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22/TEM/9B

UNITED STATES GEOLOGICAL SURVEY

TEM-9B

TREASURE HILL AREA,  
LARIMER COUNTY, COLORADO

By  
Donald G. Wyant

This internal report is released in advance of publication,  
without editorial and technical review or approval of its  
usage of geologic names, to make the information avail-  
able to interested organizations and to stimulate the  
search for uranium deposits.

December 20, 1951  
[TIS Issuance Date]

Department of the Interior



Prepared by the Geological Survey for the  
UNITED STATES ATOMIC ENERGY COMMISSION  
Technical Information Service, Oak Ridge, Tennessee

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## TREASURE HILL AREA

Larimer County, Colorado

By Donald G. Wyant

### ABSTRACT

The Treasure Hill area consists of eight mining-lode claims in secs. 10 and 15, T. 9 N., R. 70 W., Larimer County, Colo. All of the workings were examined and samples were taken from most of them. The results of the examination indicate that there is little or no detectable radioactivity in the schist and granite of the area.

### INTRODUCTION

The Treasure Hill area is about 20 miles northwest of Fort Collins (figs. 1 and 2) in secs. 10 and 15, T. 9 N., R. 70 W., Larimer County, Colo. It may be reached over 2.5 to 3 miles of ungraded road from a point on U. S. Highway 287, 8 miles north of Ted's Place which is at the junction of U. S. Highway 287 and Colorado State Highway 14. The property consists of seven lode-mining claims owned jointly by Mrs. Mildred Davis, 345 Milwaukee Street, Denver, Colo., and by the Woodhams brothers, Orville and Clifford, of Bellevue, Colo., and one claim leased from Mrs. Ruth Casey, address unknown. The mining claims are known as the West Point and the Treasure Hill numbers 1, 2, 3, 4, 5, and 6 claims, and the Casey lease. They have been explored by three short inclined adits, three short shafts, one trench, seven pits, and one cut. The area was examined in the fall of 1948.

### GEOLOGY

The country rock of the area is granite, presumably pre-Cambrian in age, that megascopically resembles the Silver Plume granite. Enclosed in the granite are isolated bodies of pendants of schist, gneiss, and quartzite that are also presumably pre-Cambrian in age, possibly Idaho Springs schist or its equivalent. The average surface dimensions of these schist pendants are about 50 by 100 feet, but some are only 5 by 10 feet. The base of the pendants is exposed in some of the short shafts and inclined adits, and the assumption is made that the average depth of the pendants beneath the present land surface is of the same order of magnitude as the surface dimensions, i.e., 50 to 100 feet.

Schistosity usually parallels lithologic boundaries, but no general attitude of schistosity prevails in all of the individual blocks. Strikes vary from N. 90° W. to N. 15° E., and dips from vertical to 20°. It is probable that individual pendants have been either twisted and rotated, as might be expected during some types of granitic intrusion, or that structure prior to granitic invasion was complicated.

The pendants consist predominantly of quartz-chlorite to biotite schist, with subordinate impure quartzite and gneiss. Some of the schist contains as an important constituent small red garnets (?). Pyrrhotite,

marcasite (?), and secondary iron oxides were observed in the dump of the shaft on the Treasure Hill No. 2 claim. The schist, quartzite, and gneiss blocks have been intersected by numerous quartz-feldspar (granite) pegmatites, and by hornblende (?) dikes.

## RADIOACTIVITY

Observations with a Beckman Geiger-Mueller counter, detecting both gamma rays and beta particles, were made at all development workings in the area. In the examination 30 counter readings were made, and the instrument was observed during traverses over the area. Fifteen samples were taken from the most extensive workings or from workings exposing different rock types.

The average of the 30 readings taken with the counter at a sensitivity scale of 0.2 was from 0 to 4;  $\overline{1.5}$ \*. This reading is approximately the normal background established by observation at many places near Denver and in the Treasure Hill area. The equivalent uranium content of the 15 samples ranged from 0.000 to 0.003 per cent and averaged 0.001 per cent.

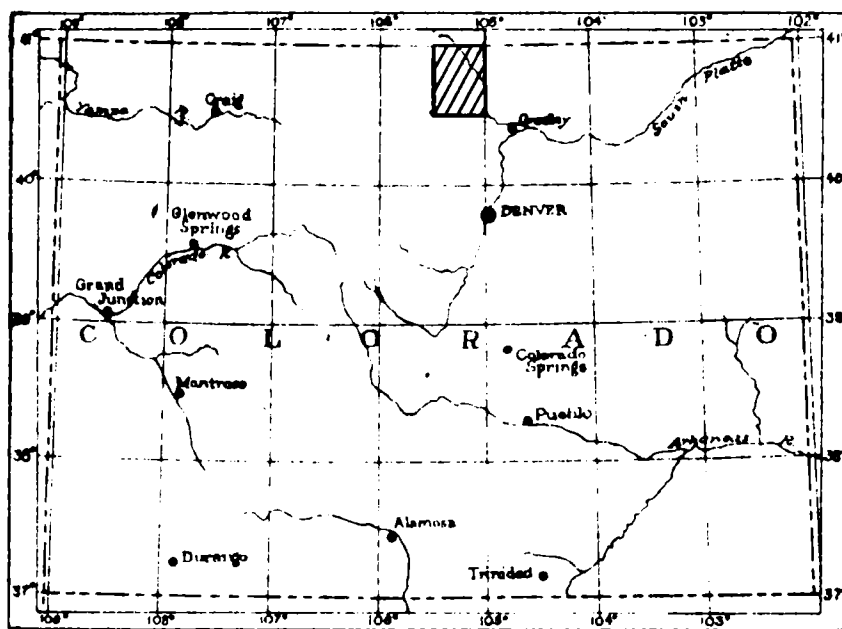


Figure 1. Index map showing location of Livermore quadrangle.

\*In an observation the milliampere dial was watched continuously for a minute and the minimum, maximum, and average scale readings were noted and recorded thus: 0-4;  $\overline{1.5}$ .

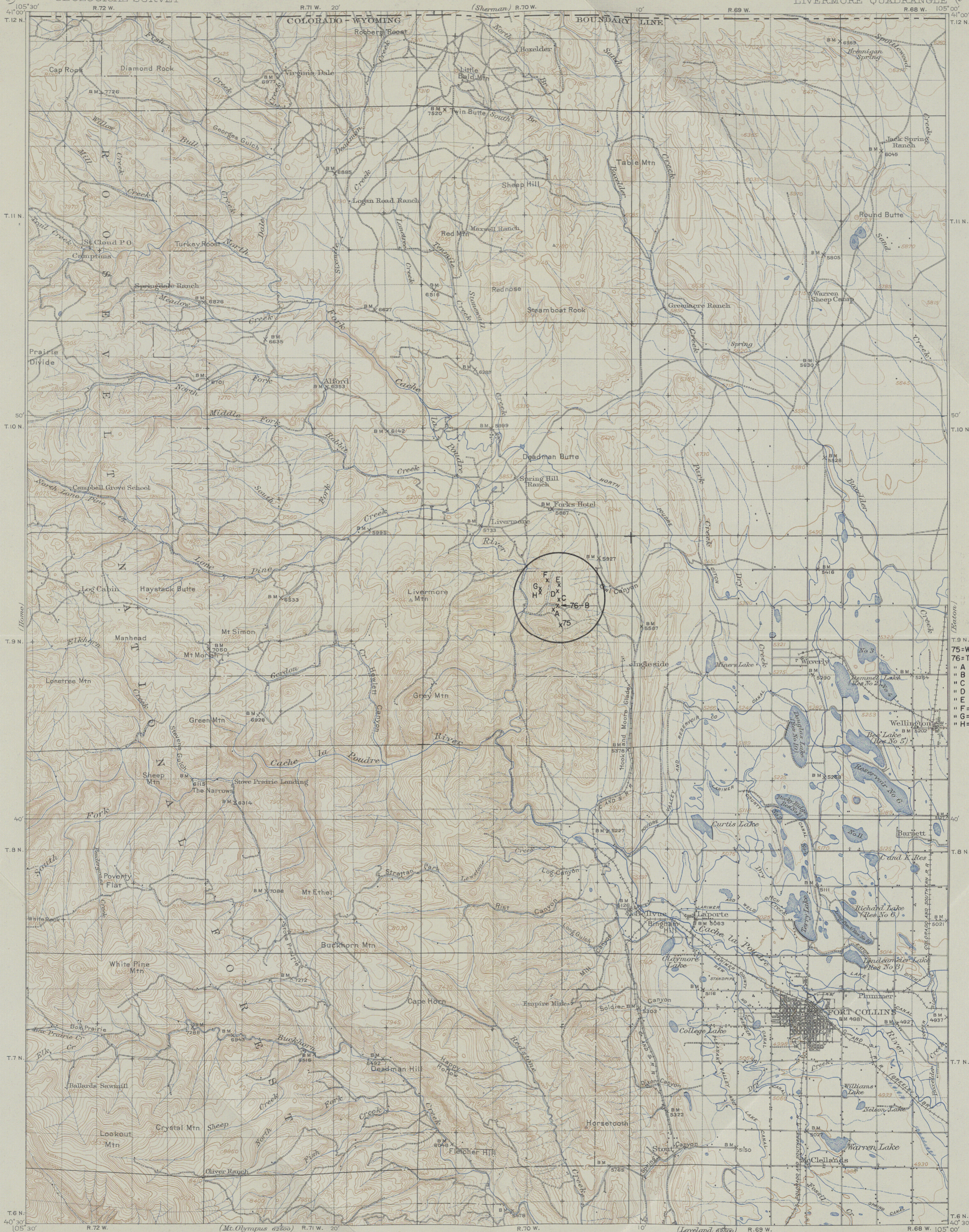
Field Sample No.	Length in ft. & type	Analyses		Description	Reference
		Field *	Laboratory % eU		
Dw-					Fig. 2
75 : 214	5, Chip	2.0	0.002	Schist, 2" quartz. Adit #1, West Point Claim	75
215	5, Chip	0.5	0.001	Schist, quartzite. Adit #1, West Point Claim	"
216	5, Chip	2.0	0.003	Decomposed granite. Adit #2, West Point Claim	"
217	-, Grab	2.5	0.000	Gossan, garnet (?) schist. Adit #2, West Point Claim	"
76 : 218	2.8, Chip	2.0	0.002	Schist, quartz-feldspar pegmatite, gneiss. Treasure Hill No. 5 Claim	76-A
219	2, Grab	1.0	0.000	Chlorite-schist. Face cut, Treasure Hill No. 5 Claim	76-B
220	.4, Grab	1.0	0.000	Hornblende (?) dike. Face cut, Treasure Hill No. 5 Claim	"
221	-, Grab	1.5	0.002	Fresh granite. Face inclined adit. T. H. No. 2 Claim	76-C
222	3.5, Chip	1.0	0.001	Garnet (?) schist, quartz, Sulfides. Face inclined adit, T. H. No. 2 Claim	"
223	-, Grab	1.5	0.001	Schist, iron oxides. Face inclined adit, T. H. No. 2 Claim	"
224	-, Grab	2.0	0.002	Schist, quartzite, MoS <sub>2</sub> (?), quartz. Dump shelf, T. H. No. 2 Claim. 3" pyrrhotite	76-D
225	3, Chip	2.0	0.002	Schist, quartzite, gneiss-3" pyrrhotite. Shaft T. H. No. 6 Claim	76-E
226	-, Grab	1.0	0.000	Garnet (?) schist, quartz. Dump pit, Casey Lease	76-F
227	3, Chip	2.0	0.000	Schist, quartz, quartz-feldspar-pegmatite. Face pit, T. H. No. 1 Claim	76-G
228	2.5, Chip	2.0	0.000	Schist gossan. Face pit, T. H. No. 1 Claim 150 ft. south from Sample 227	76-H

\* Average reading with Beckman counter at the outcrop; gamma and beta, scale 0.2.

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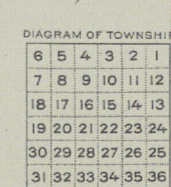
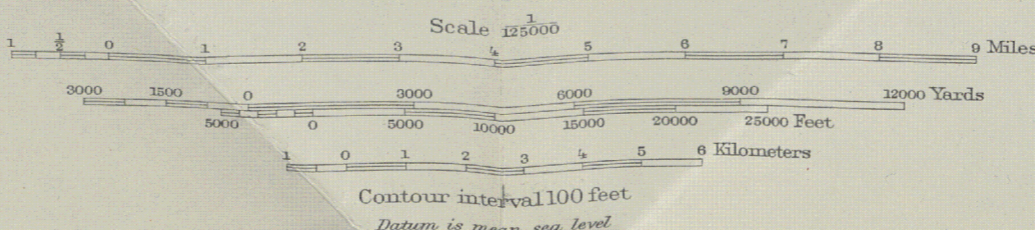




75=WEST POINT CLAIM  
76=TREASURE HILL CLAIMS  
"A" " " NO.5  
"B" " " NO.5  
"C" " " NO.2  
"D" " " NO.2  
"E" " " NO.6  
"F"=CASEY LEASE  
"G"=TREASURE HILL NO.1  
"H"= " " NO.1

E.M. Douglas and E.C. Barnard, Geographers in charge.  
Topography by Frank Tweedy and S.P. Floore.  
Control by R.H. Chapman and Frank Tweedy.  
Surveyed in 1905-1907.

APPROXIMATE MEAN  
DECLINATION 1907.



Edition of Dec. 1909, reprinted 1948  
Polyconic projection North American datum  
Map of the Fort Collins quadrangle,  
scale 1:62500, contour interval 20 feet,  
covering the southeast quarter of this quadrangle,  
is available

LIVERMORE, COLO.  
N4030-W10500/30

# THE TOPOGRAPHIC MAPS OF THE UNITED STATES

The United States Geological Survey is making a series of standard topographic maps to cover the United States. This work has been in progress since 1882, and the published maps cover more than 47 percent of the country, exclusive of outlying possessions.

The maps are published on sheets that measure about 16½ by 20 inches. Under the general plan adopted the country is divided into quadrangles bounded by parallels of latitude and meridians of longitude. These quadrangles are mapped on different scales, the scale selected for each map being that which is best adapted to general use in the development of the country, and consequently, though the standard maps are of nearly uniform size, the areas that they represent are of different sizes. On the lower margin of each map are printed graphic scales showing distances in feet, meters, miles, and kilometers. In addition, the scale of the map is shown by a fraction expressing a fixed ratio between linear measurements on the map and corresponding distances on the ground. For example, the scale  $\frac{1}{62,500}$  means that 1 unit on the map (such as 1 inch, 1 foot, or 1 meter) represents 62,500 of the same units on the earth's surface.

Although some areas are surveyed and some maps are compiled and published on special scales for special purposes, the standard topographic surveys and the resulting maps have for many years been of three types, differentiated as follows:

1. Surveys of areas in which there are problems of great public importance—relating, for example, to mineral development, irrigation, or reclamation of swamp areas—are made with sufficient detail to be used in the publication of maps on a scale of  $\frac{1}{31,250}$  (1 inch=one-half mile) or  $\frac{1}{25,000}$  (1 inch=2,000 feet), with a contour interval of 1 to 100 feet, according to the relief of the particular area mapped.

2. Surveys of areas in which there are problems of average public importance, such as most of the basin of the Mississippi and its tributaries, are made with sufficient detail to be used in the publication of maps on a scale of  $\frac{1}{62,500}$  (1 inch=nearly 1 mile), with a contour interval of 10 to 100 feet.

3. Surveys of areas in which the problems are of minor public importance, such as much of the mountain or desert region of Arizona or New Mexico, and the high mountain area of the northwest, are made with sufficient detail to be used in the publication of maps on a scale of  $\frac{1}{125,000}$  (1 inch=nearly 2 miles) or  $\frac{1}{250,000}$  (1 inch=nearly 4 miles), with a contour interval of 20 to 250 feet.

The aerial camera is now being used in mapping. From the information recorded on the photographs, planimetric maps, which show only drainage and culture, have been made for some areas in the United States. By the use of stereoscopic plotting apparatus, aerial photographs are utilized also in the making of the regular topographic maps, which show relief as well as drainage and culture.

A topographic survey of Alaska has been in progress since 1898, and nearly 44 percent of its area has now been mapped. About 15 percent of the Territory has been covered by maps on a scale of  $\frac{1}{500,000}$  (1 inch=nearly 8 miles). For most of the remainder of the area surveyed the maps published are on a scale of  $\frac{1}{250,000}$  (1 inch=nearly 4 miles). For some areas of particular economic importance, covering about 4,300 square miles, the maps published are on a scale of  $\frac{1}{62,500}$  (1 inch=nearly 1 mile) or larger. In addition to the area covered by topographic maps, about 11,300 square miles of southeastern Alaska has been covered by planimetric maps on scales of  $\frac{1}{250,000}$  and  $\frac{1}{500,000}$ .

The Hawaiian Islands have been surveyed, and the resulting maps are published on a scale of  $\frac{1}{62,500}$ .

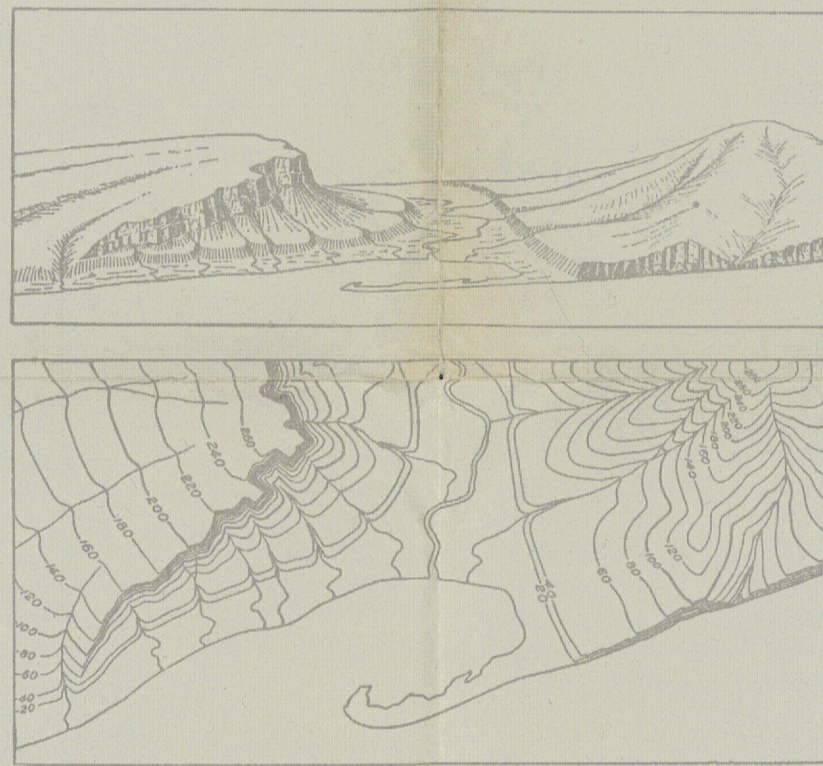
A survey of Puerto Rico is now in progress. The scale of the published maps is  $\frac{1}{30,000}$ .

The features shown on topographic maps may be arranged in three groups—(1) water, including seas, lakes, rivers, canals, swamps, and other bodies of water; (2) relief, including mountains, hills, valleys, and other features of the land surface; (3) culture (works of man), such as towns, cities, roads, railroads, and boundaries. The symbols used to represent these features are shown and explained below. Variations appear on some earlier maps, and additional features are represented on some special maps.

All the water features are represented in blue, the smaller streams and canals by single blue lines and the larger streams by double lines. The larger streams, lakes, and the sea are accentuated by blue water lining or blue tint. Intermittent streams—those whose beds are dry for a large part of the year—are shown by lines of blue dots and dashes.

Relief is shown by contour lines in brown, which on a few maps are supplemented by shading showing the effect of light thrown from the northwest across the area represented, for the purpose of giving the appearance of relief and thus aiding in the interpretation of the contour lines. A contour line represents an imaginary line on the ground (a contour) every part of which is at the same altitude above sea level. Such a line could be drawn at any altitude, but in practice only the contours at certain regular intervals of altitude are shown. The datum or zero of altitude of the Geological Survey maps is mean sea level. The 20-foot contour would be the shore line if the sea should rise 20 feet above mean sea level. Contour lines show the shape of the hills, mountains, and valleys, as well as their altitude. Successive contour lines that are far apart on the map indicate a gentle slope, lines that are close together indicate a steep slope, and lines that run together indicate a cliff.

The manner in which contour lines express altitude, form, and grade is shown in the figure below.



The sketch represents a river valley that lies between two hills. In the foreground is the sea, with a bay that is partly enclosed by a hooked sand bar. On each side of the valley is a terrace into which small streams have cut narrow gullies. The hill on the right has a rounded summit and gently sloping spurs separated by ravines. The spurs are truncated at their lower ends by a sea cliff. The hill at the left terminates abruptly at the valley in a steep scarp, from which it slopes gradually away and forms an inclined tableland that is traversed by a few shallow gullies. On the map each of these features is represented, directly beneath its position in the sketch, by contour lines.

The contour interval, or the vertical distance in feet between one contour and the next, is stated at the bottom of each map. This interval differs according to the topography of the area mapped: in a flat country it may be as small as 1 foot; in a mountainous region it may be as great as 250 feet. In order that the contours may be read more easily certain contour lines, every fourth or fifth, are made heavier than the others and are accompanied by figures showing altitude. The heights of many points—such as road intersections, summits, surfaces of lakes, and benchmarks—are also given on the map in figures, which show altitudes to the nearest foot only. More precise figures for the altitudes of benchmarks are given in the Geological Survey's bulletins on spirit leveling. The geodetic coordinates of triangulation and transit-traverse stations are also published in bulletins.

Lettering and the works of man are shown in black. Boundaries, such as those of a State, county, city, land grant, township, or reservation, are shown by continuous or broken lines of different kinds and weights. Public roads suitable for motor travel the greater part of the year are shown by solid double lines; poor public roads and private roads by dashed double lines; trails by dashed single lines. Additional public road classification if available is shown by red overprint.

Each quadrangle is designated by the name of a city, town, or prominent natural feature within it, and on the margins of the map are printed the names of adjoining quadrangles of which maps have been published. More than 4,100 quadrangles in the United States have been surveyed, and maps of them similar to the one on the other side of this sheet have been published.

Geologic maps of some of the areas shown on the topographic maps have been published in the form of folios. Each folio includes maps showing the topography, geology, underground structure, and mineral deposits of the area mapped, and several pages of descriptive text. The text explains the maps and describes the topographic and geologic features of the country and its mineral products. Two hundred twenty-five folios have been published.

Index maps of each State and of Alaska and Hawaii showing the areas covered by topographic maps and geologic folios published by the United States Geological Survey may be obtained free. Copies of the standard topographic maps may be obtained for 10 cents each; some special maps are sold at different prices. A discount of 40 percent is allowed on an order amounting to \$5 or more at the retail price. The discount is allowed on an order for maps alone, either of one kind or in any assortment, or for maps together with geologic folios. The geologic folios are sold for 25 cents or more each, the price depending on the size of the folio. A circular describing the folios will be sent on request.

Applications for maps or folios should be accompanied by cash, draft, or money order (not postage stamps) and should be addressed to

THE DIRECTOR,  
United States Geological Survey,  
Washington, D. C.

November 1937.

## STANDARD SYMBOLS

NOTE:—Effective on and after October 1, 1946, the price of standard topographic quadrangle maps will be 20 cents each, with a discount of 20 percent on orders amounting to \$10 or more at the retail rate.

CULTURE (printed in black)															
RELIEF (printed in brown)								WATER (printed in blue)							
WOODS (when shown, printed in green)															