Pupa, and *Achatina*; bones of the Mastodon have also been discovered in it.

The Yellow Loam overlies the Loess, where that exists, and elsewhere the Orange Sand; its average thickness is from 5 to 10 feet, and its characters vary more or less in accordance with those of the underlying material, which enters into its composition, and therefore testifies to a certain amount of denuding action.

The Hummocks, or Second Bottoms, as the newest beds are called, form part of the valleys of all the larger streams of the state, and are in general most extensive where the material of the adjoining uplands was most easily denuded, so as to permit the excavation of deep valleys; while, where that material resisted denudation, the contraction of the valley, and consequent greater swiftness of the stream, have either prevented the formation of these deposits, or caused their subsequent removal.

3. *Note on the Presence of Low Forms of Vegetation (filamentous Confervæ) in the hot and saline waters of California*, by Professor W. H. Brewer.—The waters contain a variety of salts in solution, principally sulphates of iron and alumina. The highest temperature in which the vegetation grew was about 200° F.

H. B. W.

REVIEWS.

I.—SILURIAN ROCKS OF BOHEMIA.

By M. J. BARRANDE.

[DEFENSE DES COLONIES. III. ÉTUDE GÉNÉRALE SUR NOS ÉTAGE G-H.; AVEC APPLICATION SPECIALE AUX ENVIRONS DE HLUBOČEP, NEAR PRAGUE. Par JOACHIM BARRANDE. With a coloured Map and Plate of Sections. 8vo. Paris and Prague, 1865].

MORE than twenty-five years ago M. Barrande began a careful search in the Palæozoic strata near Prague for fossils, whereby to learn their exact relations one with another, and with like strata elsewhere. He worked on a large scale, employing native workmen to quarry the rocks and collect every fossil and fragment of fossil, keeping special note of the layer in which it occurred. Before long this steady and perfect examination of every bed enabled M. Barrande to determine several groups of so-called Silurian strata, round about Prague, arranged in a great basin or trough, and divisible into eight successive formations or stages. Three great and distinctive assemblages of animal forms (faunas) characterize the fossiliferous part of these stages. Beneath all is the old gneiss, the marble in which has lately yielded *Eozoön* to Hochstetter and Gümbel. Stages A and B, as yet unfossiliferous, are the Prizibram and other Schists, and may be equivalent to the "Cambrian" of Britain, or the "Huronian" of Canada. Stage C, or the Ginetz beds, is characterized by the "Primordial Fauna" of Barrande, and is analogous

to the Lingula-flags of Britain. Stage D has the "Second Fauna," and is equivalent to the Llandeilo and other beds of the Lower Silurian. Lastly, Stages E, F, G, H, characterized by the "Third Fauna," are Upper Silurian. M. Barrande has described the details in various books and memoirs, and conspectuses of his discoveries and views have been given by Murchison, Lyell, Hamilton, and others. One of the most interesting points to which M. Barrande has drawn attention is the occurrence of what he terms "Colonies,"—that is, groups of fossils having special characters, that occur in thin beds intercalated in strata having a different fauna, but subsequently re-occurring in higher beds as the predominant fauna. He regards them as migratory and temporary off-shoots, as it were, from some co-existent but distant fauna, which subsequently however came into the same area in force, displacing the older fauna altogether. Thus, in Stage D, a thin but continuous stratum is full of such fossils as are abundant only far higher up in Stage E.

M. Barrande's earlier sections were merely diagrams; and when the Austrian Geological Surveyors examined the ground, they proposed to draw better sections and explain the apparent difficulties. MM. Lipold and Krejci offered therefore their views to the public, suggesting that folds of the strata, obliquely and otherwise faulted, would account for interventions of parts of one set of strata among another; and a discussion followed. M. Barrande's "Defence of the Colonies" has been spirited, careful, and clear. In this, the third part of the work, the author contrasts some of the sketch-sections of Lipold and Krejci with sections drawn to scale, to the advantage of his arguments certainly, though his pencil is not facile in rendering geological features.

The study of the Stages G and H in the neighbourhood of Hlubočep, near Prague, belongs especially to the question of the "Colonies," says M. Barrande, on account of the great importance that MM. Lipold and Krejci have attached to the stratigraphical conditions (wrongly interpreted) of that locality. Therefore, these two stages are now treated of in full, as to their strata and fossils, their subdivisions, and their exact relationship to the underlying beds that contain the "Colonies" (as shown by carefully prepared sections). Further, the representative strata in other countries, that centre paralleled with these stages, are considered; and lastly, the peculiar occurrence in G and H of *Goniatites* and other fossils that are elsewhere found, not in Silurian, but in Devonian rocks, is shown to be by no means a conclusive argument in favour of their being "Devonian." To Mr. Hamilton's admirable *résumé* of this Memoir in his late Address to the Geological Society, we may refer those who wish to see an English summary of M. Barrande's observations; we must here limit ourselves to calling attention to these valuable researches, so perseveringly and consistently carried on,—so well, nay, so magnificently, recorded as they are in Barrande's grand work—"Le Système Silurien de la Bohême,"—and so enthusiastically and successfully supported, in their generalizations, by their clear-headed, untiring, and single-minded author.