which, it is quite clear, must be corrected so far as relates to this point.

4. It must not be understood from the remarks I have made that I dispute the existence of an anticlinal axis running nearly east and west across the Kingswood Coal-field. I am quite aware that on the north of my section, in the Parish of Stapleton, there is a clear and well-defined anticlinal axis extending from Bristol, on the West, to Wick Rocks, on the East, and which, in fact, gives the geographical as well as the geological character to Kingswood Hill : but even on the apex of this anticlinal there is no appearance of the Grit ; nor is it anywhere brought within at least 400 or 500 yards of the surface. One of the main seams of the district—namely, the 'Great Vein,' marked No. 32 in the annexed list, and shown in my section—has been worked over the whole of Kingswood Hill, at the top of the anticlinal axis, at a depth varying from 30 to 60 fathoms, and from thence northward (at Soundwell) to a depth of 200 fathoms, and southwards (at St. George's) to a similar depth ; but between this seam (which is, no doubt, identical with the Bedminster 'Great Vein') and the Millstone-grit, there is proved, at Ashton Vale, to be an interval of over 300 fathoms ; so that it is quite evident that the Millstone-grit cannot exist at the surface at Kingswood Hill.

Conclusion.—The band of sandstone called 'Holmes Rock,' belonging to the Lower Coal-measures, and shown on the accompanying section, is what has been hitherto mistaken for the Millstone-grit. The section also shows twenty-one known seams of coal, varying from one to four and a half feet in thickness, lying in regular order below it.

Commercially, then, as well as scientifically, the question as to the presence or absence of the Millstone-grit at Kingswood Hill is highly important ; for, instead of the bottom of the Coal-measures, which the Grit itself would mark, we have a considerable extent of valuable Coal-field open to us, which was thought to be barren for the future energy, skill, and enterprise of those to whose talent and perseverance this country is so largely indebted for its past growth and its present prosperity.

ABSTRACTS OF FOREIGN MEMOIRS.

Cretaceous Rocks of France and England.

I. Etudes sur le Synchronisme et la Délimitation des Terrains Crétacés du Sud-Est de la France, par P. Reynès, M.D., &c. 8vo. pp. 116. Paris, 1861.—II. De L'Étage dans la Formation Crétacée. Par le Docteur Reynès. 8vo. pp. 16. Marseilles, 1864.

THE Cretaceous strata of the South-east and other parts of France have for some time specially engaged the attention of Geologists ; and their differences in petrographic and palæontological characters have been a continual source of controversy. Among the more important workers on this point are D'Archiac,

Triger, Sæmann, Renevier, Hébert, Leymerie, Mathéron, Raulin, D'Orbigny, Coquand, and others, all of whom have contributed to the elucidation of the subject, which has also received special attention from Dr. Reynès. His 'Etudes' of 1861 is divided into three parts. The First comprises the history of the different horizons and subdivisions of the Cretaceous rocks, given by different authors; and a résumé of the horizons and their synonymy is offered. The Second Part comprises the succession of these strata in the different districts of France, as shown by local sections (figured also in a lithograph plate), and lists of fossils, for Provence and surrounding Departments, the Maritime Alps, Vaucluse, Dauphiné, Drôme, Isère, High-Alps, Savoy, the Departments of Ardèche, Gard, Hérault, and lastly those of Aude and the Eastern Pyrenees. In the last Part, the order and relationship of the beds are treated of, the synchronism of the separated members of the series is attempted with relation to faunal likeness and stratal position, and some general conclusions are arrived at.

The second memoir (L'Etage, 1864) contains the ripened opinions of the author, modified by further researches in the Chalk of France and England, and also by the study of the labours of others in the Anglo-Parisian basin, Sarthe, Gironde, Charente, and the Mediterranean countries. From these researches the author has prepared the following table, showing the great Cretaceous divisions :—

1. Horizon of *Belemnitella mucronata* and *B. quadrata, Micraster coranguinum, Hemipneustes radiatus,* &c. 'Chalk of Maestricht and Meudon;' 'Upper Chalk;' 'Dordonian' and 'Campanian,' Coquand; 'Senonian,' D'Orbigny, in part; 'White Chalk' and 'Marly Chalk,' Brongniart, in part.
2. Horizon of *Radiolites fissicostatus, Sphærulites sinuatus, Micraster brevis,* &c.; beds with *Ostrea auricularis*; beds with *Hippurites Cornuvaccinum, Sphærulites augeiodes,* &c. 'Upper Chalk;' 'Marly Chalk,' Brongniart, in part; 'Senonian,' D'Orbigny, in part; 'Turonian,' D'Orbigny, in part; 'Santonian,' 'Coniacian,' 'Provencian,' Coquand; 'Horizon of *Ostrea auricularis,*' Triger; 'Chalk of Villedieu' and 'Hippurite-limestones,' Reynès.
3. Horizon of *Ammonites peramplus, Am. papalis,* and *Am. Deveriæ;* beds with *Radiolites cornupastoris.* 'Marly Chalk,' Brongniart, in part; 'Micaceous Chalk of Touraine,' D'Archiac; 'Sands of Uchaux,' Reynès; 'Horizon of *Am. peramplus,*' Triger; 'Mornassian' and 'Angoumian,' Coquand; 'Turonian,' D'Orbigny, in part; 'Lower Chalk.'
4. Horizon of *Inoceramus labiatus; Hemiaster Verneuilli, Ammonites Wielbansii.* 'Marly Chalk,' Brongniart, in part; 'Turonian,' D'Orbigny, in part; 'Angoumian,' Coquand, in part; 'Zone of *Rhynchonella Cuvieri,*' Triger.
5. Horizon of *Ostrea Columba, O. biauriculata O. carinata, Caprina adversa,* &c. 'Beds with *Ostraceæ,*' D'Archiac; 'Lower Chalk;' 'Group with *Ammonites navicularis,*' Triger; 'Carentonian' and 'Gardonian,' Coquand; 'Cenomanian,' D'Orbigny, in part.
6. Horizon of *Turrilites costatus, T. tuberculatus, Ammonites Rothomagensis, Am. inflatus,* &c. 'Glauconitic Chalk,' Brongniart, in part; 'Chalk-marl' and 'Upper Greensand;' 'Cenomanian,' D'Orbigny, in part; 'Rothomagian,' Coquand; 'Chalk of Rouen,' Reynès; 'Group with *Pecten asper,*' Triger.

7. Horizon of *Ammonites lautus, Am. Delucii, Inoceramus concentricus,* &c. 'Gault;' 'Albian,' D'Orbigny; 'Glauconitic Chalk,' Brongniart, in part.
8. Horizon of *Ammonites Cornueli, Plicatula radiola, Ostrea aquila,* &c. 'Plicatula-clay,' Cornuel; 'Speeton Clay,' Phillips; 'Lower Greensand,' and 'Aptian,' D'Orbigny.
9. Horizon of *Chama Ammonia, Pterocera Pelagii.* 'Limestone with *Ch. Ammonia*;' 'Urgonian,' D'Orbigny, in part.
10. Zone with *Ammonites Astieri, Ostrea Couloni, Crioceras Emerici.* 'Lower Greensand;' 'Neocomian,' and 'Urgonian,' D'Orbigny, in part.

As far as the South-east of France is concerned, all but the highest beds (from the Vescomian upwards) are present in Dép. Gard, Ardèche, Bouches-du-Rhone, and Vaucluse.

Believing that the above is a good approximative classification for the Cretaceous beds, Dr. Reynès leaves it for other and experienced Geologists to suggest fit names for the several groups.—J. M.

Mineral Waters considered in their Relations with Chemistry and Geology.

Les Eaux minérales considérées dans leurs Rapports avec la Chimie et la Géologie. Par Henri Lecoq, Professeur à la Faculté des Sciences de Clermont, etc. Paris: J. Rothschild, 1864, pp. 463.

REGARDING all springs as 'mineral waters' that deliver at the earth's surface water that has passed through and become modified by any portion of the earth's crust, Professor Lecoq, in the careful and elaborate work before us, has brought together a great amount of information equally useful to the chemist and the geologist. We shall endeavour to put before the reader a fair abstract of the facts. Of the theories and opinions we shall say but little, only remarking, that they are not in accordance with the views of many English geologists, who will be unwilling to take for granted that the earth has cooled down from a state of igneous fluidity, and will feel surprised at being told (p. 2), that modern lavas come from greater depths than old granite and more recent basalts. They will also demur to the statement, that in former times all rain became mineral water, by immediately sinking into, instead of running for a while over, the earth, and that all existing mineral waters are but the feeble remains of much more powerful springs.

Professor Lecoq traces mineral springs to lines of dislocation, believing that their sources are to be found below the rocks called by him primitive (granite, &c.). He mentions as illustrations, the Geysers and other hot springs of Iceland, the north-south direction of such line of springs in European Turkey, parallel to trachytes and basalts, and the mineral springs of Spain, to the number of four hundred. In France, likewise, out of nearly a thousand such springs, at least eight hundred are traced to a similar origin. Many elsewhere are on the axes of longitudinal valleys, assumed to be due to fracture. Assuming, however, that water exists abundantly in the interior of the earth under pressure, it is not extraordinary that it should come

to the surface at weak points, and through fractured portions of strata. We believe also it would not be difficult to find examples where mineral, and even thermal springs, though conducted up to the surface through fissures, do not rise from any great depth, and certainly not from beneath Silurian rock.

The volume of mineral waters poured forth is extremely large. A million of litres (200,000 gallons) a day is no unusual quantity for a single spring. A group of springs in Arkansas, North America, yield more than a thousand litres a minute (2¼ million gallons a day). Of 500 springs rising in the central plateau of France, 231, that have been gauged, yield 12,064 cubic mètres (2,628,000 gallons) every 24 hours. The remaining 269, though smaller, are estimated to add nearly one-fourth (2,810 cubic mètres) to the sum, making a total of nearly 3¼ millions of gallons a day. This is believed to be much below the real total.—(*To be continued.*) —D. T. A.

REVIEWS.

HARMONIC MAXIMS OF SCIENCE AND RELIGION. By the Rev. W. BAKER, M.A., Vicar of Crambe, near York. 8vo. 1864. LONGMAN & Co. London.

NOTES UPON THE ERRORS OF GEOLOGY. ILLUSTRATED BY FACTS OBSERVED IN IRELAND. By JOHN KELLY, V.P. Roy. Geol. Soc. of Ireland. 8vo. 1864. LONGMAN & Co. London.

THE Bible harmonized with Science is not a theme one likes the look of at first sight; we seem to have had enough of it, and more than enough. Not that there is any real reason why the harmonies of the two divine works, 'the Earth and the Word,' should not be studied and admired, but because there are so few—so very few—who can bring the requisite learning to the work. It is not the easy task some think it. That it is an impossible one we strongly doubt; and nothing will so effectually retard it as the ill-considered efforts of good men who are dunces in science,—no, not even the rash denunciations of those who know something of the Earth and but little of the Book. 'We do not know,' says the Bishop of London in his late grand address at Edinburgh, 'how much of our knowledge is purely human and naturally acquired, how much has come down from a supernatural or divine source, even when transmitted by those who professed most vehemently to discard any supernatural help.' We may rest assured in the conviction that no two truths are, or can be opposite; and we may welcome any additions to our real knowledge, while we shut our eyes as much as possible to the clumsy workmanship that tries to fit them together. And having said thus much on the general subject, let us look at the two books before us—so utterly unlike each other. Let Mr. Baker speak first.

The learned author starts with the proposition, that 'certain