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REVISED

TRIANGULATION AND PRIMARY TRAVERSE

1913-1915

R. B. MARSHALL, CHIEF GEOGRAPHER



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MAP OF THE UNITED STATES SHOWING CONDITION OF ASTRONOMIC LOCATION AND PRIMARY CONTROL
to January 1, 1916

TRIANGULATION AND PRIMARY TRAVERSE, 1913-1915.

R. B. MARSHALL, Chief Geographer.

INTRODUCTION.

PERSONNEL.

Field work.—The field work of primary control, the computed results of which are given in the following pages, was carried on from 1913 to 1915, inclusive, under R. B. Marshall, chief geographer, with Frank Sutton, W. H. Herron, Sledge Tatum, George R. Davis, and T. G. Gerdine, geographers, in charge, respectively, of the Atlantic, Central, Rocky Mountain, Pacific, and Northwestern divisions.

Credit is given to the various topographers, assistant topographers, and aids directly in charge under the headings of the several lists.

Computation.—The office computations were under the supervision of E. M. Douglas, geographer. The results were computed by the following members of the topographic branch, detailed from time to time to this work: D. H. Baldwin, T. M. Bannon, L. F. Biggs, D. S. Birkett, R. H. Chapman, C. E. Cooke, J. R. Ellis, J. I. Gayetty, G. T. Hawkins, Oscar Jones, C. B. Kendall, J. F. McBeth, Fred McLaughlin, F. J. McMaugh, E. L. McNair, C. L. Nelson, A. C. Roberts, H. S. Senseney, C. F. Urquhart, and J. H. Wilson. Mr. Biggs and Mr. Urquhart did all their computing in the Sacramento office. The data were compiled for publication by S. S. Gannett, geographer.

DATUM.

Wherever practicable, and unless otherwise stated, positions have been computed on North American datum.

STATION MARKS.

Permanent marks are placed at all occupied triangulation stations and at certain of the primary traverse stations, from 3 to 8 miles apart.

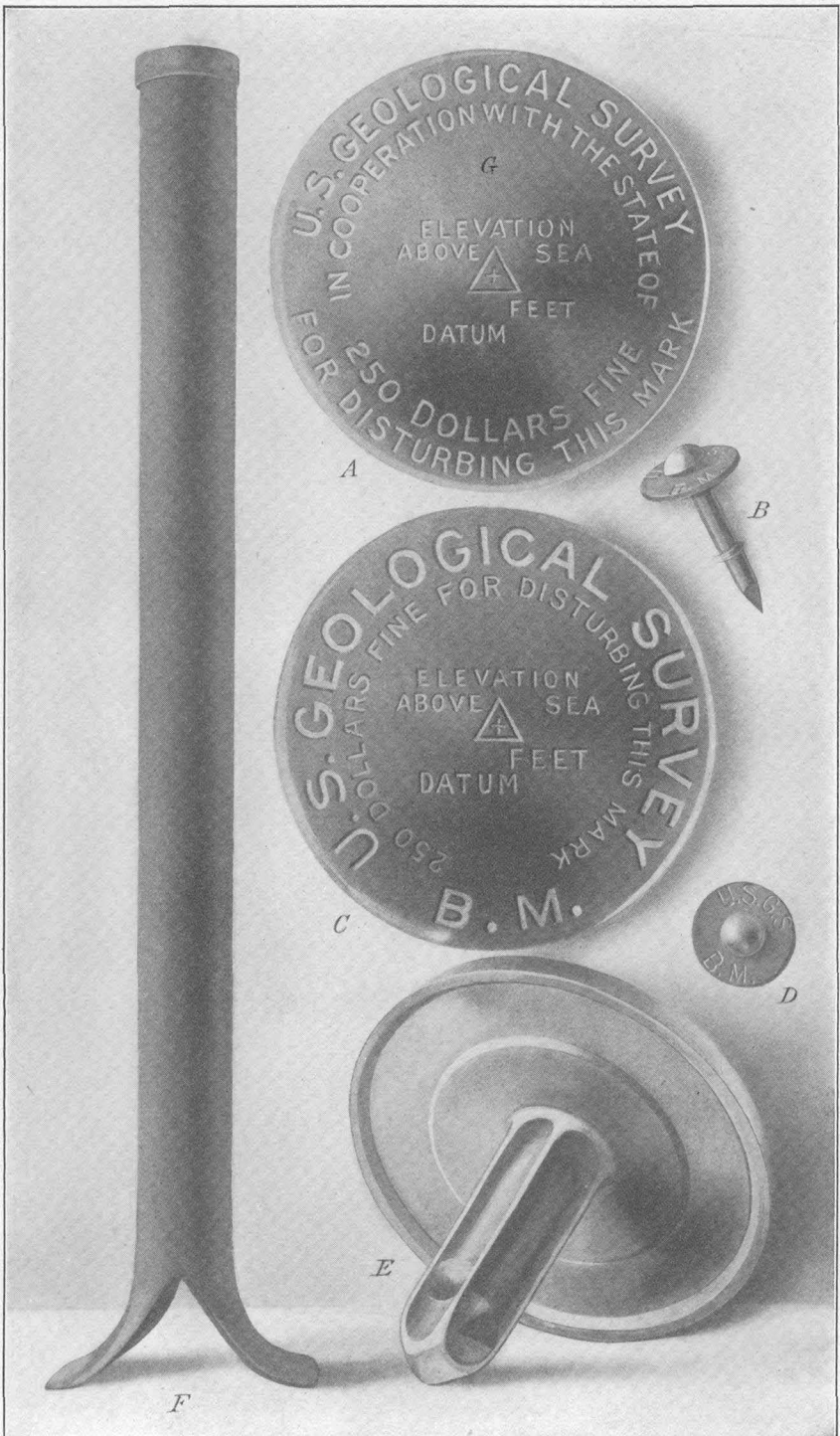
These marks are of the form adopted for leveling bench marks, and in many places the elevation as well as the latitude and longitude has been determined. The marks are of two forms. The first form is a circular bronze or aluminum tablet (*C* and *E*, Pl. II), $3\frac{1}{2}$ inches in diameter and one-fourth inch thick, having a 3-inch stem, which is cemented in a drill hole in solid rock in the wall of some public build-

ing, bridge, abutment, or other substantial masonry structure. The second form (*F*, Pl. II), set in the ground where no masonry or rock is available, consists of a hollow wrought-iron post $3\frac{1}{2}$ inches in outside diameter and 4 feet long. The bottom is spread out to a width of 10 inches in order to give a firm bearing on the earth. A bronze or aluminum-bronze cap is riveted over the top of the post. The tablets, as well as the caps on the iron posts, are appropriately lettered, and where States have cooperated in the work the fact of such cooperation is indicated by the addition of the State name (*G*, Pl. II).

SUMMARY.

Summary of triangulation and primary traverse, 1913-1915.

Locality.	Triangulation stations.	Traverse stations.
Alabama.....		143
Arizona-New Mexico.....	15	
California.....	183	
Colorado.....	98	
Colorado-Utah.....	27	
Idaho.....	47	
Idaho-Montana.....	176	
Illinois.....		873
Illinois-Wisconsin.....		137
Indiana.....		45
Iowa.....		165
Kansas-Nebraska.....		181
Kentucky.....	12	106
Louisiana.....		127
Maine.....		17
Maryland.....		197
Michigan.....		732
Michigan-Indiana.....		88
Minnesota.....		338
Minnesota-North Dakota-South Dakota.....		200
Mississippi.....		109
Missouri.....		1,019
Nevada.....	70	
New Jersey-New York-Pennsylvania.....	11	34
New Mexico.....	36	
New York.....	16	206
North Carolina.....		178
Oklahoma.....		225
Oregon.....	22	531
Tennessee-Arkansas.....		105
Texas.....	35	1,045
Utah.....	70	
Utah-Idaho.....	25	
Vermont.....	14	
Virginia-West Virginia.....		119
Washington.....	16	110
West Virginia.....	50	
Wisconsin.....		237
Wisconsin-Minnesota.....		89
Wyoming.....	7	
	930	7,356



GEOLOGICAL SURVEY STATION MARKS.

A, Tablet used in cooperating States. The State name is inserted at G.
 B and D, Copper temporary bench mark, consisting of a nail and copper washer.
 A, C, and E, Tablets for stone or concrete structures.
 F, Iron post used where there is no rock.