that the space at our disposal will not permit of our following the author in these interesting discussions, and we can only, in conclusion, heartily recommend the work to the traveller as being admirably adapted to guide him in investigating the geology of a district of extreme interest and great complexity, and to the student at home as containing numerous facts and suggestions worthy of the most thoughtful consideration.

J. W. J.

HEALTH PRIMERS

Health Primers. Edited by J. Langdon Down, M.D., F.R.C.P., Henry Power, M.B., F.R.C.S., J. Mortimer-Granville, M.D., John Tweedy, F.R.C.S. (London: Hardwicke and Bogue.)

THE proverb that a little knowledge is a dangerous thing is especially true in regard to matters connected with health, and it might therefore be supposed that the issue of a series of health primers was a thing to be deprecated, as likely to do harm. But a little reflection will show that this series is intended, not to impart a little knowledge, but to replace the knowledge, not merely little, but confused and inaccurate, which every man supposes himself to possess, by something more definite and exact. Every one fancies that he knows the appearances of health and disease, and that he is able to decide upon the condition of those whom he daily meets. Every man supposes himself able to pronounce that such and such a house cannot be healthy, and believes that he is quite capable of judging for himself how much exercise he ought to take, whether he should or should not use a cold bath in the morning, and what is the proper allowance of beer, wine, or spirits, either for himself or for his neighbours. Now, despite the confidence with which most men will pronounce an opinion on all these subjects, the data on which they would found that opinion would really be very slight, and their knowledge of the subject probably very imperfect and inaccurate, and, consequently, the conclusions at which they would arrive would most likely be erroneous. It is just on such subjects as those we have mentioned that the books of this series afford accurate information. The first of them, "On Premature Death, its Promotion and Prevention," is of a less popular character than the others, and has, we think, suffered in consequence of its author not having seen the contents of the other primers. While the material it contains is very valuable, it deals, we think, too much with statistics and too little with the causes of premature death which are under the control of the individual, although occasionally, however, it gives these also, as at p. 46, where ventilation in a hospital is said to have put a stop to the convulsions from which the children died in great numbers, and reduced the mortality to $\frac{1}{8}$ of its previous amount. But on the other hand, while we learn that 6 per cent. of the total mortality from all causes is due to diseases of the heart, the writer says nothing of the dangers incurred in running after an omnibus or in trying to catch a train.

The primer on "Personal Appearance in Health and Disease" includes the changes which the body may undergo in the form and size of its bony framework, fatty layer, and internal organs, as well as external colour. These are given shortly and well, though the alterations

produced artificially by tight-lacing and high-heeled and tight boots might have been still more strongly insisted upon and emphasised by woodcuts showing their results.

"The House and its Surroundings" is clearly written, and contains a great deal of very useful information. By its aid the householder should be able to know where to look for defects in drainage, ventilation, water supply, &c., and thus to avoid many sources of disease, although we think that the dangers of arsenical wall-papers ought perhaps to have been more strongly insisted upon.

"Baths and Bathing" discusses the physiological action, varieties, and uses of baths and bathing localities, both at home and abroad. It is written in a very readable style, and contains both advice as to the use of baths and cautions in regard to their abuse. The author warns against the too heroic use of a morning tub, but forgets to state how very much the chilliness which it brings on in persons of languid circulation may be prevented by using a bath sheet instead of a towel, so that the whole body shall be covered during drying, and not chilled by the exposure of the wet skin to the cold air.

"Exercise and Training" gives a general account of the changes produced in the body by muscular exertion, of the food required, the general régime to be pursued, and the dangers to be avoided. It is evidently written by one who is familiar with the subject of which he is treating.

"Alcohol, its Use and Abuse," deals with a very difficult subject, and does it well. The author is not prejudiced either for or against alcohol, and maintains that because ninety-nine persons out of a hundred misuse it, it is none the less true that it has a right use, this use being sometimes to check the current of thought and care, as well as to stimulate digestion and circulation, although in perfect health its use is unnecessary.

The purpose which these primers are intended to serve is a very important one, and we think that they are well calculated to serve their purpose. We have pointed out one or two things in which we think they might be improved in future editions, but on the whole they are well and carefully done, giving accurate information in a condensed yet popular form.

T. L. 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. No notice is taken of anonymous communications.]

[The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to ensure the appearance even of communications containing interesting and novel facts.]

The Mechanical Theory of Earth-Heat

NOTICING the assertion made in NATURE, vol. xx. p. 22, in reference to Prof. Church's article in *Silliman's Journal* on the Comstock Lode, that "the rock in the lower levels seems to have a pretty uniform temperature of 130° F.," and remembering what Prof. G. F. Barker, of the University of Pennsylvania, told me, that on a recent visit to those mines he found that there was no uniform temperature, but on the contrary, the most remarkable differences, some of the higher levels being much hotter than some of the lower levels—so that he came to two conclusions:—(1) That the heat was a hot water heat, and (2) that the hot waters were heated mechanically by those continuous movements of the country, so plainly shown both in the mines and at the surface;—it occurs to me to ask the following question:—

Has any one, in the discussion of Mallet's hypothesis, thought of bringing its probability to such a test as the volatilisation of the hydrocarbons of coal-beds in a highly plicated region like Belgium?

It is a remarkable fact, and one which seems to me inconsistent with the mechanical theory of earth-heat, that of two extensive regions, Belgium and Eastern Pennsylvania, equally and excessively disturbed by complications, all the coal-beds of the one are anthracite, and all those of the other are bituminous.

Again, of two regions equally undisturbed, Western Pennsylvania and Arkansas, the horizontal coal-beds of the one are bituminous and of the other anthracite.

Surely, if movements of stratum on stratum produce all the needful heat, no plicated coal-beds should escape being converted to anthracite; and I should much like to hear from English geologists how this argument is to be met. My own explanation of the origin of anthracite is not worth much, but it is the best I know. I refer such origin to three causes acting in conjunction—(1) Heat due to superposed (now wholly or partially removed) Permian and later formations; (2) Greater proportion of sands in the anthracite and of clays in the bituminous coal-measures; and (3) Plication and fracture, permitting the exit of volatilised hydrocarbons into the atmosphere.

American Philosophical Society,
Philadelphia, May 22

J. P. LESLEY

Evolution Old and New

MR. A. R. WALLACE writes, in *NATURE*, vol. xx. p. 143, that, according to the theory which I support, Australian (and more especially Queensland) sheep should show a tendency to grow a scantier and thinner fleece than their English ancestors. "If Mr. Butler," he continues, "could adduce on good authority such a fact as this, he would have some evidence in his favour, instead of which he can only make suppositions."

I never was in Australia, but had some years' experience of sheep-farming in New Zealand. It was generally believed, in my time, that fleeces soon became short and hairy in Queensland, and even in the more northern part of New South Wales. You must, however, have many readers who could tell us what the facts are. May I hope that you will kindly insert this, so as to get the matter settled by eliciting information from a competent authority? I am speaking, of course, of sheep that are left to the effect of the climate, without being frequently crossed with rams from colder countries. Do the fleeces of such sheep deteriorate in Queensland?

S. BUTLER

June 12

The River Elbe

IN *NATURE*, vol. xiv. p. 498, some particulars are given of measurements made in 1871 and 1872 of the water flowing past in the Elbe at the boundary between Saxony and Bohemia. The river basin in Bohemia above this point is stated at 880 square miles, which is evidently wrong, as the annual discharge of 6,179,000,000 cubic metres (218,223,743,000 cubic feet) would give a depth of 107·64 inches run off the ground. Measuring roughly on the map, the area of Bohemia—which, apparently, all drains into the Elbe—is 20,000 English square miles. If, on the other hand, the measurements of the river water and the solids in solution and suspension are correctly given, and the river basin is 20,000 square miles, the rainfall must have been exceptionally low at the time the measurements were taken, as the figures represent only about half that of the mean annual flow off the ground in the Danube basin, which is 9·06 inches. Perhaps the writer of the notice will be able to find out how these discrepancies occur. I may add that, taking the figures as given in *NATURE*, 607 tons per square mile per annum are removed in solution in the Elbe water. From a district composed mostly of silurian rocks, this is manifestly absurd. According to my calculations,¹ 72·7 tons per square mile are annually removed in solution in the Danube water.

Blundellsands, June 17

T. MELLARD READE

Electric Light

IN *NATURE*, vol. xx. p. 110, an account is given of Sir William Thomson's evidence on the electric light. It is stated "that one horse-power had produced 1,200 candles of actual

¹ "Geological Time," *Proceedings of Liverpool Geological Society*, Session 1876-7.

visible electric light, whereas one horse-power of energy would only produce 12-candle gas-light." In the report of Sir J. W. Bazalgette and Mr. Keates to the Board of Works, which is probably the best report we have yet had on the subject, as to the actual cost of the electric light on the Thames Embankment, it is stated that the cost of the electric light was 5·75d. per hour, whereas the cost of the gas required to produce a light equal to the electric light as regards illuminating power, in an opal globe, was 2·00d., and in a frosted globe 3·50d. per hour. Would any of your numerous readers be kind enough to give me some idea of the qualifications to be appended to the above statements, which will reduce the long odds calculated by Thomson of 100 to 1 in favour of the electric light, to the odds of 2 to 1 against it as found in actual practice? In conclusion may I venture humbly to suggest that such conflicting statements as the above, if unexplained, are apt to bring the dicta of scientific men into disrepute with the thinking portion of the general public.

F. J. M. P.

The Climbing Perch

THE aquarium of the Zoological Society's Gardens in Regent's Park has lately received a contribution of five specimens of the "Climbing Perch" (*Anabas scandens*). They were very kindly obtained for me by my friend, Mr. A. Ferguson, of Colombo, Ceylon, and were brought home in excellent condition by my brother, Mr. A. F. Dobson. Mr. Ferguson (who is so well known in Ceylon as a naturalist of great experience) kept the fish for some months in an aquarium, and trained them to take chopped meat from the hand, so that they were in the best possible condition for their long journey.

The first specimens of this fish which arrived alive in Europe were sent by me from Calcutta in 1872 to the Royal Zoological Gardens in the Phoenix Park in Dublin, where they lived for a considerable time.

I have described (P. Z. S., 1874), in my paper "On the Respiration of Indian Fresh-water Fishes," the manner in which *Anabas scandens* takes in, and rejects again, the atmospheric air, and on a visit to the aquarium in the Gardens the peculiar conduct of these fishes when respiring may be witnessed by any one.

Mr. Ferguson informs me that he has specimens of some species of *Ophiocephali* and the remarkable *Arius bakeri*, which carries its young in its mouth, in training, and I hope soon to have an opportunity of having them safely carried to England.

Netley, June 14

G. E. DOBSON

Oxygenated Rain

ON Thursday, June 12, at half-past eleven in the morning, a remarkable shower of rain fell over London, which might almost be described as "effervescing;" the drops whilst falling appeared to be colourless and perfectly transparent, but on striking against any solid surface they became milky, and on close examination it was evident that this cloudy appearance was caused by a number of very minute air-bubbles, which rapidly increased in size, and then burst. From the bleaching power which this rain appeared to have, I am led to believe that there was nascent oxygen in the gas thus evolved. Those who traverse the streets of London in the early morning may now and then observe the red colour of all bright iron-work in the pavement, such as coal-plates, &c., due to the oxidising influence of a thunder-shower in the night; this effect does not follow every thunder-shower, but seems to indicate a peculiar atmospheric condition. Have any memoranda on this subject been recorded?

EDWARD SOLLY

WILLIAM FROUDE¹

LAST week we called attention to Mr. Froude's discoveries of those laws of motion of floating bodies, upon which the behaviour and safety of a ship passively floating among sea waves depends. We now purpose giving a brief outline of his researches in another branch of hydrodynamics by which he arrived at a true appreciation of the nature and amount of the resistance opposed by water to the passage of a body like a ship through it. In connection with the resistance of ships, the subject of marine propulsion, which Mr. Froude has also done much

¹ Continued from p. 150.