In this connection I would call attention to a striking feature of the Grand Canyon faults, as described by Dutton in his monograph. He says the ends of the down-thrown strata are commonly turned *down* in this region, the beds on the other side coming undisturbed to the fault. This is specifically described for the West Kaibab and Hurricane faults, both with up-throw to east.

The phenomenon of the down-turned edges is puzzling, but it might result from the following history. All the steps assumed to follow in succession are found in the region to-day:

1. Western beds flexed up, giving a western high level passing through a monocline to an eastern low level.

2. Flexure becomes a fault at the foot (east end) of the monocline, giving western high level passing down a monocline to an east-facing fault cliff, below which lie the horizontal beds of the undisturbed side.

3. Reversal of fault, giving upthrow on east and the structure existing to-day—low level on west passing to a west-facing fault cliff by a down-turn (monocline perhaps partly obliterated by friction during the reversal).

In confirmation is the fact that both faults are greatest in the north and steadily diminish southward, the Hurricane having at the river less than a sixth of its northern value, while the West Kaibab disappears just where it crosses the chasm. Dutton thinks it reappears to the south of the canyon, but *reversed*, giving an east-facing cliff. So if the observation of Dutton is good, reversal of fault has occurred in one case and there is a suggestion of it in the other. Now the significance of this fault history is that the river seems conscious of something of the sort. It turns south on the second V of the Grand Canyon at the Hurricane fault, as if to avoid the early western uplift, now recorded only in the down-turned strata-ends; while at the Kaibal the reversal-point has been selected by the river to return northward from the deviation about the uplift here. The peculiar grouping of meanders is readily seen on the map, as also the relation of bends in the river to the displacements at the Uinta, junction of Grand and Green, Kaibab (East and West), and Hurricane.

In explaining these latter events as represented in effect on the present river, I have founded my suggestion on that simple and diagrammatic character that Powell and Dutton have described in this region.

Are not these additional grounds for questioning the Colorado's antecedence?

MARK S. W. JEFFERSON.

GILMANTON, N. H.

AMPHIBIA OR BATRACHIA.

TO THE EDITOR OF SCIENCE: As a teacher of zoology, but without claim to expert authority upon taxonomic points, I read the article of Dr. Baur under the above title (SCIENCE, July 30, 1897, 170–174), with the hope and expectation of being able to decide which name to employ hereafter. I regret to confess myself still unconvinced. Dr. Baur shows that the French word *Batraciens* was applied to the frogs, toads and salamanders by Brogniart in 1799, and that the Latin forms *Batrachii* and *Batrachia* were not introduced until 1804 and 1807, by Latreille and Gravenhorst respectively. But does not Dr. Baur lay undue stress upon the distinction between the French and the Latin form. *Batraciens* is not (like *crapaud*, etc.) a vernacular word; it is the French form, or Galloparonym, of the Latin *Batrachia*, and the employment of the former would seem to constructively sanction the use of the latter. In anatomy the employment of either of the national forms, *hippocamp*, *Hippokamp*, *hippocampe*, or *hippocampo*, would be tantamount to the introduction of the international form, *hippocampus*. The principle involved in both cases has been formulated by me in two passages in my 'Neural Terms, International and National (*Jour. Comp. Neurology*, VI., 274, 329), as follows: "The introduction of any derivative, oblique case, or national paronym, practically renders the introducer responsible for the actual or potential Latin antecedent of such words, in accordance with the usual rules of derivation and paronymy." I trust the discussion may continue until all doubts are removed. The case is the more urgent in view of the confusion of students in finding not merely that *Amphibia* and *Batrachia* are synonyms for the entire class,

but also that in Huxley's writings the latter is applied to an ordinal subdivision of the former.

BURT G. WILDER.

SCIENTIFIC LITERATURE.

Report on the Valley Regions of Alabama. By HENRY MCCALLEY, Assistant State Geologist. Part I., on the Tennessee Valley Region, pp. 436. Part II., on the Coosa Valley Regions, pp. 862. Geological Survey of Alabama, Montgomery, 1896–97.

The aim of this report is to give a complete account of the geology and mineral resources of that part of Alabama which is occupied by known Paleozoic formations. This includes approximately the northern third of the State, with an area of about 18,000 square miles. It is limited on the southeast by the metamorphic series of undetermined age and on the southwest by the unconformable post-Paleozoic formations. The term 'valley regions' in the title is somewhat misleading, since all the mountains of Alabama, such as they are, are included in the region described and are as fully treated as the adjacent valleys. Except to one already familiar with the topographic features of the State, the title conveys no idea of location whatever.

The region outlined above is about equally divided between the Tennessee and Coosa drainage basins, and this division is a natural one from geologic and economic points of view. It is, therefore, taken as the basis for subdividing the report into two parts which treat respectively of the Tennessee and Coosa Valley regions. Each part is again subdivided into two sections. In the first is given a general account of the topography, geology and mineral resources, and in the second each county is described in detail. This method of treatment is, perhaps, necessary where the county is the all-important unit in the political and social organization, but its defects are serious as seen in the present case. It involves endless repetition and distributes through a volume details which should be in a compact body. Thus there are 275 more or less extended but entirely distinct references to the limonite deposits, containing sufficient observations for an exhaustive monograph on the subject if brought together and properly arranged. Yet one seeks in vain for any systematic classification of the deposits or a statement of their essential characteristics.

In reading the report one is continually hampered by the lack of maps. It is true the State geological map, published in 1894, is referred to, but its scale is entirely too small for representing details of structure, and in numerous respects it does not correspond with the statements in the report. The crudest sort of sketch maps would be of the greatest assistance to an understanding of the complicated structural relations found in parts of this region. In fact, no amount of verbal description, even from a master of English, can supply their place, and the present case is hopeless for reasons which the following quoted sentence will readily suggest: "The northeast end of the belt, just to the northwest of the Terrapin or Ladiga Mountains, or the portion of that belt within this county, is a portion of the counterpart of the belt last described, or is a portion of the southeast rim of the badly faulted, broad, broken, unsymmetrical synclinal of which the belt last described is the major part of the northwest rim." The reader cannot rid himself of the suspicion that among other reasons for the absence of maps and diagrams is the lack, on the author's part, of a sufficiently clear conception of the structure for their preparation.

In the descriptions of topographic features the principles of modern geography or physiography are entirely ignored. Hence there is a vagueness and uncertainty about the descriptions which might have been excusable twenty years ago, but for which no excuse can be found at the present time. It borders on the absurd to speak of 'high rugged mountains with lofty peaks' in Alabama, where the greatest relief is barely 2,000 feet above the sea-level.

By far the most valuable portion of the report is found in the detailed county descriptions, especially those of mineral deposits. Here is a vast mass of facts, poorly digested and arranged, it is true, but given in such a way that they will be of great service in the economic development of the region. All locations are given by land numbers, so that, while they convey little meaning to the general reader, they are in the best possible form for use by the prospector upon the ground.

C. W. HAYES.