

smaller size to the water, would have the effect of increasing the average weight of the stock of fish in three years' time, and would, we think, have prevented the red flesh of some trout being attributed to richer feeding rather than to a differently constituted menu. We think, too, that the theory set forth to account for the absence of a run of salmon in some rivers of the east of Scotland in May, June, and July is somewhat strange, and cannot be maintained in the light of our present knowledge of the salmon's life-history.

There are throughout the book numerous practical hints of value upon such subjects as flies and baits, and as to the time and place for fishing under various conditions of water and weather; in the last chapter there is also a most thrilling tale of a riverside adventure. The illustrations, reproduced from photographs, are excellent, but are almost invariably separated by many pages from the corresponding text, and there is a good index.

L. W. B.

#### 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.]

#### A New Departure in Seismology.

ON the photographic records obtained from British Association types of seismograph it has been noticed that when the films have been moving slowly (60 mm. per hour) there have been slight thickenings in the trace, while if the recording surface has been moving quickly (240 mm. per hour) the line which ought to be straight is slightly wavy. These irregularities, which have hitherto received but slight attention, are so small that they may be easily overlooked. When the thickenings were first observed it was supposed that their existence was due to a flickering at the source of light or to some irregularity in the movement of the record-receiving surface. When, however, it was observed that these markings frequently occurred at the same time at different stations, as, for example, at Shide and Bidston, the conclusion was that they were due to movements of the ground, and might be the surviving phases of large movements with origins at a distance.

A very good illustration of this is given by comparison of the times of occurrence of the after-shocks which followed the earthquake of January 14, 1907, in Jamaica, with the times at which suspicious irregularities were found on the seismographic traces at Shide and Bidston. Between January 14 and July 5, 148 shocks were noted in Jamaica. Forty-three minutes after the occurrence of fifty-one of these shocks irregularities were found on the films at the stations mentioned. As forty-three minutes is the time we should expect a "surface" wave to travel sixty-seven degrees, or from Jamaica to England, the inference is that the slight irregularities represent movements which had their origin in Jamaica. Corresponding markings, with the exception of one at Göttingen on July 5, do not appear in the registers from European stations, which are not more than six or seven degrees farther from Jamaica than Britain.

Another instance of the recording of after-shocks are the markings seen on seismograms after the disaster which, on December 28, 1908, ruined Messina and Reggio. Between December 29 and January 30 at Mileto, forty miles from Messina, 225 shocks were noted. Eight of these reached the Isle of Wight, while on January 1 and 13 at Göttingen, Hamburg, and Laibach, only two were noted. The reason that so small a number travelled a considerable distance indicates that the originating impulses were weak. That a larger number should be recorded in Britain than at comparatively near stations is not so clear.

With smoked paper recording surfaces, whether the multiplication of recording levers be 10 or 200, a certain slackness in joints and elasticity of pointers prevents any record of motion being obtained until a certain amplitude of ground motion has been reached. With photographic

recording apparatus where a light source is far from a recording surface, a thick line may obscure any minute movement. These instruments are therefore unsuitable as recorders of very small movements. This, at any rate, has been my experience.

The British Association type of instrument, when properly adjusted and installed, does, however, pick up these neglected movements—a result which is shown very clearly in the registers for this year.

It seems to me that beneath observatories all over the world earth-messages may be passing every few minutes, but these are not recognised because instruments generally in use are not capable of recording the same. To investigate this possible new departure in seismology, old types of instruments will have to be improved or new ones adopted.

JOHN MILNE.

Shide, Isle of Wight, July 2.

#### Tables of Bessel Functions.

A COMMITTEE of Section A of the British Association for the Advancement of Science, appointed to undertake the further tabulation of Bessel functions, is at present considering the advisability of unifying and completing the existing tables with the view of the publication of a complete table of Bessel functions.

The committee would be glad of information as to existing tables of Bessel and Neumann functions with a real or complex argument, in addition to the following, of which the members are already aware:—

(1) *Meissel's Tables* (reprinted in Gray and Mathews' treatise on Bessel functions) giving  $J_0(x)$  and  $J_1(x)$  from  $x=0$  to  $x=15.5$  at intervals of 0.01 [12 places]; also a table of the first 50 roots of the equation  $J_1(x)=0$  to 16 places.

(2) *British Association Tables* (1889, 1893, 1896 Reports) giving  $I_0(x)$  and  $I_1(x)$  from  $x=0$  to  $x=5.1$  at intervals of 0.001 [9 places]; also  $I_0(x)$  to  $I_{11}(x)$  from  $x=0$  to  $x=6.0$  at intervals of 0.2 [11 and 12 significant figures]; also a table of  $J_0(x\sqrt{i})$  from  $x=0$  to  $x=6$  at intervals of 0.2 [9 places]. (Part of these tables are reprinted in Gray and Mathews.)

(3) *Tables of  $J_n(x)$  in Gray and Mathews* from  $n=0$  to  $n=60$  and from  $x=0$  to  $x=24$  at intervals of unity [18 places].

(4) *B. A. Smith's Tables* giving  $Y_0(x)$ ,  $-Y_1(x)$ ,  $(\log 2 - \gamma)J_0(x) - Y_0(x)$  and  $(\log 2 - \gamma)J_1(x) - Y_1(x)$ , from  $x=0$  to  $x=1.00$  at intervals of 0.01 and from  $x=1.1$  to  $x=10.2$  at intervals of 0.1 [4 places: error not exceeding 2 in the last place]. (*Messenger of Maths.*, vol. xxvi., 1897, and *Phil. Mag.*, vol. xlv., 1898.)

(5) *Aldis' Tables* of  $I_0(x)$ ,  $I_1(x)$ ,  $K_0(x)$ ,  $K_1(x)$  from  $x=0$  to  $x=11$  at intervals of 0.1 [16 places]. (*Roy. Soc. Proc.*, 1896 and 1899.)

(6) *J. G. Isherwood's Tables* of  $K_0(x)$  to  $K_{10}(x)$  from  $x=0$  to  $x=5$  at intervals of 0.2 [5 significant figures]. (*Manchester Lit. and Phil. Soc.*, vol. xlviii., 1904.)

The committee will be grateful to be allowed, through the medium of NATURE, to invite any readers who are aware of the existence of tables of Bessel functions other than the above to make known this fact.

Communications should be addressed to the secretary of the committee, Dr. L. N. G. Filon, University College Gower Street, W.C.

M. J. M. HILL.

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#### Baskets used in Repelling Demons.

IN the issue of NATURE published on May 27 Mr Kumagusu Minakata inquires regarding the use of basket in repelling demons in countries other than Japan. I Calcutta, and I believe in other parts of India, it is customary when a new building is being erected to set up on the highest part of the scaffolding a pole, to the top of which a round basket and a scavenger's broom are attached. The basket and broom are apparently recognised as emblems of the low-caste "sweeper," and therefore being disgusting objects. They are supposed to ward off ill-luck from the building. Their use in this instance may thus be compared to the use in many countries of obscene objects or gestures as a protection against malicious spirits or the evil eye.

N. ANNANDALE.

Indian Museum, Calcutta, June 13.