unsuccessful attempts had been made to lay it—and in the following year, some months after it had been recovered and completed, both it and the new 1866 cable broke, while one of them broke again the following year.

The fact is that to construct an Atlantic cable at all in those days was a very courageous thing to do; to lay it successfully, even with many failures, evinced a faith and confidence in engineering skill and a dogged spirit of determination that make one proud of the Anglo-Saxon race. To every one who took a prominent part in the enterprise, as certainly did Sir Charles Bright, all honour is due as well as the thanks, not only of his contemporaries, but of all who have followed him.

But we are inclined to think that the authors of this memoir would have been well advised had they not allowed their reverential memory for the brother of the one and the father of the other to lead them to adopt the painter's only method of representing a bright light, viz. by intentionally throwing the rest of the picture into shade.

Volume ii. deals with the telegraph to India, Sir Charles' parliamentary life, the West Indian cables, Sir Charles' work in connection with mining, fire alarms, telephony, electric lighting, the Paris Electrical Exhibition of 1881, the Institution of Electrical Engineers, Freemasonry, and concludes with various appendices.

This life-story is distinctly interesting, but its interest would have been even greater had the matter been compressed into about half, or at any rate into not more than two-thirds, the space. Before a second edition appears we would suggest that such scientific crudities as the following should be altered:—"A current which was estimated by the experts to amount to about 2000 volts." "In the absence of a determinate unit of inductive capacity or quantity of electricity condensers were employed for the first time." "When electricity passes through this surrounding coil of wire, the magnet and mirror take up a position of equilibrium between the elastic force of the silk and the deflecting force of the current. . . . The magnet is artificially brought back to zero with great precision after each signal by the use of an adjustable controlling magnet."

OUR BOOK SHELF.

The Maintenance of Solar Energy. By F.R.A.S. Pp. 20. (London: The Southern Publishing Co., Ltd., 1899.)

THE author of this short essay is not satisfied with the current ideas as to the maintenance of solar energy, but believes his new views tend to remove much of the difficulty. So far as can be judged by these "preliminary notes," however, the theory advanced is one which is not likely to convince any one but its author. Interplanetary water vapour and the periodical indulgence of the sun in cometary vapour baths appear to play an important part, the idea being that as a result of their action the radiant forces of the sun are confined within the limits of the solar system. The recurring absorption of the planets by the sun and subsequent disruption into new systems are other features of a theory which has its principal strength in the fact that there are no means of testing its chief teachings. The author's name does not appear on the title-page, but the preface is signed by J. H. Brown.

Official Report of the National Poultry Conference held at Reading in July 1899. Edited by the Honorary Secretaries, Edward Brown, F.L.S., and F. H. Wright, F.S.A.A. Pp. xvi + 138.

THE conference of which this is a report was the first of its kind held in this country, and its success should lead to other similar meetings. The report shows that most of the papers were of a scientific character, and its publication should extend the knowledge of the principles which lead to successful poultry-farming. Among the subjects dealt with are: the science and practice of farm poultry keeping, the parasitic diseases of poultry, and the assistance afforded by science in the production of eggs and poultry. There will be hope for British agriculture when the spirit which pervades these papers guides the operations of all who are concerned with rural industries.

The Story of Ice in the Present and Past. By W. A. Brend. Pp. 228. (London: George Newnes, Ltd., 1899.)

AN instructive addition to the "Library of Useful Stories," containing a clearly-written account of the physical properties and geological operations of ice. General readers should find the volume interesting. We notice that the cavities formed by glacier mills are termed "potholes or giant's kettles"; but the former term ought to be restricted to the circular holes found in the beds of streams.

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.*]

Effect of Vibration on a Level Bubble.

I HAVE never seen any notice of this phenomenon, but it is sufficiently curious to be worth describing.

I had fitted on a bicycle a small level with a radius of curvature of a foot, in order to note gradients without dismounting. In general this answered very well, and the gradients could be satisfactorily measured with an accuracy of about 1 per cent., but when going over certain classes of rough road (*e.g.* granite paving), the roughnesses of which had a definite pitch, it was noticed that though the road might be level, the bubble would at certain speeds indicate gradients as steep as one in eight or one in six, and remain steadily in such positions as long as the speed and character of the road remained constant. It seemed a matter of chance whether the bubble moved so as to indicate an up or a down gradient.

The explanation is to be found in the coincidence of a natural period of the bubble, due to the surface tension of the fluid, and the interval which elapses between successive encounters of the bicycle wheel with the roughnesses of the road.

Owing to the level being at a certain height above the ground (it was attached to the upper tube of the frame), any pitching of the bicycle, such as is caused by going over rough ground, gives a backward and forward motion to the frame in addition to the general onward movement.

We may suppose, for the sake of simplicity, that this backward and forward motion is a simple harmonic.

When a level is subjected to a harmonic displacement parallel to the mean direction of the tube, the bubble will endeavour at each instant to place itself at that part of the tube where the tangent is at right angles to the resultant of gravity and the imposed acceleration. Thus the bubble tends to move relatively to the tube in the direction of the displacement of the latter, and would always occupy its true position with regard to the resultant if its motion under the variable force was quick enough. The motion of the bubble, however, is very slow compared with that required to bring about this result; but although the forces which act on the bubble have not time to move it far in each period, they do deform it, and the deformation may become