majority of visitors gather their impressions of Madeira from a limited halt in the Bay of Funchal, or from a winter sojourn on its south side, yet fine as its coast line and peaks are seen to be, they are no more comparable to the grandeur of the northern side than the cultivated banks of the Rhine are to the gorges of the Yosemite. The south side is almost destitute of forest growth, except the introduced sweet chestnut, oak, and maritime pine, for the native juniper and dragon trees are almost extinct, but in crossing the dividing ridge another world is entered. Here all but the highest peaks are clothed with densest virgin forest. The naturalist may penetrate at will the wildest gorges, for the only paths into their recesses are the beds of half dried torrents.

The common distinctive feature of all these gorges is the precipitous nature of their sides, which time seems not yet to have weathered into angles of repose. The verticality is everywhere appalling, yet giant evergreens cling to every nook and crowd on every terrace. Some of the laurel tribe reach immense girth, and are quite inaccessible to the woodman's axe, rotting as they stand, and forming soil for carpets of Killarney, filmy, and hares-foot ferns. The warm, moist, and shady valleys form a paradise for ferns, the *Dicksonia*, *Woodwardia*, and *Asplenium* rivaling each other in size. The botany of the island is of great interest, especially in its relations to that of Europe and Africa; but the visible fauna, except *Mollusca*, is meagre, and the comparative absence of birds and butterflies is felt. Beyond the foreground of vast walls of red and brown rock, often 3000 to 4000 feet high, clothed and softened by dark green foliage, are peaks weathered into most fantastic forms, and rising to 6000 feet. But if this grand scenery could become monotonous, there are English moorlands on the Paúl da Serra, barren tracts of rock at the extremities of the island, cultivated country with lanes hedged by fuchsias and hydrangeas at Camacha. The coast-line is magnificent in the extreme, one headland on the south presenting a vertical cliff to the sea of 2000 feet, and another, a mountain clothed with myrtle on the north, being scarcely inferior to it. The ascent of some of the peaks might tax even an experienced Alpine climber's nerves; but the effect of ocean rising to the skies like a blue wall all round is very striking when seen for the first time from a lofty island peak. In summer the heat is not oppressive among the mountains, and now that the fares are no longer unreasonable, one with an overtaxed brain seeking rest might make a worse choice than Madeira for a ramble. To him Miss Taylor's exhaustive book is inexhaustible, and the itineraries in it, sketched by Mr. Charles Cossart, invaluable.

No mention of Madeira is complete without allusion to its staple produce—wine. The export seems never to have exceeded 20,000 pipes annually, and though this was reached as early as 1750, yet this is far below the producing power of the island. The vines, destroyed by *Oideum*, have again severely suffered from *Phylloxera*, but the shipments, owing chiefly to the persistent efforts of Messrs. Cossart Gordon, are steadily recovering. It cannot be too widely known that Madeira is a pure wine, for at the price of grapes there, there is no incentive to use anything but grape juice in its production, though Madeira is exported to other wine countries, presumably for manufacture into sherry. The retail price is only artificially maintained by a pretended scarcity.

J. STARKIE GARDNER

Tschermak's Lehrbuch der Mineralogie. Part II. (Vienna: Alfred Hölder.)

IN this part of Prof. Tschermak's text-book the discussion of the optical and physical characters of minerals is continued and concluded in a manner more scanty than was perhaps to be anticipated from the first part. The results of many of the most recent additions to our knowledge of the structure of mimetic and twin-crystals, such

as milarite, microcline, &c., as shown by their optical properties, are, however, included. In the chemical introduction which follows, too much space is devoted to the exposition of the fundamental principles of chemistry, such as those of equivalents, atoms, and the theory of types; as also to the principal simple tests for the various elements. A fair knowledge of chemistry is absolutely necessary to the mineralogist, and Prof. Tschermak might well have expected his students to bring such a knowledge with them. In this case his exposition is unnecessary, while if the student is ignorant of chemistry, it is hardly likely to be adequate, and it undoubtedly diminishes the space available for the principles of isomorphism and polymorphism.

Considerable space is given to the description of the situations in which minerals are found, and of their associations in beds and veins. Another chapter is devoted to mineral genesis and to the decompositions and transformations which minerals are liable to under the action of natural agencies. These subjects, common to the mineralogist and geologist, are apt to suffer through being relegated by each to the other, and we are glad to see the importance attached to them by Prof. Tschermak.

The systematic description of the principal minerals is to occupy the whole of the third part. This volume extends as far as the elements and sulphides, and gives us a foretaste of what is to come. The descriptions are well done, and give much more information than the ordinary text-books do. This information is, moreover, given in general language, and the different forms are better and more fully illustrated than is usually the case. The minerals discussed are those of importance either from their utility, the frequency of their occurrence, or their scientific value; and the selection, from this point of view, is well made.

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.]

Scientific Exploration in Egypt

NOW that we have embarked in a war in Egypt, it is to be hoped that steps will be taken to have a proper staff of scientific explorers attached to the army with facilities for conducting their investigations. There are periods of rest in a campaign during which soldiers and others may be usefully employed in conducting excavations at comparatively slight cost; and difficulties in the way of investigation, arising from the requirements of trade and industry, disappear in time of war. The deposits of the Delta require to be examined. The gravels of the Nile Valley have to be connected with their animal remains. Much has to be done for the earliest and best period of Egyptian art, and the Stone Age of Egypt has to be fixed with certainty, the importance of which cannot be over estimated in connection with the earliest civilisation of the world.

I trust also that we shall not rob Egypt of her antiquities to any great extent. It may be useful to complete our typical series to a limited extent, but if Boulak should be happily preserved, I hope it will be preserved for Egypt, and not brought home. Nothing would serve more to prove that we go there to civilise and not to rob. The means of communication are now so easy that all who are interested in Egyptology can see it there. Steam and railways have materially altered the requirements of education in this respect. Humanity, and British humanity in particular, now pours through all the great arteries of the world,

and people observe and study more abroad than at home. The time has passed when antiquities should be regarded as trophies of war. It is no longer necessary for instruction to hoard up valuable specimens of foreign antiquities in European museums. So long as science has access to the materials of knowledge, that is all that it is necessary to bring away; and national museums, with the limited space at their disposal, should more and more become devoted to local collections. Besides which, it should be remembered that the atmosphere of Egypt preserves antiquities in a way that no other climate can do; and when this fact hereafter becomes fully impressed upon the public mind, the time may come when subscriptions will be raised to take back obelisks and put them up again in their proper places; at any rate we have enough of them weathering and withering in smoke and damp. They are quite out of place in European towns, and seem to hold up a finger of caution to us to proceed no further in that direction. But the opportunity for exploration should not be lost. The French savants did their work thoroughly during their military operations in that country, and it would be shameful if, with the knowledge now at our disposal, the British expedition did not achieve more for the promotion of science than was effected by Napoleon half a century ago.

Carlsbad, August 3

A. PITT-RIVERS

Francis Maitland Balfour

THE memoir of Prof. Francis M. Balfour, published in *NATURE*, vol. xxvi. p. 313, appears to have been founded, as far as his life at Harrow is concerned, on incomplete information; and I therefore ask your permission to supplement it with my own reminiscences.

He entered Harrow School in January, 1865, and when he had reached the upper part of the fifth form in 1867, I was appointed to give instruction in natural science. Although this subject was not taught in any of the forms which Balfour passed through, he soon afterwards eagerly availed himself of the opportunity offered of taking lessons in practical work in biology. This continued without intermission until he left the school for Cambridge more than three years afterwards. He was always ready to spend as many hours as I could give him for work with the microscope and in making dissections. With Dr. Rolleston's "Forms of Animal Life" as guide, he dissected nearly all the typical examples described in that book. In the same way he gained a knowledge of osteology, using a small collection of skeletons which received, for his special benefit, the important additions of a complete crocodile, and an armadillo, several incomplete skeletons of ornithorhynchus, and echidna. No part of comparative anatomy was neglected, but of such an extensive subject, much of his knowledge was necessarily derived from books only, but it was sound, being based on Huxley, Müller, Kölliker, and the like. He had the opportunity also of learning elementary botany.

All this work was carried on under conditions with which only a boy of his energy and indomitable perseverance could have coped. At first he had some difficulty in acquiring skill in the purely mechanical details of dissection, but he determined to overcome this difficulty, and he succeeded. The time at his disposal for biology was chiefly the half-holidays, and for such work no marks could be given by his form masters, but on the contrary, it is only too certain that his position in other subjects was affected by his devotion to natural science.

Those who managed the affairs of the School Scientific Society in 1868 (two years before Balfour left Harrow), showed their appreciation of his remarkable powers by asking Prof. Huxley to award the prize, which had been offered, through the liberality of Mr. C. J. Leaf, for the best essay written during the previous holidays, being a description of some district known to the author. This unusual step was taken when it was found that the essay sent in by Balfour and another by his friend A. J. Evans, were of such rare merit, that it was felt that they were worthy of being brought under the notice of such a distinguished man as Prof. Huxley. His opinion of the value of these essays fully justified this view.

Balfour's knowledge of geology was chiefly gained at home, and no doubt it was of considerable service to him in the com-

petition for the Natural Science Scholarships, which he gained soon after he went into residence at Cambridge.

Whether the teaching referred to in the previous lines was of advantage to him or not, could be best determined by himself, and it is interesting to have his judgment on this point when the recollection of it was fresh in his mind. In a letter dated "Cambridge, April 28, 1871," he says: "Many thanks for your congratulations on my success, which is certainly chiefly due to you." This opinion he again very warmly expressed to me when I had the pleasure of spending a few days with him in the same year after the meeting of the British Association at Edinburgh.

He left Harrow in August, 1870, having spent nearly six years in the school.

G. GRIFFITH

Harrow, August 7

I AM sorry that I omitted in my brief sketch to point out the benefits which Balfour undoubtedly derived from the science teaching at Harrow, and I am sure my friend Mr. Griffith will understand that it is as far as possible from my wishes to fail in acknowledging the fruit of the labours which he has been carrying on there these several years with such zeal and energy. There can be no doubt, I think, that the training which Balfour had under Mr. Griffith not only helped towards his gaining the scholarship, but materially contributed to making him the man he was. What I wrote concerning his reputation at Harrow, referred rather to what I understood was the general opinion of the school, than to Mr. Griffith's own forecast of what Balfour might become; the latter I have known for a long time to be so sanguine as to come near the truth.

M. FOSTER

On "getting" Coal by Means of Caustic Lime

IN an article on this subject (*NATURE*, vol. xxvi. p. 299) Mr. William Galloway states that this system "has been found by experiment to be incapable of breaking down a hard rock or shale roof," and is, therefore, not likely to have anything but a limited application.

Will you allow me, as one who has had a good deal to do with the new process, to assure Mr. Galloway that so far as it has yet been applied, it has answered every purpose in respect of which gunpowder or wedging have been hitherto used.

We have not yet had time to make a series of experiments with the lime-process on hard rock, &c., as our attention has been until now turned exclusively to the getting of coal, especially in those mines in which, from their fiery nature, the use of powder has been prohibited. In the Shipley Collieries, where the lime-process has been in constant operation for many months, it is regularly applied to one of the hardest seams in the Midland coal-field, the toughest part of which is that next the roof, and this portion could never be got by wedging in the ordinary way, but had subsequently to be hacked down into slack—by the lime process, however, the coal is parted clean from the roof, along the entire face operated on.

In other districts where it has been proved to be a complete success, the places selected for experiment were invariably the hardest in the mine. The cases where the tamping has been blown out are extremely rare, and have been due to causes immediately and easily rectified.

We have no reason to believe that the process would fail in its application to the mining of shales, iron ores, &c., and this point will be settled by experiment before long, pending which Mr. Galloway's conclusion on the subject is at least premature.

PAGET MOSLEY

81, Warwick Road, Earl's Court, August 10

IN stating that the caustic lime process was likely to have only a limited application in coal-mining operations, it was not my intention to convey the impression, as Mr. Mosley appears to think it was, that the area of its usefulness would necessarily be a small one. On the contrary, I believe it could be successfully employed in getting coal under a large variety of circumstances.

Mr. Mosley's connection with the subject could not well be more intimate than that of the gentlemen who supplied me with the information brought forward in the article referred to, and I understood them to say that experiments had been made with the roof of Shipley Collieries, giving results which amply justified the conclusions I stated.