

Coast chain commencing to the south in the Coast ranges of California, and continuing along the islands of British Columbia, and on the sea border beyond to Mount St. Elias.

Finally, the combination of two or more chains makes a *Cordillera*, as the term is used in South America for the Andes. Accordingly, the Coast and Sierra chains together with the chains of the Rocky Mountain summit constitute the *Cordillera of the Rocky Mountains*. In South America the term *cordillera* is used not only for the Andes as a whole but often also for one of its long ridges or ranges or chains. The combined mountain systems of the whole Pacific border of North America were first called a Cordillera by J. D. Whitney.

By the above definitions, *range*, *system*, *chain*, are no longer interchangeable terms, dependent for their use on extent or complexity of mountain regions, but have fixed significations.

*Study of a mountain range.* — Since an individual mountain range has great magnitude, and commonly great complexity through its long series of involved flexures and faults, and through the excavating work of running waters, investigation requires a long and searching study of the structure as a whole, — that is, as an individual. The geological examination of a single ridge of a range may afford conclusions as to the fact of upturnings, flexures and faults and may obtain evidence as to the force concerned, and perhaps settle the question of the foliation, or bedding, of the schists of the ridge, if any are present. But it can afford no general conclusions as to the range; and a petrological investigation would accomplish still less. A single section across the range would afford facts, but no general results; for the flexures may vary every few miles, new faults appear and other rocks come out to view. The student should make his sections not merely in one, or a dozen transverse lines, but in as many lines as possible in *all* directions, studying positions of strata, and noting the changes they undergo from ridge to ridge until the connection of each ridge with every other in the general system of warping has been ascertained. Further, this study should be carried on until the true limits of the mountain individual as far as possible are ascertained. And if the range is more or less metamorphic, the belt of maximum metamorphic change should be studied out, and the fringe of diminishing change, on one or both sides. A ridge of upturned rocks, whether Archæan or of later date, is almost invariably evidence of the existence, in the region, of a mountain range 100 to 1000 miles long, or more; and this should be assumed to be a fact until the contrary is proved.

With the completion of the investigation there will be little further reason for questionings about the fact of pressure and movements as a source of dynamical effects; and if the beds are metamorphic, none as to the source of the heat that produced the metamorphism. But it remains for petrology to complete the work by investigating the special characteristics of the metamorphic changes, their relations to the positions of the beds, the minerals due to the original metamorphism and the results of later changes, besides other points in the history, for light upon which geology is dependent on its kindred science.

Further, a mountain range being a *very large individual*, — a length of a thousand miles and breadth of more than a hundred being common, — three such individuals cannot exist on a single area of 50 miles square. When, therefore, indications of three or more periods of upturned rocks are announced, as indicated, by unconformabilities in any limited region of upturned crystalline or uncrystalline rocks, Archæan, or others, it is quite certain that the unconformabilities are in part only unconformities through faults, or overlaps, or erosion, which have little epochal significance.