dioryte in dikes would be a natural result of friction along fault-planes cutting through such an underlying crystalline mass. The extrusion of igneous rocks accompanying mountain-making has been a common fact over the summit region of the Rocky Mountains; an example occurs in the Wasatch, which has, like the Sierra, a "granite" core.

Had the granitoid mass been a result of deep-seated eruption at the time of the upturning, or at any later date, or earlier, it would have come to the surface in great fissures; for fissures, as the result of fractures, give exit to the confined liquid rock of the earth's depths. Moreover, liquid dioryte is identical with andesyte lava, and liquid granite with rhyolyte; and if ejected at the time supposed, it should show evidence of the chilling effect of the relatively cold Sierra rocks along their contacts with them. Instead of this, the rock of the core is well crystallized to its surface, and has a coarseness of crystalline texture which indicates extremely slow cooling. Neither is the existence of auriferous quartz veins in the granite positive evidence of its recent origin; for the granite of Pike's Peak, according to W. Cross, contains *sandstone dikes* (Feb., 1894). Further, if the ridges of crystalline rock in California and to the north are all eruptive and of late Mesozoic age, as is urged, and the emergence at the close of the Triassic is the earliest of much importance, there is no sufficient source for the sediments of which the successive sedimentary rocks were made. They could not have come from the eastward; for the oceanic currents of the Pacific border are now, and must have been in early time, from the northwest; and besides, the ridges of the Pacific border are north or northwest in course. Moreover, oceanic currents are relatively feeble transporters, and find their material for rock making near at hand.

Such a mass of crystalline rock having irregular or indefinite outline has received the name of *bathylite.* (*Bathylith* would be a better name, as it is here used for a *mass*, not a *kind*, of rock.) It has one mode of origin that is consistent with indefiniteness of outline. When a pile of deposits, 30,000 feet or more in depth, has beds in its lower portion that admit of fusion under the action of the heat producing metamorphism, the melted material would make a mass of indefinite outline. The fusion, under the same circumstances, of the rocks immediately below the pile, might add to the melted mass or be its chief source. Here is fusion unbounded by the walls of a fissure. This was common, as has been elsewhere remarked, in Archæan time. There is no sufficient evidence that it occurred during the Sierra upturning at the close of the Jurassic, or in any other part of Mesozoic time.

The pre-Cretaceous age of the metamorphic rocks of the Coast Range has been urged by Fairbanks (1892). This view is held also to some extent by Turner and Diller; and the latter states that the Coast Range was upheaved with the Sierra Nevada at the close of the Jurassic. This conclusion is drawn from the fact that the Cretaceous thins out, both to the eastward and westward of the Sacramento valley, and that the later beds have their greatest extension in these directions.

The Cascade Range appears, from its position, to be part of the Sierra system. Becker reports that the same class of metamorphic rocks characterizes the portion of it in Oregon where not buried beneath later volcanic ejections. The Blue Mountains of Oregon also have their Jurassic rocks, and were probably among the results of the post-Jurassic upturning.

In the Plateau Belt, or that of the Great Basin, near Carson Lake, the West-Humboldt range, according to King, was made at this time. It includes several ridges between $117\frac{1}{2}°$ W. and $119°$ W.; and the thickness of the