

including Alaska, has been for many years engaged in prosecuting trigonometrical surveys.

Norway, although a comparatively poor country, has set itself on having a good topographical map, on a scale of $\frac{1}{100,000}$ compiled from trigonometrical surveys.

Austria has completed a new map of the Empire, comprising 715 sheets also compiled from data furnished by trigonometrical surveys.

Denmark, Switzerland, Spain, Portugal and Italy are all carrying on trigonometrical surveys, to enable them to map their territories accurately.

France has completed her survey, and the result is shown in 276 sheets of map.

On this continent surveys of a high order of precision have been made by the United States Government, and the work of the Coast and Geodetic Survey is going steadily on, having been extended along the sea coast and also along the Great Lakes, and many of the States and Territories have been covered by its operations, including some in the far West, viz.: Nevada, Colorado, Utah, New Mexico, Montana, Idaho and part of Arizona.

Several of the states have conducted independent trigonometrical surveys of their own territory, including Massachusetts, California, New Jersey and New Hampshire, and in other states they are in progress.

All the foregoing surveys are based on triangulation.

It may be asked what are the practical benefits to be derived from a trigonometrical survey, and what is there to justify the expenditure of the large sum of money which a survey of this kind would ultimately cost. To make the point of practical benefit clear, the following will be readily understood by all:

It is stated by an eminent American Engineer that "if the State of Massachusetts had had a good topographical map in 1836, some \$20,000,000 would probably have been saved in its public railway expenditure."

Mr. Sandford Fleming, C.M.G., in his report to the Minister of Public Works, dated April 5th, 1879, says: "If the railways of Ontario had to be established 'de novo,' a careful study of the requirements of that Province would enable any intelligent engineer of ordinary experience to project a new system which at one half the cost would far better serve the public, and would meet every demand of traffic, would more fully satisfy every expecta-