon which the basis of a great deal of geological reasoning must be founded. HENRY H. HOWORTH.

30 Collingham Place, Earl's Court,
March 11.

The Röntgen Rays.

So many people are buying tubes for the "new photography," that I think it ought to be made known that the best results can be obtained with the original spherical tube used by Prof. Crookes in 1879, to show the incandescence of platinum under impact of the projected molecules which were focussed on it by a concave kathode. I have been using such a tube for my best work up to now. On January 29 last, I put in hand a larger tube of the same kind, with the same large concave kathode at the top and small disc anode at the bottom, but without the platinum in the middle. This tube is six inches in diameter. But the tube-makers have been so occupied with smaller tubes,