OROGENICS OF THE GREAT BASIN

WHEN, about forty years ago, the members of the Fortieth Parallel Survey leisurely traversed the mile-high Great Basin between the lofty Rockies and the Sierra Nevada, their impressions on the configuration of the mountain ranges were that there was chiefly folding of the Appalachian type wherein the synclines were deeply and almost completely filled with illy transported rock-waste from the neighboring highlands.

A decade later, corps of other governmental surveys, passing through this part of the country, put an entirely different interpretation on the origin of the rugged desert ranges. Novel as well as brilliant was the conception that these mountains were recently tilted fault-blocks of gigantic size. This fancy led to another brilliant idea—the hypothesis of isostatic compensation, whereby there is ready response to the transference of eroded rock materials from one point to another, loading areas sinking and unloading areas rising.

Curiously enough when the isostatic hypothesis came to be critically tested in the field no faults bounding the orographic blocks were discoverable. More than a third of a century passed since the idea was first promulgated and yet no one appeared to find impeachable evidences of the alleged crustal ruptures. A governmental expedition, especially fitted out to solve the problem and headed by the author of the hypothesis himself, failed to establish the claim or to publish the desired data. Many of the so-called fault-scarps which were described as marking the basin ranges proved not to be fault phenomena at all, but merely characteristic features of normal eolic erosion at the level of maximum activity. Other investigators searching especially for the assumed faults found not major lines of this character bounding the present mountains but instead discovered dislocation phenomena in the most unexpected situations —far out on the smooth intermontane plains. There was manifestly no genetic relationships existing between mountain profile and geologic structure. On the whole the proposed hypothesis of Basin Range structure proved to be singularly unsupported by observation.

In the meanwhile testimony of another kind abundantly accumulated bearing upon the problem. When the presence of faulting was all but completely discredited, it was shown that although extensive rupturing actually occurred in the region it was mainly relatively ancient. It long antedated the time when the present mountains took form.

There is, however, a third possible explanation of the faulting phenomena displayed in the Great Basin. The major faulting of the region may not be of the normal gravity type as is so commonly supposed. It may be mainly of overthrust character. In support of this suggestion, as a general proposition, there are a number of considerations besides the almost conclusive theoretical one. A remarkable circumstance is that some of these thrust-planes in the desert ranges are often mistaken for lines of unconformities. This may be the real reason why so few normal faults are found bounding the mountain blocks. The overpowering influence of the normal fault idea has much to do with the general misinterpretation of Basin Range orogeny.

Concerning the tectonic genesis of the desert ranges we shall now probably have to give up our brilliant conceptions of mountain blocks floating on the liquid interior of the earth much after the fashion of ice-cakes in a river at time of spring break-up. What the substitute shall be may not yet be perfectly clear. Mountains of circumdenudation through the differential activity of eolic erosion under the stimulus of the aridity and over a region previously effected widely by overthrust movements seems more nearly in accordance with the larger aspects of the conditions presented. At least the extent of the overthrust activity is worthy of the most careful consideration and severest test in the field.

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DISTRIBUTION OF THE FRESH-WATER MEDUSA, CRASPEDACUSTA, IN THE UNITED STATES

IN SCIENCE, November 8, 1907, the writer published a brief account of the appearance