are to be congratulated on their good work in this respect. R. H. THURSTON.

The Life and Correspondence of William Buckland, D. D., F. R. S. Some time Dean of Westminster, twice President of the Geological Society, and First President of the British Association. By his daughter, MRS. GORDON. With portraits and illustrations. New York, D. Appleton & Co. 1894. Post 8°. Pp. 288. $3.50.

To those who were 'brought up,' geologically speaking, on perhaps the most weighty and yet brilliant of the Bridgewater Treatises, 'Geology and Mineralogy considered with reference to Natural Theology,' and are familiar with the prolonged struggle for existence undergone by the 'noble subterranean science' in the first half of our century, this life of the English participant in the contest will show what a force he must have been in the intellectual and scientific life of his time.

Dean Buckland was one of the creators of the science. Himself inspired by the teachings, though at second-hand, of William Smith, 'the father of English Geology,' he became the teacher of Lyell, of Murchison, of Etheridge, Daubeny, Egerton and Lord Enniskillen. As early as 1809, when a Fellow at Oxford, he had by his energy in collecting, his contagious enthusiasm, and his bold and effective advocacy of the infant science, produced a sort of panic in the minds of those who would have gladly strangled this newly born science.

The philosophic calm and classical serenity of the Oxford dons was sorely vexed and disturbed by the young savant. "Some dreaded lest his example should drive the *amœnitates academicæ* out of fashion." When his shorter journeys on British soil finally led to a longer excursion to the Alps and to Italy, one of the elders is said to have exclaimed: "Well, Buckland is gone to Italy; so, thank God, we shall hear no more of this geology." But young Buckland's zeal, energy, overflowing humor and eloquence, led to his appointment in 1813 to the Readership of Mineralogy, and in 1819 a Professorship of Geology was created for him.

He went on triumphantly in his career of advancing and popularizing his favorite science, overcoming objections and theological narrowness either by a joke, a hearty laugh, a strain of lofty eloquence, or by earnestly insisting that the study of geology, so far from being irreligious or atheistic in its consequences, had a tendency to confirm the evidences of Natural Religion, and that there could be no opposition between the works and the word of God.

His humor, quick wit and overflowing jollity or playful fancy in the lecture room were contagious. His field lectures were largely attended, and many are the stories told of his apt illustrations on these occasions, as well as of some of his adventures on his geological excursions. They are illustrated by rhymes and by comic pictures from the pen and pencil of his fellow geologists. As an example of his graphic mode of explaining the earth as understood in his day, it is said "He compared the world to an apple-dumpling, the fiery froth of which fills the interior, and we have just a crust to stand upon; the hot stuff in the centre often generates gas, and its necessary explosions are called on earth, volcanoes." When riding towards London with a friend on a very dark night, they lost their way. "Buckland therefore dismounted, and taking up a handful of earth, smelt it. 'Uxbridge,' he exclaimed, his geological nose telling him the precise locality." Mr. Etheridge tells the story of Buckland when travelling in Scotland, "in order not to shock the feelings of the Scotchmen on Sunday, carrying his hammer up his sleeve." Ruskin, who was an undergraduate of Christ Church when Buckland was not only

the Professor of Geology, but also a Canon of the Cathedral, writes in his 'Præterita :' "Dr. Buckland was extremely like Sydney Smith in his staple of character ; no rival with him in wit, but like him in humor, common sense, and benevolently cheerful doctrine of Divinity . . . Geology was only the pleasant occupation of his own merry life."

With these characteristics of head and heart, a sane mind in a sound body, it may be imagined what an immense impetus Buckland gave to the growth and development of the young science. He was the first president of the Royal Geological Society, and the first president of the British Association for the Advancement of Science, which he invited to meet at Oxford. His papers and memoirs were not numerous, though upwards of fifty, besides three general works ; perhaps his volume on Caves, 'Reliquiæ Diluvianæ,' was of most lasting value. He was, though at first rejecting Agassiz's theory, one of the first to recognize the fact of the former existence of glaciers in Great Britain.

Buckland was born in 1784 and died in 1856. His last scientific paper appeared in 1849. In 1845 he was appointed by Sir Robert Peel to the deanery of Westminster, and one of the first things he did was to introduce a system of pipe-drainage in Westminster Abbey, the first of its kind ever laid down in London, and which led to the disuse of cesspools and brick sewers throughout that city. He was, then, not only dean and a doorkeeper in that palatial house of the Lord, but he applied his scientific knowledge to the thorough cleansing of its foundations. Cleanliness with the good dean was evidently a synonym of godliness. His sermon delivered in 1848 on the words, 'Wash and be clean,' was almost the first contribution to sanitary science, a subject in which he was far ahead of his time. His interest in medical science, in general charity and philanthropy, in building churches and schools, was informed and enlightened by his early geological training and advanced ideas. When, in 1846, the famine crept over Ireland, and even into England, he met the difficulty while living in his summer house at Islip, and among other wise and kindly acts he supplied the village shops with sacks of hominy and Indian corn. Here also he built a recreation room for the village lads, the forerunner of our boys' clubs and kindred associations.

The story of Buckland's brilliant and useful life is in most respects well told ; the illustrations are amusing and often instructive, and we warmly recommend the book as most entertaining reading for geologists, young and old, and indeed for all lovers of nature. A. S. Packard.

GEOLOGY.

Report on the Iron Mountain Sheet, by Arthur Winslow, E. Haworth, Frank L. Nason and others. Arthur Winslow, State Geologist, Mo. Geol. Surv. 1894.

This is the third number of the same series of reports as the Bevier sheet and covers an area of about 250 square miles in portions of Iron, St. Francois and Madison counties. As in the others, the principal feature is the map showing the topography and the geology. This was constructed by Messrs. Haworth, E. H. Lonsdale and C. F. Marbut and is similar in scale and contour interval to the one described above. It is also accompanied by a sheet of columnar and cross sections, showing the structure of Iron mountain and Pilot knob. In the text the peculiar topography of the region, as well as the other physiographic features, are described by Mr. Winslow. Mr. Haworth contributes the portion on the geology of the crystalline rocks and Mr. Winslow that on the geology of the Paleozoic rocks. The economic geology of the iron