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R. P. LAMONT, Secretary

COAST AND GEODETIC SURVEY

R. S. PATTON, Director

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# FIRST-ORDER LEVELING IN NEW JERSEY

By

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## GENERAL STATEMENT

This publication contains the descriptions and elevations of all bench marks in New Jersey whose elevations have been determined by first-order leveling executed by the United States Coast and Geodetic Survey. Some of the marks were established by the New Jersey Geological Survey and the Pennsylvania Railroad, but the elevations which are given in this publication were determined by the engineers of the United States Coast and Geodetic Survey.

Approximately 500 miles of first-order levels have been run within the limits of the State of New Jersey, as follows:

Line 1, Sandy Hook, N. J., to Harrisburg, Pa. (part).....	1881
Line 2, Red Bank to Elizabethport, N. J., via Staten Island, N. Y.....	1887
Line 3, Perth Amboy to Sandy Hook, N. J.....	1914
Line 4, Perth Amboy to Keyport, N. J.....	1925
Line 5, Perth Amboy to Atlantic City, N. J.....	1924
Line 6, Absecon to Cape May, N. J.....	1924
Line 7, Highlands to Absecon, N. J.....	1930
Line 8, Manahawkin to Beach Haven and Barnegat City, N. J.....	1930
Line 9, Sea Isle Junction to Camden, N. J.....	1930

A short paragraph descriptive of each line will be found at the beginning of the list of descriptions and elevations of bench marks for the line.

## INSTRUMENTS AND FIELD METHODS

Except for the lines in the northeastern part of the State, which were run in 1881 and in 1886-87, the leveling has all been done with instrumental equipment similar to that described in Coast and Geodetic Survey Special Publication No. 129, Geodetic Level and Rod.

The field work was done, with the exception noted in the preceding paragraph, in accordance with the specifications and instructions which are given in detail in Special Publication No. 140, Manual of First-order Leveling.

For the work done in 1881, 1886, and 1887, the field methods and equipment are described in Coast and Geodetic Survey Report for 1898-99, Appendix 8, pages 414-418. This publication is now out of print, but may be consulted at many libraries scattered throughout the country where copies are available.

## COMPUTATIONS AND ADJUSTMENT

The office computation of the leveling in New Jersey was carried out in accordance with instructions contained in Special Publication No. 140, Manual of First-order Leveling.

The leveling between Perth Amboy and Sandy Hook, and the line from Perth Amboy to Atlantic City, via Camden, were included in the 1929 general adjustment of the first-order level net. This adjustment is described briefly below.

At Sandy Hook and at Atlantic City the leveling was connected with the plane of mean sea level as defined by the elevations of tidal bench marks. The descriptions and elevations of these tidal bench marks are given in Special Publication No. 148, Tidal Bench Marks in New Jersey.

The leveling between Absecon and Cape May was adjusted to fit the 1929 general adjustment elevations at Absecon and the plane of mean sea level at Cape May as defined by the elevations of tidal bench marks. The descriptions and elevations of these tidal bench marks are given in Special Publication No. 148.

The leveling between Highlands and Absecon was fitted to the 1929 general adjustment elevations of bench marks at Highlands and Absecon.

Likewise the leveling from the Sea Isle Junction to Camden was fitted to the 1929 general adjustment elevations of bench marks at Camden and to the adjusted elevations of bench marks at Sea Isle Junction. The latter were derived from the adjustment of the line from Absecon to Cape May, as described above.

Thus, it will be seen that all first-order leveling in New Jersey has been adjusted for closure and is in harmony with the results of the 1929 general adjustment of the first-order level net.

## THE 1929 GENERAL ADJUSTMENT

In 1929 an adjustment of the combined level nets of the United States and Canada was made. The combined nets were connected with 21 tidal stations on the coasts of the United States and 5 such stations on the coasts of Canada. Over 66,000 miles of leveling, forming 270 closed circuits or connections between tidal stations, was included and gave rise to the 270 conditions which were satis-

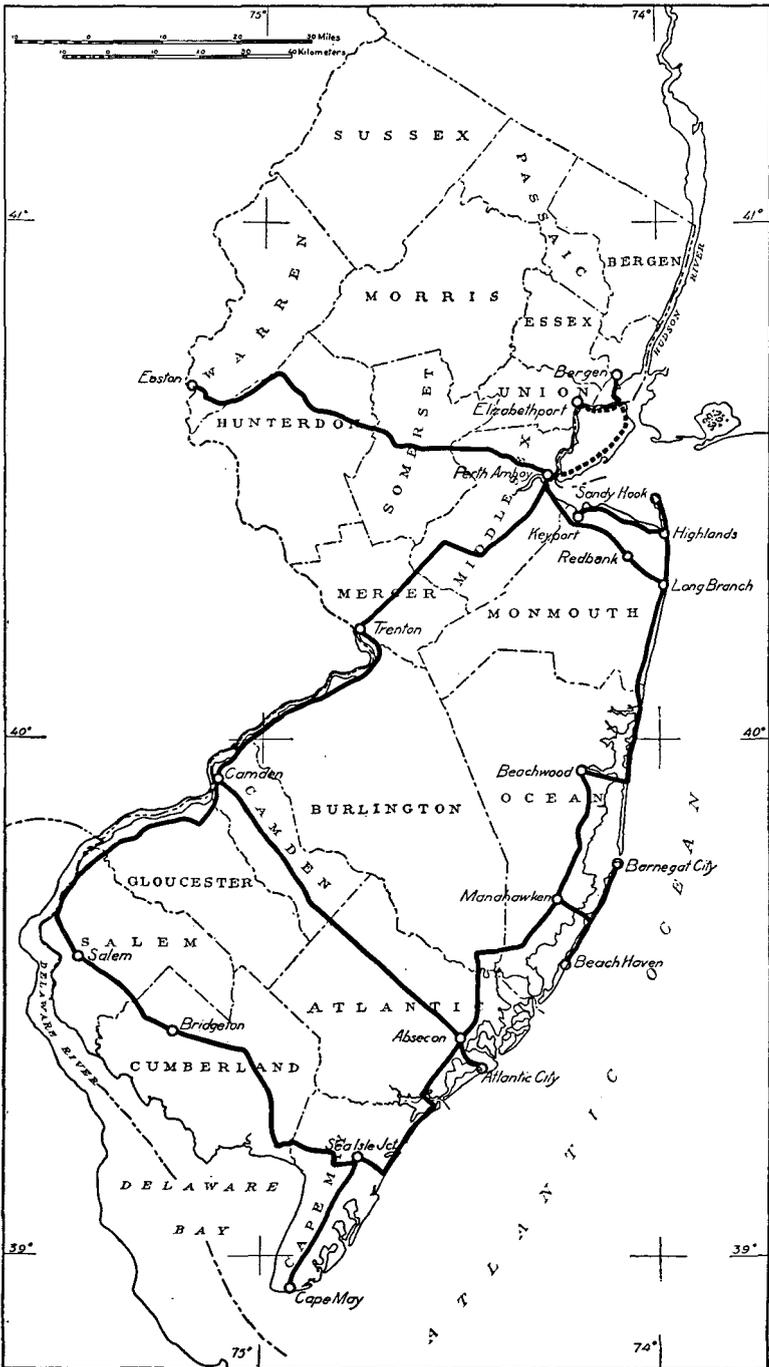


FIGURE 1.—Index map, showing leveling in New Jersey

fied by the least-squares adjustment. The elevations resulting from this adjustment are undoubtedly the best ones available at this time and may be considered as standard or final elevations for all engineering purposes.

### ORTHOMETRIC CORRECTION

Owing to the fact that the earth is an oblate spheroid, level surfaces at different elevations are not parallel but tend to converge slightly toward the poles of the earth. This necessitates the application of an orthometric correction to the observed differences of elevation in order that the resulting elevations of the bench marks may represent their true height above the sea-level surface. The orthometric correction and the methods used in computing it are discussed in detail in Special Publication No. 140, Manual of First-order Leveling.

The orthometric correction reaches its maximum on lines which trend north and south and run at high elevations, and it is zero on an east-and-west line. The majority of the leveling in New Jersey is at such a low elevation above sea level that the orthometric correction is extremely small and of no practical importance whatever. For the sake of consistency the orthometric correction was applied to the leveling in New Jersey, but in no case did it amount to more than three tenths of a millimeter between two consecutive bench marks, and in no case did the accumulated effect through a whole line of the leveling amount to as much as 2 millimeters.

### BENCH MARKS

The standard bench mark disk now used by the Coast and Geodetic Survey is shown in Figures 2 and 3. These disks are set in existing structures, in concrete posts cast in place for the special purpose, and in outcrops of rock where such outcrops are available. In the portions of New Jersey covered by most of this leveling, outcrops are of such rare occurrence that they were seldom available as sites for bench marks.

The concrete posts extend deep enough below the surface of the ground, in no case less than 4 feet, to be reasonably free from disturbance by frost action. They usually project a few inches above the ground to aid in their recovery.

### DESCRIPTIONS AND ELEVATIONS OF BENCH MARKS

In the following pages will be found the descriptions and elevations of all the bench marks in New Jersey whose elevations have been determined by this bureau. For a mark established by some other organization there will be found in parentheses, following the designation of the mark, the initials of the organization which established it. A question mark in parentheses "(?)" indicates that the organization is not known. The descriptions state the general and specific location of the mark as well as the character of the mark itself.

The elevations of the marks are given in both meters and feet. The value in feet was obtained from the metric elevation by using the conversion factor, 1 meter=3.2808333 feet. The only exceptions

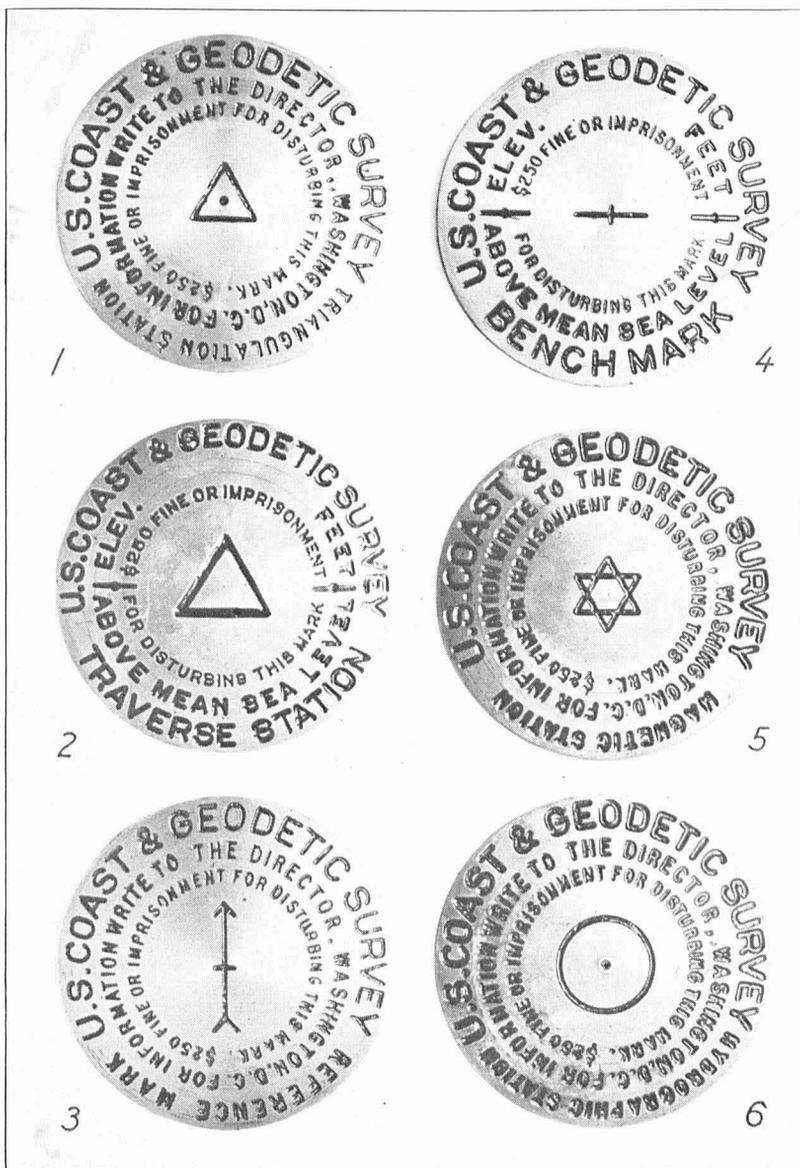


FIGURE 2.—STANDARD MARKS OF THE U. S. COAST AND GEODETIC SURVEY

- |                                |                               |
|--------------------------------|-------------------------------|
| 1. Triangulation station mark. | 4. Bench mark.                |
| 2. Traverse station mark.      | 5. Magnetic station mark.     |
| 3. Reference mark.             | 6. Hydrographic station mark. |

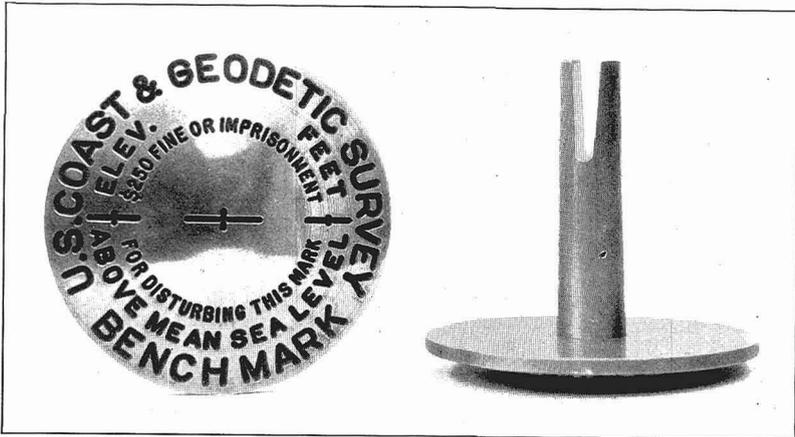


FIGURE 3.—STANDARD BENCH MARK DISK, SHOWING SHANK BY WHICH IT IS FASTENED IN PLACE

are for bench marks Tidal 18 and Basic Bench Mark at Atlantic City and Tidal 3 at Cape May (Cold Spring Inlet), the elevations of which were determined in feet and converted to metric units for use in the adjustment.

Since the completion of the leveling covered by this report a few of the marks are known to have been disturbed or destroyed, and in such cases appropriate notes are appended to the descriptions.

For bench marks known to have been destroyed the descriptions are omitted, but the elevations, based on the 1929 general adjustment, are given for the use of the engineers who may have tied systems of level lines to these marks and who may wish to change their elevations to agree with the 1929 general adjustment elevations of the first-order marks used by them.

**LINE 1, SANDY HOOK, N. J., TO EASTON, PA.**

This line follows, throughout the most of its length, the Central Railroad of New Jersey from Sandy Hook, N. J., through Highlands, Sea Bright, Oceanport, Red Bank, Matawan, South Amboy, Metuchen, South Plainfield, Bound Brook, Somerville, Annandale, and Bloomsbury, N. J., to Easton, Pa. The field work was done by Assistant Andrew Braid during the summer of 1881.

**T. H.**—Destroyed. (3.488 meters or 11.444 feet.)

**A.**—Destroyed. (3.475 meters or 11.401 feet.)

**B.**—Destroyed. (2.863 meters or 9.393 feet.)

**C.**—At **Sandy Hook**, Monmouth County, in the wall of the main lighthouse tower, a few inches west of the northwest angle of the tower and  $9\frac{1}{4}$  inches above the sloping ledge near its base. A cross on the head of a copper bolt. (5.900 meters or 19.357 feet.)

**No. I.**—At **Sandy Hook**, Monmouth County, at the southwest corner of the fort and on the center of the inner edge of the second embrasure. (4.720 meters or 15.486 feet.)

**No. II.**—About  $\frac{3}{4}$  mile north of the station at **Highlands**, Monmouth County, on the east side of the track of the Central Railroad of New Jersey. The top of a heavy granite post which projects about 2 feet above the ground. (2.321 meters or 7.615 feet.)

**No. III.**—At **Navesink Highlands**, Monmouth County, about 43 feet south of the southernmost lighthouse tower. A mark on the top of a heavy granite post. (61.714 meters or 202.473 feet.)

**D.**—At **Navesink Highlands**, Monmouth County, at the southeast corner of the base of the southernmost lighthouse tower and on the sloping ledge. The bottom of a square cavity. (63.274 meters or 207.591 feet.)

**No. IV.**—At **Sea Bright**, Monmouth County, at the bridge over South Shrewsbury River, on the north wing wall of the west abutment. The bottom of a square cavity. (2.822 meters or 9.259 feet.)

**No. V.**—About  $1\frac{1}{2}$  miles north of the Central Railroad of New Jersey station at **Branchport**, Monmouth County, on the south pier of the **Oceanport Drawbridge**. The bottom of a square cavity. (1.060 meters or 3.478 feet.)

**E.**—At **Red Bank**, Monmouth County, in the southwest corner of the intersection of Monmouth and Pearl Streets, and near the southeast corner of the house of the Rev. B. F. Leipser. The top of a marble post. (11.728 meters or 38.478 feet.) It was reported in 1887 that ownership of the property had changed and that the house then belonged to Van Dyke Reed. A new porch, resting on a brick foundation, is flush with the east edge of the bench mark and covers about one-third of it. The bricks of the foundation do not rest upon the marble post, which is over 5 feet long and projects about 5 inches above the ground.

**No. VI.**—At **Matawan**, Monmouth County, on Main Street, in front of the house of Benjamin Tuttle. The center of a triangle cut on a flagstone. (16.860 meters or 55.315 feet.) This elevation was derived from the leveling of 1887. The leveling of 1881 gave an elevation of 16.788 meters or 55.079

feet. This mark was reported by the chief engineer of the Board of Estimate and Apportionment of the City of New York as probably destroyed.

**No. VII.**—Near the Central Railroad of New Jersey station at **Morgan**, Middlesex County, on the southeast pier of the drawbridge over Cheesequake Creek. The center of a chiseled triangle. (1.705 meters or 5.594 feet.)

**No. VIII.**—Destroyed. (4.437 meters or 14.557 feet.)

**F.**—Destroyed. (2.364 meters or 7.756 feet.)

**No. IX.**—At **Metuchen**, Middlesex County, at the stone bridge carrying the tracks of the Pennsylvania Railroad over the Lehigh Valley Railroad, on the west end of the south wall. A small circular cavity within a chiseled triangle. (25.495 meters or 83.645 feet.)

**No. X.**—At **South Plainfield**, Middlesex County, about 500 feet east of the Lehigh Valley Railroad station, at the northwest corner of a small iron railroad bridge. The bottom of a small square cavity, flanked by the letters "B. M." cut in the stone abutment. (19.466 meters or 63.865 feet.)

**No. XII.**—About  $\frac{3}{4}$  mile west of the Lehigh Valley Railroad station at **New Market**, Middlesex County, on the south end of a small railroad bridge. The bottom of a chiseled square surrounded by the letters "B. M. XII" cut in the stone. (14.994 meters or 49.193 feet.)

**No. XI.**—About  $\frac{1}{4}$  mile east of **Bound Brook**, Somerset County, on the northeast corner of the stone abutment of the Central Railroad of New Jersey bridge. The bottom of a chiseled square, flanked by the letters "B. M." cut in the stone. (9.907 meters or 32.503 feet.)

**No. XIII.**—At **Bound Brook**, Somerset County, at the road bridge over the Raritan River and Canal and on the west end of the north abutment. The bottom of a chiseled square flanked by the letters "B. M." cut in the stone. (10.901 meters or 35.764 feet.)

**No. XIV.**—At **Somerville**, Somerset County, in the grounds of the county courthouse, in the top of the true meridian monument of the State survey. The bottom of a circular cavity in the top of the granite monument. (24.946 meters or 81.844 feet.)

**G.**—At **Somerville**, Somerset County, at the county courthouse, in the stone at the base of the easternmost pillar on the front of the building. The bottom of a chiseled square surrounded by the letters "G. B. M. U. S. C. & G. S. 1881" cut in the stone. (27.836 meters or 91.325 feet.)

**No. XV.**—Near the Central Railroad of New Jersey station at **North Branch**, Somerset County, at the southwest corner of the railroad bridge over the north branch of the Raritan River. The bottom of a chiseled square surrounded by the letters "B. M. XV" cut in the stone. (25.887 meters or 84.931 feet.)

**No. XVI.**—About 1 mile east of **Annandale**, Hunterdon County, at an overhead bridge, on a projecting stone near the center of the north abutment wall. The original description does not mention the character of the mark; but it is probably the bottom of a chiseled square, and some lettering may be found cut in the stone near the mark. (108.264 meters or 355.196 feet.)

**No. XVII.**—About  $\frac{1}{4}$  mile west of **Bloomsbury**, Hunterdon County, on the northwest corner of a stone bridge carrying the Central Railroad of New Jersey over a wagon road. The bottom of a chiseled square surrounded by the letters "B. M. 1881" cut in the stone. (99.473 meters or 326.354 feet.)

**No. XVIII.**—About  $\frac{1}{2}$  miles east of **Phillipsburg**, Warren County, at the Central Railroad of New Jersey bridge over the Delaware and Lackawanna Canal, on the east end of the north parapet. The bottom of a chiseled square, surrounded by the letters "B. M. 1881" cut in the coping stone. (80.204 meters or 263.136 feet.)

The line continues into Pennsylvania.

In 1886 two additional marks were established at Sandy Hook, as follows:

**T of 1886.**—At **Sandy Hook**, Monmouth County, on the western slope of the high ridge, just east of the old New Jersey Southern Railroad wharf, 375 feet west of the western corner of the roundhouse, below the crest of the ridge and sheltered by vegetation. The bottom of a  $\frac{1}{2}$ -inch chiseled square in the top of a marble post. The upper part of the post is dressed and the letters "U. S. C. S." are carved in the top surface of the post. (3.280 meters or 10.761 feet.) Recovered as described in 1923.

**U of 1886.**—Destroyed. (1.877 meters or 6.158 feet.)

**LINE 2, RED BANK TO ELIZABETHPORT, N. J., VIA STATEN ISLAND, N. Y.**

This line extends from Red Bank to Keyport, with spur lines to Port Monmouth and Conaskonk Point; from Keyport to South Amboy and Perth Amboy; along the southeast and northeast shores of Staten Island to Elizabethport, N. J., with a spur line to Constable Hook and Bergen. The field work was done in 1886 and 1887 by Assistant John B. Weir and Subassistant J. E. McGrath.

**E.**—See page 5.

**S.**—At **Port Monmouth**, Monmouth County, at the northeast corner of the piazza of Captain Bowman's house. The center of a chiseled cross in the east face of a brick in the upper course of the brick pier. (3.556 meters or 11.667 feet.)

**Port Monmouth Tidal B. M.**—At **Port Monmouth**, Monmouth County, at the northeast corner of the piazza of Captain Bowman's house. The upper surface of the brick on which Bench Mark S, described above, is cut. (3.576 meters or 11.732 feet.)

**R.**—At **Keyport**, Monmouth County, on the south side of Front Street, about 30 yards east of the center line of Broad Street, at the building of the Keyport Banking Co., on the east end of the stone doorsill. A chiseled cross. (7.017 meters or 23.022 feet.) This elevation is based on leveling in 1914.

**Conaskonk Point Tidal B. M.**—At **Conaskonk Point**, Monmouth County, near the Monmouth House. The top of a nail driven in a silver poplar tree. (3.960 meters or 12.992 feet.)

**No. VI.**—See page 5.

**South Amboy Tidal B. M.**—Destroyed. (2.188 meters or 7.178 feet.)

**No. VIII.**—See page 6.

**F.**—See page 6.

**State Geological Survey B. M.**—At **Perth Amboy**, Middlesex County, in the center of High Street, 97.75 feet southwesterly along the center line of High Street from the center line of Market Street, in the public park, in a triangular grass plot. The top of a granite post. (18.576 meters or 60.945 feet.)

The line then crosses to Staten Island, N. Y. A spur line extends to Constable Hook and Bergen and the line also extends to Elizabethport where it ends.

**Constable Hook B. M.**—Destroyed. (2.732 meters or 8.963 feet.)

**P.**—Destroyed. (2.953 meters or 9.688 feet.)

**Q.**—Destroyed. (4.070 meters or 13.353 feet.)

**Elizabethport Tidal B. M.**—At **Elizabethport**, Union County, at the southeast corner of Worrall & Co.'s foundry and in the seventh course of brick from the ground. A chiseled cross, flanked by the letters "U. S." cut in the brick wall. (3.779 meters or 12.398 feet.) This elevation was determined by Frederick W. Koop, assistant engineer, Board of Estimate and Apportionment of the City of New York and is based on an adjustment of the first-order leveling of that organization which was held fixed in the 1929 general adjustment of the first-order level net.

**LINE 3, PERTH AMBOY TO SANDY HOOK, N. J.**

This line extends from Perth Amboy, N. J., through Morgan, Matawan, Keyport, Port Monmouth, and Highland Beach to Sandy Hook, N. J. The field work was done in 1914 by Assistant R. P. Strough.

**State Geological Survey B. M.**—See above.

**D 1.**—At **Perth Amboy**, Middlesex County, on the masonry of the northwest pier of the Central Railroad of New Jersey drawbridge between Perth Amboy and South Amboy. A chiseled square. (6.039 meters or 19.813 feet.)

**C 1.**—At **South Amboy**, Middlesex County, on the east side of the Pennsylvania Railroad station at South Amboy Junction, about 3 feet north of the door and 4 feet above the ground. A chiseled cross in a brick. (6.517 meters or 21.381 feet.) This elevation is based on leveling in 1924.

**B 1.**—At **Morgan**, Middlesex County, on the Central Railroad of New Jersey drawbridge over Cheesecake Creek, on top of the southwest bridge pier,

between the wooden beams at the southwest corner of the bridge, on the concrete. A shallow chiseled square. (2.991 meters or 9.813 feet.)

**K 1.**—At **Morgan**, Middlesex County, on the Central Railroad of New Jersey drawbridge over Cheesequake Creek, on the northeast bridge pier. A deep chiseled square. There is one of these squares on each pier of this bridge. This mark is also a railroad bench mark. (1.888 meters or 6.194 feet.) This elevation is based on leveling in 1924.

**A 1.**—At **Matawan**, Monmouth County, on the front (north side) of the Aberdeen Hotel, about 9 yards south of the north side of the building, about 1.5 meter west of a door, and about 2.5 feet above the floor of the porch. A chiseled cross cut in the brick wall. (12.879 meters or 42.254 feet.)

**E 1.**—At **Keyport**, Monmouth County, on the north side of the Central Railroad of New Jersey station, in the east end of the doorstep. A standard disk. (11.098 meters or 36.411 feet.)

**R.**—See page 7.

**F 1.**—At **Lorillard**, Monmouth County, about 650 feet east of the railroad station, on a small masonry bridge, in the top of the northwest pier. A standard disk. (4.138 meters or 13.576 feet.)

**G 1.**—At **Port Monmouth**, Monmouth County, south of the railroad track, east of the road crossing near the station, in the northwest corner of the brick wall around the cellar of a house. A standard disk. (4.291 meters or 14.078 feet.)

**H 1.**—At **Atlantic Highlands**, Monmouth County, at a brick building just south of the railroad station, at the north side of Antonide's Drug Store, in the stone doorstep. A standard disk. (4.163 meters or 13.658 feet.)

**I 1.**—About 0.9 mile west of the railroad station at **Water Witch**, Monmouth County, in the concrete base of a signal pole on the north side of the track, close to the sea wall. A standard disk. (2.819 meters or 9.249 feet.)

**J 1.**—At **Highland Beach**, Monmouth County, at the railroad drawbridge between Highlands and Highland Beach, in the top of the east bridge pier. A standard disk. (4.144 meters or 13.596 feet.)

**L 1 (U. S. A.).**—At **Sandy Hook**, Monmouth County, near the office at the Sandy Hook proving grounds, about 200 feet northwest of a small water tank which is located on the opposite side of the tracks from the office building. A copper bolt, set in the top of a granite post which in turn is set in concrete. (2.555 meters or 8.383 feet.)

**Y.**—At **Sandy Hook**, Monmouth County, about 10 feet northeast of the northeast corner of the Army engineer's building near the wharf. A cross cut in the top of an iron bolt set in cement. (3.742 meters or 12.277 feet.)

**C.**—See page 5.

#### LINE 4, PERTH AMBOY TO KEYPORT, N. J.

The field work on this line was done in 1925 by Herman Odessey, junior hydrographic and geodetic engineer.

**State Geological Survey B. M.**—See page 7.

**B 5.**—At **Perth Amboy**, Middlesex County, at the corner of High and Market Streets, at the Baptist Church, about 12 feet from the south corner of the church, about 9½ feet south of the center of the High Street door, midway between the bottom step and the concrete coping to the basement grating, and about 1 foot above the concrete walk. A standard disk, stamped "B 5 1925." (19.693 meters or 64.609 feet.)

**C 5.**—At **Perth Amboy**, Middlesex County, at the corner of Maple and Jefferson Streets, at the post office, on the south side of the steps at the Maple Street entrance, in a large flat slab of stone, 23 inches from each side of the slab, 26 inches back of the center of an iron pedestal supporting a cluster of lights, and 14½ inches from the face of the wall. A standard disk, stamped "C 5 1925." (14.123 meters or 46.335 feet.)

**C. 1.**—See page 7.

**D 5.**—At the northern edge of **South Amboy**, Middlesex County, about 300 yards south of the Pennsylvania Railroad station at South Amboy Junction, at the bridge carrying the Pennsylvania Railroad tracks over the tracks of the Central Railroad of New Jersey, in the northwest corner of the pier which is midway between the northbound and southbound tracks. A standard disk, stamped "D 5 1925." (3.408 meters or 11.181 feet.)

**K 1.**—See above.

**E 5.**—About 2½ miles southeast of the Pennsylvania Railroad station at **South Amboy Junction**, Middlesex County, at the highway bridge over Cheesequake Creek, about 9 feet northeast of the southwest end of the west abutment and 48½ inches northeast of a "U. S. Harbor Line Reference Mark." A standard disk, stamped "E 5 1925." (4.176 meters or 13.701 feet.)

A 1.—See page 8.

**Brass Bolt.**—At **Matawan**, Monmouth County, about 75 yards southeast of the Aberdeen Hotel, at the railroad station, 15 yards north of the ticket office, in the concrete footing for the most northerly column supporting the shed, in the southeast corner of the southwest side of the footing. A brass bolt. (12.512 meters or 41.050 feet.)

E 1.—See page 8.

**F 5.**—At **Keyport**, Monmouth County, about 100 yards northeast of the Central Railroad of New Jersey station, at the Keyport High School, about 5 yards west of the north entrance, on the west face of the north side of a small projection of the building, and 32 inches above the ground. A standard disk, stamped "F 5 1925," and set vertically in the brick wall. (11.283 meters or 37.018 feet.)

**21.61 (N. J. G. S.)**—At **Keyport**, Monmouth County, at the red brick synagogue at No. 60 Broad Street, about 6 inches above the sidewalk, on the north side of the limestone doorsill. A chiseled cross. (6.619 meters or 21.716 feet.)

R.—See page 7.

#### LINE 5, PERTH AMBOY TO ATLANTIC CITY, N. J.

The field work on this line was done during the summer of 1924 by E. B. Roberts, junior hydrographic and geodetic engineer, and J. C. Bose, aid. The line follows the Pennsylvania Railroad through Trenton to Camden; the Philadelphia & Reading Railway from Camden to a point about 10 miles west of Atlantic City, at which point the line crosses over and again follows the Pennsylvania Railroad for a more convenient entry into Atlantic City and a better approach to the previously established tidal bench marks at that place.

**State Geological Survey B. M.**—See page 7.

C 1.—See page 7.

K 1.—See page 8.

**64 (P. R. R.)**—About 1⅓ miles south of **South Amboy**, Middlesex County, at the Raritan River Railroad bridge over the Pennsylvania Railroad, on the face of the north abutment, about 3 feet above the ground. A shelf in the masonry. (24.785 meters or 81.315 feet.)

**A 2.**—About 1⅓ mile south of **South Amboy**, Middlesex County, at the Raritan River Railroad bridge over the Pennsylvania Railroad, in the north abutment, 15 feet south of the north wing wall, and 1 foot above the ground. A standard disk, stamped "A 2 1924." (24.434 meters or 80.164 feet.)

**B 2.**—About ½ mile south of **Ernston**, Middlesex County, on the Trenton Division of the Pennsylvania Railroad, at the northeast end of the reservation of the Du Pont Bronze Co., 35.8 feet northwest of the northwest rail, 5 feet west of a country road which crosses the tracks, and 2.8 feet from the fence bounding the reservation. A standard disk, stamped "B 2 1924." and set in the top of a concrete post. (28.372 meters or 93.084 feet.)

**C 2.**—About ½ mile south of **Runyon**, Middlesex County, on the Trenton Division of the Pennsylvania Railroad, opposite milepost 6-55, in the top of the concrete foundation of the water tower, and 3.8 feet south of the south rail of the main-line tracks. A standard disk, stamped "C 2 1924." (3.494 meters or 11.463 feet.)

**58 (P. R. R.)**—At **Old Bridge**, Middlesex County, on the Trenton Division of the Pennsylvania Railroad, 200 yards east of the station, at the southeast corner of the pump house. A square cut in the masonry foundation. (3.453 meters or 11.329 feet.)

**7.54 (N. J. G. S.)**—At **Old Bridge**, Middlesex County, on the Trenton Division of the Pennsylvania Railroad, about 200 yards east of the station, at the railroad bridge over the creek, in the top of the northwest end of the south abutment. A cross cut in the masonry. (2.307 meters or 7.569 feet.)

**D 2.**—At **East Spotswood**, Middlesex County, on the Trenton Division of the Pennsylvania Railroad,  $1\frac{1}{2}$  rails south of the south end of the station platform, 21.5 feet west of the west rail, and 35 feet east of the east edge of the traveled way of the Old Bridge-Jamesburg road. A standard disk, stamped "D 2 1924," and set in the top of a concrete post. (8.090 meters or 26.542 feet.)

**28.21 (N. J. G. S.)**.—At **Spotswood**, Middlesex County, on the Trenton Division of the Pennsylvania Railroad, 100 yards northeast of the railroad station, on the northwest corner of the concrete base of the semaphore. A chiseled cross. (8.653 meters or 28.389 feet.)

**56 (P. R. R.)**.—At **Spotswood**, Middlesex County, on the Trenton Division of the Pennsylvania Railroad, 20 feet west of the station, in the center of the driveway along the freight platform. A square cut in the top of a stone monument. (8.382 meters or 27.500 feet.)

**E 2.**—About  $\frac{3}{4}$  mile west of **Spotswood**, Middlesex County, on the Trenton Division of the Pennsylvania Railroad, 27 rails west of milepost 51-10,  $1\frac{3}{4}$  rails west of a farm-road crossing, 8 feet south of the south rail, in the top of the southeast corner of the concrete base of a semaphore. A standard disk, stamped "E 2 1924." (9.859 meters or 32.346 feet.)

**44.07 (N. J. G. S.)**.—At **Helmetta**, Middlesex County, in the northeast section of the city, on the north face of the public school, at the first window to the left of the entrance, in the center of the sill. A chiseled cross. (13.489 meters or 44.255 feet.)

**40.39 (N. J. G. S.)**.—At **Helmetta**, Middlesex County, at the George W. Helme Co.'s plant, in the east face of the northeast corner of the boiler house, in the north end of the window sill. A chiseled cross. (12.374 meters or 40.597 feet.)

**55 (P. R. R.)**.—At **Helmetta**, Middlesex County, on the south parapet of a culvert on the public road. A chiseled square. (12.710 meters or 41.699 feet.)

**55 A (P. R. R.)**.—At **Helmetta**, Middlesex County, on the doorsill of the brick store. A chiseled square. (12.753 meters or 41.840 feet.)

**F 2.**—About 1 mile south of **Helmetta**, Middlesex County, on the Trenton Division of the Pennsylvania Railroad, 74 feet east of a bridge over the tracks, 26.5 feet west of a whistle post, and 15.5 feet north of the north rail, in line with the telegraph poles. A standard disk, stamped "F 2 1924," and set in the top of a concrete post. (17.617 meters or 57.798 feet.)

**53 (P. R. R.)**.—At **Jamesburg**, Middlesex County, at the Gatsmer Avenue Bridge, on the west abutment, in the north end of the bridge seat. A copper bolt. (23.716 meters or 77.808 feet.)

**52 (P. R. R.)**.—At **Jamesburg**, Middlesex County, at the northeast corner of the engine house, in the lower course of masonry. A chiseled square. (24.692 meters or 81.010 feet.)

**G 2.**—About 2 miles northwest of **Jamesburg**, Middlesex County, on the Trenton Division of the Pennsylvania Railroad, in the west face of the southwest concrete abutment of a bridge, 12.5 feet south of the south rail, and about 1.5 feet higher than the top of the rail. A standard disk, stamped "G 2 1924." (39.229 meters or 128.704 feet.)

**H 2.**—At **Dayton**, Middlesex County, at the Pennsylvania Railroad station,  $127\frac{1}{2}$  feet west of the semaphore at the crossing of the Dayton-Deans highway, 18.3 feet south of the south rail, and 6 feet from the right-of-way fence, in line with the row of telegraph poles. A standard disk, stamped "H 2 1924," and set in the top of a concrete post. (31.798 meters or 104.324 feet.)

**I 2.**—At **Monmouth Junction**, Middlesex County, about 150 feet west of the Pennsylvania Railroad station, in the south foundation of signal bridge No. 410,  $48\frac{1}{2}$  feet southwest of the southwest corner of the concrete platform at the station, 11 feet south of the south rail, and about 12 feet north of the south right-of-way fence. A standard disk, stamped "I 2 1924." (27.546 meters or 90.374 feet.)

**90.94 (N. J. G. S.)**.—At **Monmouth Junction**, Middlesex County, at the Pennsylvania Railroad station, on the west side of the building, at the north entrance, on the south end of the sill. A chiseled cross. (27.747 meters or 91.033 feet.)

**J 2.**—About  $2\frac{1}{2}$  miles west of the Pennsylvania Railroad station at **Monmouth Junction**, Middlesex County, about 17 feet east of the center of the traveled way at Shock's crossing and 11 feet north of the north rail. A standard disk, stamped "J 2 1924," and set in the top of a concrete post. (22.279 meters or 73.094 feet.)

**K 2.**—At **Plainsboro**, Middlesex County, about 300 feet east of the station, at a bridge over the Pennsylvania Railroad, 5 feet north of the north rail, and

6¼ feet east of the most westerly end of the north abutment, in the second course from the bottom. A standard disk, stamped "K 2 1924." (24.458 meters or 80.243 feet.)

**L 2.**—At **Princeton Junction**, Mercer County, at the Pennsylvania Railroad station, 28½ feet north of the east end of the brick platform, 24½ feet west of the northwest foundation of signal bridge No. 471, about 22 feet east of milepost 43-47, and about 9 feet north of the north rail of the Princeton Branch. A standard disk, stamped "L 2 1924," and set in the top of a concrete post. (24.768 meters or 81.260 feet.)

**48 A.**—At **Princeton Junction**, Mercer County, in the doorsill of the Pennsylvania Railroad station. A copper bolt. (25.844 meters or 84.790 feet.)

### Spur line to Princeton, N. J.

**M 2.**—At **Princeton**, Mercer County, at the Pennsylvania Railroad station, about 5½ feet below the top of the south face of the concrete platform, 6 feet southwest of the southwest rail, and about ½ foot above the ground. A standard disk, stamped "M 2 1924," and set vertically. (47.497 meters or 155.830 feet.)

**W 2.**—At **Princeton**, Mercer County, on the campus of Princeton University, at the main entrance on the north side of Nassau Hall, in the capstone of the landing, 7 feet east of the center of the landing, 8 inches out from the wall, and 2½ feet from the base of the bronze tiger on the east side of the entrance. A standard disk, stamped "W 2 1924." (66.636 meters or 218.622 feet.) Recovered as described May 24, 1930.

**X 2.**—At **Princeton**, Mercer County, on the campus of Princeton University, on the east side of the Cleveland Memorial Tower, in the second course of the foundation of the southeast corner pillar, 2 feet above the ground, and 5 inches south of the intersection of the corner pillar and the east wall of the tower. A standard disk, stamped "X 2 1924," and set vertically. (54.712 meters or 179.501 feet.)

### End of spur.

**N 2.**—About 2½ miles south of **Princeton Junction**, Mercer County, at a bridge over the main-line tracks of the Pennsylvania Railroad, 94 feet north of milepost 49-41, and 10½ feet west of the west rail, in the top of the north end of the west abutment. A standard disk, stamped "N 2 1924," and set horizontally. (27.446 meters or 90.046 feet.)

**51 (P. R. R.)**.—About ¾ mile east of **Lawrence**, Mercer County, on the Pennsylvania Railroad, at the north end of the east abutment of a culvert. A chiseled square. (21.316 meters or 69.934 feet.)

**O 2.**—At **Lawrence**, Mercer County, opposite the Pennsylvania Railroad station, 14¾ feet north of the north end of the wooden platform, on the right of way 7½ feet east of the east rail. A standard disk, stamped "O 2 1924," and set in the top of a concrete post. (18.604 meters or 61.037 feet.)

**52 A (P. R. R.)**.—About ⅔ mile west of **Lawrence**, Mercer County, 400 feet north of the Pennsylvania Railroad, on the southwest wing wall of a public-road bridge. A chiseled square. (17.133 meters or 56.211 feet.)

**52 (P. R. R.)**.—About ¾ mile west of **Lawrence**, Mercer County, on the Pennsylvania Railroad, on the northwest corner of an arched culvert. A chiseled square. (16.190 meters or 53.117 feet.)

**P 2.**—About 2½ miles south of **Lawrence**, Mercer County, at the footbridge which leads from the Trenton Fairgrounds across the Pennsylvania tracks to the Reclamation Plant, in the northeast corner of the east abutment, and 9 feet east of the east rail. A standard disk, stamped "P 2 1924." (18.105 meters or 59.399 feet.)

**Q 2.**—Destroyed. (13.134 meters or 43.090 feet.)

**55 (P. R. R.)**.—At **Trenton**, Mercer County, on the Pennsylvania Railroad, at the Chestnut Avenue bridge, on the end step of the northeast wing wall. A copper bolt. (10.872 meters or 35.669 feet.) This mark has been disturbed and its elevation is considered unreliable.

**56 (P. R. R.)**.—At **Trenton**, Mercer County, on the Pennsylvania Railroad, at the Clinton Street bridge, in the foundation at the east end of the pier. A copper bolt. (9.617 meters or 31.552 feet.)

**104 (P. R. R.)**.—At **Trenton**, Mercer County, on Broad Street, in the top of the north wall of the lock in the Delaware and Raritan Canal. A copper bolt. (16.039 meters or 52.621 feet.)

**103 (P. R. R.).**—About  $1\frac{1}{2}$  miles south of **Trenton**, Mercer County, on the Pennsylvania Railroad, at the bridge between locks 3 and 4 of the Delaware and Raritan Canal, in the west end of the north coping. A copper bolt. (11.942 meters or 39.180 feet.)

**R 2.**—About 1 mile south of the Pennsylvania Railroad station at **Trenton**, Mercer County, 120 yards west of the Laylor Street crossing, 330 feet west of "UN Tower," 300 feet east of bridge 41-45, and 7 feet south of the south rail, in the foundation of a semaphore on the Bordentown Branch. A standard disk, stamped "R 2 1924." (12.456 meters or 40.866 feet.)

**102 (P. R. R.).**—About 3 miles south of **Trenton**, Mercer County, in the top of the south wall of Delaware and Raritan Canal lock No. 2. A copper bolt. (6.425 meters or 21.079 feet.)

**Bordentown (U. S. E.).**—At **Bordentown**, Burlington County, on the Pennsylvania Railroad, opposite the Transportation Co.'s wharf, in the concrete foundation of a semaphore. A chiseled square. (6.641 meters or 21.788 feet.)

**S 2.**—At **Bordentown**, Burlington County, on the Pennsylvania Railroad, 330 feet south of the Park Avenue bridge, 8 feet west of the west rail,  $7\frac{1}{2}$  feet north of the most northerly iron column supporting the station platform cover, and about  $1\frac{1}{2}$  feet lower than the top of the rail. A standard disk, stamped "S 2 1924," and set in the top of a concrete post which is flush with the ground. (6.835 meters or 22.424 feet.)

**31 (P. R. R.).**—At **Bordentown**, Burlington County, on the Pennsylvania Railroad, at the locomotive works, in the top of the foundation of the office. A chiseled square. (3.338 meters or 10.951 feet.)

**T 2.**—At **Roebling**, Burlington County, on the Trenton-Camden line of the Pennsylvania Railroad, 240 feet east of the station "Kinkora," about 8 feet south of the south rail of the main-line track, in the foundation of a semaphore. A standard disk, stamped "T 2 1924." (3.082 meters or 10.112 feet.)

**9.24 (N. J. G. S.).**—At **Kinkora**, Burlington County, 250 feet west of the Pennsylvania Railroad station, on the southwest corner of the concrete base of a signal on the north side of the tracks. A chiseled cross. (3.019 meters or 9.905 feet.)

**27.77 (N. J. G. S.).**—At **Roebling**, Burlington County, near the Pennsylvania Railroad station, at the corner entrance to the M. W. Stern Building, a few feet south of the tracks, on the step, at the base of an iron post. A chiseled cross. (8.530 meters or 27.986 feet.)

**U 2.**—At **Florence**, Burlington County, about 100 feet west of the Pennsylvania Railroad station, 56 feet east of the grade crossing of a concrete highway, about 41 feet south of the south rail, and about 7 feet north of the south right-of-way fence, in line with the row of telegraph poles. A standard disk, stamped "U 2 1924," and set in the top of a concrete post. (15.620 meters or 51.247 feet.)

**V 2.**—About  $1\frac{1}{2}$  miles north of the Pennsylvania Railroad station at **Burlington**, Burlington County, 8 rails north of "QN Tower," and  $7\frac{1}{2}$  feet west of the west rail, in the foundation of a semaphore. A standard disk, stamped "V 2 1924," and set horizontally. (5.437 meters or 17.838 feet.)

**13.62 (N. J. G. S.).**—At **Burlington**, Burlington County, at the Mechanic's National Bank building, to the left of the main entrance, on the foundation course, under the bronze tablet bearing the name of the bank. A chiseled cross. (4.228 meters or 13.871 feet.)

**Y 2.**—At **Burlington**, Burlington County, at the post office, at the first window west of the loading platform in the rear of the building, in the east end of the sill. A standard disk, stamped "Y 2 1924," and set horizontally. (5.171 meters or 16.965 feet.)

**Z 2.**—At **Edgewater Park**, Burlington County, about 100 yards north of the Pennsylvania Railroad station, near bridge No. 15/32 over a highway, about 13 feet south of the southeast abutment, and about 10 feet east of the east rail, in line with the row of telegraph poles along the east side of the right of way. A standard disk, stamped "Z 2 1924," and set in the top of a concrete post. (9.127 meters or 29.944 feet.)

**A 3.**—At **Delanco**, Burlington County, on the Pennsylvania Railroad, 300 feet north of the north bank of Rancocas Creek, 43 feet south of the south end of the station platform, and  $6\frac{1}{2}$  feet west of the west rail, in the foundation of a semaphore. A standard disk, stamped "A 3 1924." (4.442 meters or 14.573 feet.)

**19.78 (N. J. G. S.).**—At **Riverside**, Burlington County, at the offices and knitting mill of W. F. Taubel (Inc.), at the Scott Street corner entrance, on the

outer corner at the east end of the brownstone doorsill. A chiseled cross. (6.143 meters or 20.154 feet.)

**B 3.**—About midway between **Taylor** and **Cambridge**, Burlington County, on the Trenton-Camden line of the Pennsylvania Railroad, 6 telegraph poles west of a culvert, and about 20 feet south of the south rail. A standard disk, stamped "B 3 1924," and set in the top of a concrete post. (4.275 meters or 14.026 feet.)

**7.49 (N. J. G. S.)**.—About  $\frac{1}{4}$  mile north of **Riverton**, Burlington County, on the south end of the west abutment of a Pennsylvania Railroad bridge. A chiseled cross. (2.407 meters or 7.897 feet.)

**C 3.**—At **Riverton**, Burlington County, on the Pennsylvania Railroad, 61 feet northeast of the north end of the station platform, and 6 feet 8 inches east of the east rail, in the foundation of a semaphore. A standard disk, stamped "C 3 1924." (5.100 meters or 16.732 feet.)

**13. (P. R. R.)**.—At **Riverton**, Burlington County, at the Pennsylvania Railroad station, on the sill of the ticket-office window. A chiseled square. (6.416 meters or 21.050 feet.)

**21.14 (N. J. G. S.)**.—At **Riverton**, Burlington County, on the doorsill of **Collins's** store. A chiseled cross. (6.562 meters or 21.529 feet.)

**12 (P. R. R.)**.—At **Palmyra**, Burlington County, at the Pennsylvania Railroad station, on the sill of the ticket-office window. A chiseled cross. (7.538 meters or 24.731 feet.)

**21.71 (N. J. G. S.)**.—At **Palmyra**, Burlington County, at the Pennsylvania Railroad station, on the outer edge of the doorsill at the baggage room. A chiseled cross. (6.750 meters or 22.146 feet.)

**23.81 (N. J. G. S.)**.—At **Palmyra**, Burlington County, on the southwest face of the **P. O. S. A. Hall**, at the third entrance from the northwest corner, on the doorsill. A chiseled cross. (7.387 meters or 24.236 feet.)

**11 (P. R. R.)**.—At **West Palmyra**, Burlington County, 150 feet east of the Pennsylvania Railroad station. The top of a stone monument set in the ground. (5.305 meters or 17.405 feet.)

**14.10 (N. J. G. S.)**.—About 1 mile west of **West Palmyra**, Burlington County, at the Pennsylvania Railroad bridge over **Pensauken Creek**, at the level of the bridge seat, and 4 feet from the girder, on the southwest corner of the stone at the south end of the northeast abutment. A chiseled cross. (3.582 meters or 11.752 feet.)

**D 3.**—About  $\frac{1}{4}$  mile south of **Morris**, Camden County, on the Pennsylvania Railroad, 98 feet north of signal tower "MB," and  $7\frac{1}{2}$  feet east of the east rail, in line with the row of telegraph poles. A standard disk, stamped "D 3 1924," and set in the top of a concrete post. (3.034 meters or 9.954 feet.)

**25.40 (N. J. G. S.)**.—At **Delair**, Camden County, at the Delaware River railroad bridge over the Camden & Amboy Railroad, at the north end of the east abutment, on the northwest corner of the bottom step of the wing wall. A chiseled cross. (7.882 meters or 25.860 feet.)

**E 3.**—At **Delair**, Camden County, at the Delaware River railroad bridge over the Camden & Amboy Railroad, at the north end of the east abutment, in the next to the lowest course at the north end of the wing wall. A standard disk stamped "E 3 1924." (7.878 meters or 25.846 feet.)

### Spur line toward Philadelphia, Pa.

**11 (P. R. R.)**.—At **Delair**, Camden County, at the Delaware River railroad bridge over the Camden & Amboy Railroad, at the north end of the east abutment, in the top stone step. A copper bolt. (13.436 meters or 44.081 feet.)

**10 (P. R. R.)**.—At **Delair**, Camden County, at the Delaware River bridge, on the north end of the east abutment. A copper bolt. (15.314 meters or 50.243 feet.)

### This spur line continues into Pennsylvania.

**F 3.**—At **Pavonia**, Camden County, about 100 feet south of the railroad station, at the Twenty-seventh Street bridge over the Camden & Amboy Railroad, in the north end of the concrete foundation of the west pier. A standard disk, stamped "F 3 1924." (9.269 meters or 30.410 feet.)

**29.94 (N. J. G. S.)**.—At **Pavonia**, Camden County, at the overhead highway bridge at the Pennsylvania Railroad station, at the south end of the west pier. A chiseled cross. (9.244 meters or 30.328 feet.)

**G 3.**—At **Camden**, Camden County, at the city hall,  $8\frac{1}{2}$  feet from the most northwesterly corner of the police-court wing, midway between the two most

westerly subsurface windows in the north face, and 3 feet from the wall. A standard disk, stamped "G 3 1924," and set in the top of a concrete post. (7.604 meters or 24.947 feet.) Recovered as described, September 21, 1930.

**30.44 (N. J. G. S.).**—At **Camden**, Camden County, at the Haddon Avenue entrance to the city hall, at the north end of the doorsill, on the outer corner. A chiseled cross. (9.416 meters or 30.892 feet.) Recovered as described, September 21, 1930.

**S 3.**—At **Camden**, Camden County, at the Philadelphia & Reading Terminal, at the foot of Atlantic Avenue, south of the most southerly track in the train shed, at the southeast corner of the terminal, and 3 inches west of the west face, in the water table. A standard disk, stamped "S 3 1924." (6.443 meters or 21.138 feet.) Recovered as described, September 21, 1930.

**H 3.**—Destroyed. (4.569 meters or 14.990 feet.)

**I 3.**—At **Audubon**, Camden County, on the Philadelphia & Reading Railway, 125 feet west of the baggage room at the station, and 16½ feet east of the east rail, in line with the telegraph poles. A standard disk, stamped "I 3 1924," and set in the top of a concrete post. (15.820 meters or 51.903 feet.)

**J 3.**—At **Lawnside**, Camden County, on the Philadelphia & Reading Railway, about 60 feet north of the station, in the northeast foundation of a banjo-signal bridge, and 9.5 feet east of the east rail. A standard disk, stamped "J 3 1924," and set horizontally. (24.341 meters or 79.859 feet.)

**K 3.**—At **Stratford**, Camden County, on the Philadelphia & Reading Railway, 2¾ feet east of the northwest corner of the station, and 1½ feet north of the wall. A standard disk, stamped "K 3 1924," and set in the top of a concrete post. (26.964 meters or 88.464 feet.)

**L 3.**—At the Philadelphia & Reading Railway station at **Pine Valley**, Camden County, 6 rails south of a road crossing, and 8 feet east of the east rail, in the concrete foundation of banjo signals 22X and 24. A standard disk, stamped "L 3 1924." (28.905 meters or 94.832 feet.)

**M 3.**—At **Albion**, Camden County, at the Philadelphia & Reading Railway station, 48 feet south of the southwest crossing-warning sign, 18 feet south of a hand-operated semaphore, and 27.5 feet west of the west rail of the southbound main-line track. A standard disk, stamped "M 3 1924," and set in the top of a concrete post. (43.545 meters or 142.864 feet.)

**N 3.**—At **Williamstown Junction**, Camden County, about 100 yards east of the Philadelphia & Reading Railway station, midway between the section house and "JN" tower, about 10 feet east of milepost 17-39, and 6 feet north of the north rail of the westbound main-line track, in the concrete foundation of banjo signal No. 28. A standard disk, stamped "N 3 1924." (47.073 meters or 154.439 feet.)

**O 3.**—At **Cedar Brook**, Camden County, on the Philadelphia & Reading Railway, 25 feet north of the south end of the station platform, 5½ rails south of a banjo signal located east of the tracks, 41 feet north of a semaphore located west of the tracks, 18 feet west of the west rail, and about 3 feet higher than the tracks. A standard disk, stamped "O 3 1924," and set in the top of a concrete post. (37.951 meters or 124.511 feet.)

**P 3.**—At **Blue Anchor**, Camden County, on the Philadelphia & Reading Railway, 34 feet north of the north end of the station platform, and 12 feet west of the west rail, in the concrete foundation of banjo signal No. 37 which is located between the station and the road crossing north of the station. A standard disk, stamped "P 3 1924." (41.950 meters or 137.631 feet.)

**Q 3.**—At the Philadelphia & Reading Railway station at **Winslow Junction**, Camden County, at the south end of the bridge over the tracks of the Central Railroad of New Jersey, 6 feet above the level of the walk, and 3 feet from the wing wall. A standard disk, stamped "Q 3 1924," and set in the top of a concrete post. (31.690 meters or 103.970 feet.)

**R 3.**—At **Hammonton**, Atlantic County, on the Philadelphia & Reading Railway, 4 rails north of the northbound waiting room of the station, 40 feet south of Orchard Street, and 6 feet east of the east rail of the northbound main-line track, in the foundation of a semaphore. A standard disk, stamped "R 3 1924," and set horizontally. (33.006 meters or 108.287 feet.)

**T 3.**—At the Philadelphia & Reading Railway station at **Da Costa**, Atlantic County, 27 feet east of the center of the traveled way of a road crossing the tracks, 16.5 feet south of the south rail, 14.5 feet south of the north edge of the platform, and 8 feet east of the crossing-warning sign on the south side of the tracks. A standard disk, stamped "T 3 1924," and set in the top of a concrete post. (26.681 meters or 87.536 feet.)

**42 (P. R. R.).**—At **Da Costa**, Atlantic County, at the northwest end of the station. A copper bolt, set in the top of a stone monument. (26.386 meters or 86.568 feet.)

**U 3.**—About  $\frac{1}{2}$  mile west of **Elwood**, Atlantic County, on the Philadelphia & Reading Railway,  $7\frac{1}{2}$  feet west of the west rail, in the concrete foundation of banjo signal No. 151X which is located on the west side of the tracks. A standard disk, stamped "U 3 1924." (22.681 meters or 74.413 feet.)

**V 3.**—At **Elwood**, Atlantic County, on the Philadelphia & Reading Railway, in line with the west face of the station,  $25\frac{1}{4}$  feet from the northwest corner of the station, and  $14\frac{3}{4}$  feet east of the east rail. A standard disk, stamped "V 3 1924," and set in the top of a concrete post. (27.865 meters or 91.420 feet.)

**W 3.**—About 2 miles west of **Egg Harbor City**, Atlantic County,  $15\frac{1}{2}$  rails south of milepost 20-36, and 8 feet west of the west rail, in the foundation of semaphore No. 53. A standard disk, stamped "W 3 1924." (25.643 meters or 84.130 feet.)

**X 3.**—At **Egg Harbor City**, Atlantic County, 143 feet north of the north face of the Philadelphia & Reading Railway station,  $30\frac{1}{4}$  feet west of the west rail,  $5\frac{3}{4}$  feet south of the crosswalk which forms the north border of the lawn, and  $9\frac{1}{2}$  feet west of the most northeasterly maple tree on the lawn. A standard disk, stamped "X 3 1924," and set in the top of a concrete post. (18.302 meters or 60.046 feet.)

**Y 3.**—At **Cologne**, Atlantic County, about 150 feet south of the Philadelphia & Reading Railway station, 2 rails south of the center of a grade crossing, and 8 feet west of the west rail, in the concrete foundation of a semaphore. A standard disk, stamped "Y 3 1924." (17.722 meters or 58.143 feet.)

**50 (P. R. R.).**—At **Pomona**, at the north end of the station and just south of a grade crossing. A copper bolt, set in the top of a stone monument. (20.608 meters or 67.611 feet.)

**Z 3.**—About 0.4 mile north of **Pomona**, Atlantic County, 14 feet west of the west rail,  $5\frac{1}{2}$  feet east of a high-tension transmission line on the west side of the tracks, and  $4\frac{1}{2}$  feet north of a whistle post. A standard disk, stamped "Z 3 1924," and set in the top of a concrete post. (19.820 meters or 65.026 feet.)

**A 4.**—About 350 yards northwest of the station at **Doughty**, Atlantic County,  $5\frac{1}{2}$  rails from milepost 49-11, in the north end of the north capstone on the northeast end of a masonry culvert, and about 15 feet east of the east rail. A standard disk, stamped "A 4 1924." (7.938 meters or 26.043 feet.)

**B 4.**—At **Absecon**, Atlantic County, about 0.2 mile north of the Pennsylvania Railroad station, 82 feet south of a crossing-warning light located east of the track, and 15.7 feet east of the east rail. A standard disk, stamped "B 4 1924," and set in the top of a concrete post. (3.318 meters or 10.886 feet.) Recovered as described, August 22, 1930.

**C 4.**—About 2 miles south of **Absecon**, Atlantic County, on the Pennsylvania Railroad, at the first curve south of Absecon, and 1 foot from the south end of the east side of a concrete bridge over a stream. A standard disk, stamped "C 4 1924." (2.631 meters or 8.632 feet.) Recovered as described, August 23, 1930.

**D 4.**—Destroyed. (2.911 meters or 9.551 feet.)

**Tidal 30.**—At **Atlantic City**, Atlantic County, at the corner of Ohio and Pacific Avenues, on the northerly side of the center archway at the Ohio Avenue entrance to the high-school building. A standard disk, stamped "30 1922," and set in the stone sill. (2.949 meters or 9.675 feet.)

**Tidal 23.**—At **Atlantic City**, Atlantic County, at the north corner of the intersection of Pacific and Illinois Avenues, at the Illinois Avenue entrance to the library building, at the southeast end of the steps, about 3 inches from the east corner of the granite side wall, and at about the same elevation as the top of the dark-colored foundation of the building. A chiseled cross. (3.256 meters or 10.682 feet.)

**Tidal 18.**—At **Atlantic City**, Atlantic County, near the intersection of the Board Walk and Arkansas Avenue, at a brick building which is about 100 feet from the building on the corner, at the Arkansas Avenue entrance to the building, in the northwest end of the stone sill. A chiseled cross. (3.557 meters or 11.67 feet.) (See p. —.)

**Tidal 31.**—At **Atlantic City**, Atlantic County, at the southwest corner of the intersection of New York and Pacific Avenues, at the main entrance to an

apartment house and business building, in the left end of the sill. A standard disk, stamped "31 1922." (2.780 meters or 9.121 feet.)

**F 4.**—At **Atlantic City**, Atlantic County, at the Atlantic Avenue entrance to the city hall, 5 inches from the wall, and 3 inches from the west edge of the first stone step. A standard disk, stamped "F 4 1924." (2.867 meters or 9.406 feet.)

**Tidal 26.**—At **Atlantic City**, Atlantic County, at the southeast corner of the intersection of Pacific and Pennsylvania Avenues, in the foundation of the post office building, 8 inches above the pavement, and a few inches to the left of the steps at the Pennsylvania Avenue entrance which is near the corner of the building. A standard disk, stamped "26 1922." (3.192 meters or 10.472 feet.)

**Tidal 27.**—At **Atlantic City**, Atlantic County, at the east corner of Pacific and Delaware Avenues, at the corner entrance to the brick building housing Jackson's Drug Store, in the north corner of the stone doorsill. A chiseled cross. (2.670 meters or 8.760 feet.)

**Tidal 28.**—At **Atlantic City**, Atlantic County, near the east corner of Pacific and Connecticut Avenues, at the door of a barber shop. This door is the first one from the corner of the building and on the Pacific Avenue side. A chiseled cross on the northeast end of the doorsill. (2.688 meters or 8.819 feet.)

**B. M. 1**—"Absecon Light Bench Mark."—At **Atlantic City**, Atlantic County, on the north side of Absecon Lighthouse, on the top of the ashlar coping of the stone foundation, and directly beneath the west corner of the north window. A plain chiseled surface. (2.648 meters or 8.688 feet.) This mark was established by Capt. A. C. Mitchell in 1867.

**E 4.**—Destroyed. (2.528 meters or 8.294 feet.)

**Tidal 32.**—At **Atlantic City**, Atlantic County, at Haddon Hall, on the Board Walk between North Carolina and Pennsylvania Avenues, and on the east side of the most easterly column of the arcade. A standard disk, stamped "32 1922." (4.201 meters or 13.783 feet.)

**Basic Bench Mark.**—At **Atlantic City**, Atlantic County, near Pacific Avenue between Vermont and Rhode Island Avenues, at the Absecon Light reservation, about 32 feet northwesterly from the lighthouse, in a grass plot. A standard disk, stamped "10.30," and set horizontally in the center of the top of a large concrete monument one side of which is lettered "UNITED STATES COAST AND GEODETIC SURVEY BASIC BENCH MARK." (3.139 meters or 10.30 feet.) (See p. 5.)

#### LINE 6, ABSECON TO CAPE MAY, N. J.

This line follows a highway from Absecon, N. J., to Pleasantville, N. J., thence along the Shore Fast Line to Ocean City; thence along the Pennsylvania Railroad to Sea Isle City, Sea Isle Junction, and Cape May Courthouse to Cape May, N. J. A spur line extends from Cape May to the Naval Air Service reservation at Cold Spring Inlet to connect with a tide gage. The field work was done during the fall of 1924 by J. C. Bose, aid.

**B 4.**—See page 15.

**G 4.**—At **Pleasantville**, Atlantic County, at the corner of Main Street and West Jersey Avenue, at the entrance to the Pleasantville National Bank, west of the most westerly column, 3.5 feet from the foot of the column, and 5.5 feet southwest of the sidewalk, in the granite water table. A standard disk, stamped "G 4 1924." (8.434 meters or 27.671 feet.) Recovered as described, August 23, 1930.

**H 4.**—At **Northfield**, Atlantic County, on the Atlantic City & Shore electric line, 52.7 feet from the west side of the station, 18 feet south of the south rail of the eastbound main-line track, and 10.3 feet south of the line of poles on the south side of the right of way. A standard disk, stamped "H 4 1924," and set in the top of a concrete post. (8.676 meters or 28.465 feet.)

**I 4.**—At **Ocean Heights**, Atlantic County, at the intersection of the Atlantic City & Shore electric line and Ocean Heights Road, 14 feet south of the south rail, at the east edge of the road, in the foundation of the crossing-warning sign which carries cross arms and an arc of flashing red lights. A standard disk, stamped "I 4 1924," and set vertically. (6.372 meters or 20.905 feet.)

**J 4.**—At **Somers Point**, Atlantic County, on the Atlantic City & Shore electric line, about 22 feet south of the south face of the station, 26 feet east of the east rail, and near a bank in the grass plot south of the station. A standard disk, stamped "J 4 1924," and set in the top of a concrete post. (2.886 meters or 9.468 feet.)

**K 4.**—At **Ocean City**, Cape May County, at the northwest corner of Asbury Avenue and Eighth Street, in the granite coping at the northwest (rear) face of the Ocean City Title and Trust Co.'s building, about 4 feet from the north corner, and  $\frac{3}{4}$  foot above the ground. A standard disk, stamped "K 4 1924," and set vertically. (2.028 meters or 6.654 feet.)

**L 4.**—About 2 miles south of **Ocean City**, Cape May County, at the Thirty-fourth Street station of the Pennsylvania Railroad, in line with the north face of the station, 54 feet east of the east end of the station, about 10 feet south of the south rail, and about  $5\frac{1}{2}$  feet north of the line of poles. A standard disk, stamped "L 4 1924," and set in the top of a concrete post. (1.835 meters or 6.020 feet.)

**M 4.**—South of **Ocean City**, Cape May County, about 100 yards south of the Fifty-fifth Street station of the Pennsylvania Railroad, 7 rails south of the Fifty-sixth Street crossing, and  $8\frac{1}{2}$  feet east of the east rail, in the foundation of a semaphore on the east side of the track. A standard disk, stamped "M 4 1924." (1.470 meters or 4.823 feet.)

**N 4.**—At **Corsons Inlet**, Cape May County, south of the Pennsylvania Railroad station, in the station yard, opposite a semaphore on the west side of the tracks. A standard disk, stamped "N 4 1924," and set in a concrete post. (1.965 meters or 6.447 feet.)

**O 4.**—At **Sea Isle City**, Cape May County, on the Pennsylvania Railroad, 18 feet north of the station platform, in the concrete foundation of a semaphore. A standard disk, stamped "O 4 1924." (1.722 meters or 5.650 feet.)

**5.12 (P. R. R.).**—At **Sea Isle City**, Cape May County, on the Pennsylvania Railroad, on the east side of the baggage platform, in the top of a concrete monument. A copper bolt. (1.842 meters or 6.043 feet.)

**P 4.**—At **Ocean View**, Cape May County, in the yard of the Pennsylvania Railroad station, 47 feet southeast of the edge of the highway crossing at the station, and 26 feet southwest of the south rail. A standard disk, stamped "P 4 1924," and set in the top of a concrete post. (5.143 meters or 16.873 feet.)

**17.47 (P. R. R.).**—At **Ocean View**, Cape May County, 10.2 feet southeast of the north corner of the railroad station, in the angle between the ticket office and the waiting room, 1.6 feet northeast of the waiting room, and 1.5 feet northwest of the ticket office. A copper bolt, set in the top of a concrete monument. (5.611 meters or 18.409 feet.)

**16.90 (P. R. R.).**—At **Sea Isle Junction**, Cape May County, south of the Pennsylvania Railroad station, in the corner of a grass plot, in the top of a concrete monument. A copper bolt. It was reported in August, 1930, that this mark has been broken down on one side, exposing the bolt. The mark is located a foot from a water spigot from which water is constantly running, soaking the ground about the mark. Leveling in 1930 indicates that this mark has settled. (5.524 meters or 18.123 feet.) This elevation is based on the 1930 leveling.

**Q 4.**—About 0.1 mile south of the Pennsylvania Railroad station at **Sea Isle Junction**, Cape May County,  $8\frac{1}{4}$  feet east of the east rail of the track to South Seaville, in the concrete foundation of the second semaphore south of the signal bridge. A standard disk, stamped "Q 4 1924." (5.594 meters or 18.353 feet.)

**22.66 (P. R. R.).**—At **South Seaville**, Cape May County, on the Pennsylvania Railroad, at the southeast corner of the station, in the top of a concrete monument. A copper bolt. (7.202 meters or 23.629 feet.)

**R 4.**—About 1 mile northwest of **Swain**, Cape May County, on the Pennsylvania Railroad, opposite a whistle post located midway between 2 private crossings,  $\frac{1}{4}$  mile southeast of a semaphore, and 9 feet west of the west rail, in the concrete foundation for a semaphore. A standard disk, stamped "R 4 1924." (4.813 meters or 15.791 feet.)

**24.02 (P. R. R.).**—At **Swain**, Cape May County, on the east side of the Pennsylvania Railroad station, in the top of a concrete monument. A copper bolt. (7.665 meters or 25.148 feet.)

**S 4.**—At **Swain**, Cape May County, about 3 rails southwest of the Pennsylvania Railroad station, 63 feet northeast of a crossing, and 18 feet northwest

of the northwest rail. A standard disk, stamped "S 4 1924," and set in the top of a concrete post. (7.334 meters or 24.062 feet.)

**21.62 (P. R. R.).**—About  $\frac{3}{4}$  mile north of Cape May Courthouse, Cape May County, on the second step at the south end of the east abutment of the Reading bridge. A copper bolt. (6.931 meters or 22.739 feet.)

**T 4.**—At Cape May Courthouse, Cape May County, about  $8\frac{1}{2}$  rails north of the Pennsylvania Railroad station, and  $8\frac{1}{4}$  feet east of the east main-line rail, in the concrete foundation of a semaphore. A standard disk, stamped "T 4 1924." (5.141 meters or 16.867 feet.)

**U 4.**—About 0.9 mile north of the Pennsylvania Railroad station at Wildwood Junction, Cape May County, 70 feet south of the southwest corner of the foundation of the iron water tower at an abandoned locomotive watering station, and about 19 feet west of the west rail. A standard disk, stamped "U 4 1924," and set in the top of a concrete post. (6.682 meters or 21.923 feet.)

**21.49 (P. R. R.).**—At Wildwood Junction, Cape May County, 120 feet south of the Pennsylvania Railroad station, in the top of a concrete monument. A copper bolt. (6.883 meters or 22.582 feet.)

**V 4.**—At Rio Grande, Cape May County, in the foundation of a semaphore located about 105 feet north of milepost 75-6 which in turn is opposite the Pennsylvania Railroad station. A standard disk, stamped "V 4 1924." (6.265 meters or 20.554 feet.)

**21.47 (P. R. R.).**—At Rio Grande, Cape May County, at the southeast corner of the Pennsylvania Railroad station, in the top of a concrete monument. A copper bolt. (6.946 meters or 22.789 feet.)

**W 4.**—About  $1\frac{1}{2}$  miles north of the Pennsylvania Railroad station at Bennett, Cape May County, between the Pennsylvania Railroad and the Philadelphia & Reading Railway, about  $18\frac{1}{2}$  feet east of the east rail of the Pennsylvania Railroad, about  $32\frac{1}{4}$  feet west of the west rail of the Philadelphia & Reading Railway, and  $23\frac{3}{4}$  feet south of the center of the traveled way of a private crossing. A standard disk, stamped "W 4 1924," and set in the top of a concrete post. (4.732 meters or 15.525 feet.)

**X 4.**—About 200 yards south of the Philadelphia & Reading Railway station at Cold Spring, Cape May County, about  $2\frac{1}{2}$  rails north of a farm-road crossing, and about  $10\frac{3}{4}$  feet west of the west rail of the Philadelphia & Reading Railway, in the concrete foundation of a semaphore. A standard disk, stamped "X 4 1924." (5.442 meters or 17.854 feet.)

Spur line to the Naval Air Service Reservation at Cold Spring Inlet.

**Tidal 3.**—At Sewell Point, Cape May County, on the Naval Air Service Reservation, at the southeast corner of the intersection of the entrance street and the first north-and-south street from the entrance, at the low, black water tank, in the northeast concrete footing. A standard disk, stamped "No. 3 1924." (3.018 meters or 9.90 feet.) (See p. 5.)

**Tidal 4.**—At Sewell Point, Cape May County, on the Naval Air Service Reservation, about 100 feet northeast of the intersection of the entrance street and the first north-and-south street, at the tall water tank, in the southwest concrete footing. A standard disk, stamped "No. 4 1924." (3.056 meters or 10.026 feet.)

**Tidal 2.**—At Sewell Point, Cape May County, at the northeast corner of the intersection of the street leading south from the Coast Guard dock and the first east-and-west street south of the Coast Guard Station, in the northwest corner of the top of the manhole. A standard disk, stamped "No. 2 1924," and set in concrete. (2.614 meters or 8.576 feet.)

**Tidal 5.**—At Sewell Point, Cape May County, on the Naval Air Service Reservation north of the road leading from the entrance to the reservation, about 100 yards east of the intersection of the road leading to the Coast Guard dock, at the western end of the concrete porch of a large warehouse, and near the side of the building. A standard disk, stamped "No. 5 1924." (4.071 meters or 13.356 feet.)

**Tidal 6.**—At Sewell Point, Cape May County, near the amusement pavilion, on the western jetty at Cold Spring Inlet, about 33 feet southeast of the shore end of the jetty, in the top of a brick pier which projects a few inches above the surrounding portion of the jetty. A standard disk, stamped "No. 6 1924." (2.501 meters or 8.205 feet.)

**Tidal 1.**—At Sewell Point, Cape May County, on the Naval Air Service Reservation, just north of the Coast Guard Station at Cold Spring Inlet, in the

northeast corner of the concrete base of the steel signal tower. A standard disk, stamped "No. 1 1924." (2.249 meters or 7.379 feet.)

End of spur line.

**Z 4.**—At **Cape May**, Cape May County, at the southeast corner of the intersection of Washington Avenue and Decatur Street, at the Merchants National Bank,  $2\frac{3}{4}$  feet north of the southwest corner of the building, and  $\frac{3}{4}$  foot above the sidewalk, in the coping of the foundation. A standard disk, stamped "Z 4 1924." (4.676 meters or 15.341 feet.)

**Y 4.**—At **Cape May**, Cape May County, on Washington Avenue, at the Cape May High School, in the south face of the west wing of the building, about 6 feet west of the west wall of the main portion of the building, about 5 feet below the bottom of the concrete water table, and about 1 foot above the ground. A standard disk, stamped "Y 4 1924." (4.933 meters or 16.184 feet.)

**A 5.**—At **Cape May**, Cape May County, at the intersection of Columbia Avenue and Guernev Street, in a small triangular grass plot at the Soldiers and Sailors Monument,  $25\frac{3}{4}$  feet west of the monument, and  $10\frac{1}{4}$  feet east, at a lamp post. A standard disk, stamped "A 5 1924," and set in the top of a concrete post. (2.900 meters or 9.514 feet.)

#### LINE 7, HIGHLANDS TO ABSECON, N. J.

This line follows the Central Railroad of New Jersey from Highlands to Long Branch, the Pennsylvania Railroad from Long Branch to Beachwood, the Central Railroad of New Jersey from Beachwood to Barnegat, the Tuckerton Railroad from Barnegat to Tuckerton and the highway from Tuckerton to Absecon. The field work was done during the summer of 1930 by W. R. Porter, junior hydrographic and geodetic engineer.

**J 1.**—See page 8.

**H 5.**—About 0.5 mile south of **Highlands**, Monmouth County, on the Central Railroad of New Jersey, between the railroad and a highway east of a large white cottage with a circular drive and flagpole, 21.7 feet east of the highway, 29.0 feet north of pole SBRB3JB, and 17.7 feet west of the west rail. A standard disk, stamped "H 5 1930," and set in the top of a concrete post. (2.778 meters or 9.114 feet.)

**J 5.**—At **Sea Bright**, Monmouth County, at the southeast corner of the Central Railroad of New Jersey station, 3 feet above the sidewalk, and 8 inches north of the south face of the building. A standard disk, stamped "J 5 1930," and set vertically. (3.158 meters or 10.361 feet.)

**7.89 (N. J. G. S.)**—At **Sea Bright**, Monmouth County, on the west face of the Central Railroad of New Jersey station, west of the tracks near the east end of the bridge over Shrewsbury River, and on the outer edge at the north end of the bluestone doorsill. A chiseled cross. (2.356 meters or 7.730 feet.)

**T. B. M. 5.**—About 0.2 mile north of **Monmouth Beach**, Monmouth County, on the Central Railroad of New Jersey, at signal tower No. S74, on the north side of a large circular control box. A chiseled square. (1.951 meters or 6.401 feet.)

**K 5.**—At **North Long Branch**, Monmouth County, at the northwest end of the Central Railroad of New Jersey station, in the stone step. A standard disk, stamped "K 5 1930," and set horizontally. (4.476 meters or 14.685 feet.)

**T. B. M. 8.**—About 0.54 mile south of **North Long Branch**, Monmouth County, on the Central Railroad of New Jersey, at signal No. S102, on the concrete base. A chiseled square. (4.170 meters or 13.681 feet.)

**L 5.**—At **Long Branch**, Monmouth County, at the post office, in the northeast end of the building, facing east, and 2 feet above the ground. A standard disk, stamped "L 5 1930," and set vertically. (8.604 meters or 28.228 feet.)

**M 5.**—At **Long Branch**, Monmouth County, about 100 yards north of the Pennsylvania Railroad station, on the northwest end of the Pennsylvania Railroad office building, facing west, and 3 feet above the ground. A standard disk, stamped "M 5 1930," and set vertically. (8.692 meters or 28.517 feet.)

**N 5.**—At **West End**, Monmouth County, 10 rails south of the Pennsylvania Railroad station, and 24.4 feet east of the east rail of the main track. A standard disk, stamped "N 5 1930," and set in the top of a concrete post. (7.987 meters or 26.204 feet.)

**26.33 (N. J. G. S.).**—At **West End**, Monmouth County, at the southeast corner of the railroad station, west of the tracks, on the northeast corner of the concrete footing supporting an iron column which in turn supports the roof. The mark is about 0.75 feet above the platform. A chiseled cross. (8.009 meters or 26.276 feet.)

**T. B. M. 12.**—About 0.7 mile south of **Long Branch**, Monmouth County, on the Pennsylvania Railroad, at signal tower No. L241, on the south base bolt on the east side. The top of the bolt. (10.895 meters or 35.745 feet.)

**P 5.**—At **Elberon**, Monmouth County, in the west face of the Pennsylvania Railroad station, on the corner of the central section, and 2.5 feet above the sidewalk. A standard disk, stamped "P 5 1930," and set vertically. (11.970 meters or 39.272 feet.)

**37.39 (N. J. G. S.).**—At **Elberon**, Monmouth County, at the Pennsylvania Railroad station, east of the track, and on the north end of the sill of the most southerly door in the west face of the building. A chiseled cross. (11.372 meters or 37.310 feet.)

**30.33 (N. J. G. S.).**—About  $\frac{3}{4}$  mile north of **Deal**, Monmouth County, at the New Jersey Water and Light Co.'s power house, on the east side of the railroad, and on the center of the concrete sill of the most westerly window in the north face of the building. A chiseled cross. (9.199 meters or 30.180 feet.)

**Q 5.**—At **Deal**, Monmouth County, at the Pennsylvania Railroad station, in the stone step on the west face of the station, and at the most northerly door. A standard disk, stamped "Q 5 1930," (9.926 meters or 32.566 feet.)

**32.68 (N. J. G. S.).**—At **Deal**, Monmouth County, at the railroad station, east of the track, and on the north end of the sill of the most northerly door in the west face of the building. A chiseled cross. (9.916 meters or 32.533 feet.)

**T. B. M. 14.**—At **Allenhurst**, Monmouth County, in the northeast corner of the concrete base of a support for the station, and west of the tracks. A chiseled cross. (5.037 meters or 16.526 feet.)

**T. B. M. 15.**—About 0.2 mile north of **North Asbury Park**, Monmouth County, at bridge No. 27.11, on the northeast corner of the northeast abutment. A chiseled square. (4.018 meters or 13.182 feet.)

**R 5.**—At **Asbury Park**, Monmouth County, on the west face of the railroad station, on the projection at the ticket office, and 2 feet above the sidewalk. A standard disk, stamped "R 5 1930," and set vertically. (4.723 meters or 15.495 feet.)

**S 5.**—At **Asbury Park**, Monmouth County, at the corner of Grant and First Avenues, at the front entrance to the public library, on the second step. A standard disk, stamped "S 5 1930," and set horizontally. (6.488 meters or 21.286 feet.)

**T 5.**—At **Asbury Park**, Monmouth County, on the southwest corner of the post office. A standard disk, stamped "T 5 1930," and set in stone. (7.675 meters or 25.180 feet.)

**U 5.**—At **Bradley Beach**, Monmouth County, in the west face of the railroad station, about 10 feet south of the north end of the building, and 2½ feet above the sidewalk. A standard disk, stamped "U 5 1930," and set vertically. (7.823 meters or 25.666 feet.)

**V 5.**—At **Avon by the Sea**, Monmouth County, about 100 yards south of the railroad station and 26.2 feet east of the east rail. A standard disk, stamped "V 5 1930," and set in the top of a concrete post. (4.155 meters or 13.632 feet.)

**W 5.**—At **Belmar**, Monmouth County, at the railroad station, in the center of the section of the building housing the ticket office. A standard disk, stamped "W 5 1930," and set vertically. (5.653 meters or 18.547 feet.)

**17.24 (N. J. G. S.).**—At **Belmar**, Monmouth County, at the railroad station, on the west face of the building, at the outer edge of the south end of the doorsill. A chiseled cross. (5.192 meters or 17.034 feet.)

**20.95 (N. J. G. S.).**—At **Lake Como**, Monmouth County, on the west face of the railroad station, at the most southerly entrance, on the outer corner at the north end of the door sill. A chiseled cross. (6.348 meters or 20.827 feet.)

**X 5.**—At **Spring Lake**, Monmouth County, on the west side of the railroad station, in the face of the stone window sill of the ticket office. A standard disk, stamped "X 5 1930," and set vertically. (7.598 meters or 24.928 feet.)

**Y 5.**—At **Seagirt**, Monmouth County, about 75 yards south of the railroad station, about 75 feet north of the center of the crossing of a highway, and

14.2 feet east of the east rail. A standard disk, stamped "Y 5 1930," and set in the top of a concrete post. (5.864 meters or 19.239 feet.)

**Z 5.**—At **Manasquan**, Monmouth County, at the southeast corner of the Manasquan High School, about 8 inches above the ground, in the face of a stone window sill. A standard disk, stamped "Z 5 1930," and set vertically. (5.122 meters or 16.804 feet.)

**A 6.**—At **Manasquan**, Monmouth County, in the north face of the post office, 3 feet above the sidewalk, and 1 foot from the east face of the building. A standard disk, stamped "A 6 1930," and set in the stone wall. (6.409 meters or 21.027 feet.)

**19.37 (N. J. G. S.).**—At **Manasquan**, Monmouth County, at the Manasquan National Bank on Main Street, just east of South Street, on the outer edge of the easterly end of the granite doorsill and step at the entrance to the building. A chiseled cross. (5.907 meters or 19.380 feet.)

**T. B. M. 22.**—About 1 mile south of **Manasquan**, Monmouth County, on the Pennsylvania Railroad at the second bridge south of Manasquan, on the northeast pier or the long railroad bridge over a stream. A chiseled cross. (2.508 meters or 8.228 feet.)

**B 6.**—At **Point Pleasant**, Ocean County, in the face of the ticket-window projection of the railroad station, and about 2 feet above the sidewalk. A standard disk, stamped "B 6 1930," and set vertically. (4.301 meters or 14.111 feet.)

**C 6.**—About 0.1 mile north of **Bayhead**, Ocean County, at the Pennsylvania Railroad bridge No. 69/18, about 5.6 feet east of the east rail, on the southeast abutment. A standard disk, stamped "C 6 1930," and set in the concrete abutment. (1.596 meters or 5.236 feet.)

**D 6.**—At **Mantoloking**, Ocean County, at the southeast corner of the fire station, on the concrete steps. A standard disk, stamped "D 6 1930," and set horizontally. (1.262 meters or 4.140 feet.)

**E 6.**—At **Lavallette**, Ocean County, about 130 feet north of the railroad station, between a siding and a dirt road which is parallel to and east of the tracks, 48 feet north of the center line of a street which crosses the tracks, and 25.3 feet east of the east rail of the main-line track. A standard disk, stamped "E 6 1930," and set in the top of a concrete post. (1.979 meters or 6.493 feet.) Note: This mark is in danger of being disturbed by traffic.

**EX 6.**—At **Lavallette**, Ocean County, 93¼ feet south of the south face of the railroad station, 49½ feet east of the east rail of the main-line track, and 87 feet north of the center of an east-and-west street. A standard disk, stamped "EX 6 1930," and set in the top of a concrete post which projects about 2 inches above the ground. (1.845 meters or 6.053 feet.)

**F 6.**—At **Seaside Heights**, Ocean County, on the west face of the railroad station, on the south side of the south entrance. A standard disk, stamped "F 6 1930," and set vertically in the face of the doorsill. (2.186 meters or 7.172 feet.)

**G 6.**—At **Seaside Park**, Ocean County, at the southeast corner of the Seaside Park School, about 2 feet above the ground, 1 foot west of the east face of the building, and 1 foot below the corner stone. A standard disk, stamped "G 6 1930," and set vertically. (2.073 meters and 6.801 feet.)

**H 6.**—At **Seaside Park**, Ocean County, about 125 feet south of the railroad station, 25.0 feet east of the east rail, 10.3 feet south of a hedge, and 8½ feet west of pole No. 55X. A standard disk, stamped "H 6 1930," and set in the top of a concrete post which projects about 6 inches above the ground. (1.895 meters or 6.217 feet.)

**J 6.**—At **Seaside Park**, Ocean County, about 700 feet north of the railroad station, at the edge of the town, in the southeast concrete footing of the Seaside Park water tank. A standard disk, stamped "J 6 1930," and set horizontally. (1.833 meters or 6.014 feet.)

**K 6.**—At **Oceangate**, Ocean County, 45.1 feet south of the southwest corner of the railroad station, and 27.95 feet south of the south rail of the main-line track. A standard disk, stamped "K 6 1930," and set in the top of a concrete post which projects about 6 inches above the ground. (2.202 meters or 7.224 feet.)

**L 6.**—At **Beachwood**, Ocean County, on the Pennsylvania Railroad, 76½ feet west of the center of the crossing of the Atlantic City highway, 25.7 feet south of the south rail, and 17 feet north of a dirt road which parallels the tracks. A standard disk, stamped "L 6 1930," and set in the top of a concrete post. (7.481 meters or 24.544 feet.)

**M 6.**—At **Beachwood**, Ocean County, at the crossing of the Pennsylvania Railroad and the Central Railroad of New Jersey, 70 feet east of the railroad station, 18 feet northeast of the intersection of the tracks, and 58 feet southwest of the end of the curb on the street leading to the station. A standard disk, stamped "M 6 1930," and set in the top of a concrete post. (7.811 meters or 25.627 feet.)

**N 6.**—About 2 miles south of **Beachwood**, Ocean County, on the Central Railroad of New Jersey, about 100 feet north of the road forks, between the tracks and the gravel road, 21.4 feet west of the west rail, 21 feet east of the center of the gravel road, and 42 feet south of a pole. A standard disk, stamped "N 6 1930," and set in the top of a concrete post. (10.317 meters or 33.848 feet.)

**P 6.**—About 2.9 miles south of **Beachwood**, Ocean County, on the Central Railroad of New Jersey, about 60 feet northeast of a highway crossing, 55.0 feet east of the east rail, 16 feet east of a dirt road which parallels the tracks, 72 feet north of a road leading to the highway, and 20 feet west of a long barn. A standard disk, stamped "P 6 1930," and set in the top of a concrete post. (15.537 meters or 50.974 feet.)

**Q 6.**—At **Lanoka Harbor**, Ocean County, about 116 feet north of the railroad station, 45½ feet east of the east rail, at the edge of the woods. A standard disk, stamped "Q 6 1930," and set in the top of a concrete post. (5.941 meters or 19.491 feet.)

**S 6.**—At **Forked River**, Ocean County, on the Central Railroad of New Jersey, 44¼ feet south of the first crossing north of the station, and 20.2 feet west of the west rail. A standard disk, stamped "S 6 1930," and set in the top of a concrete post which projects about 4 inches above the ground. (5.942 meters or 19.495 feet.)

**R 6.**—At **Forked River**, Ocean County, about 164 feet south of the Central Railroad of New Jersey station, 63 feet north of the edge of the river, 45.4 feet east of the east rail, and 12½ feet south of the south edge of a road. A standard disk, stamped "R 6 1930," and set in the top of a concrete post which projects about 6 inches above the ground. (4.384 meters or 14.383 feet.)

**T 6.**—About 1.2 miles north of **Waretown**, Ocean County, on the west end of the south abutment of a highway bridge. A standard disk, stamped "T 6 1930," and set horizontally. (2.454 meters or 8.051 feet.)

**V 6.**—At **Waretown**, Ocean County, 58¼ feet north of the railroad station, and 20¾ feet east of the east rail. A standard disk, stamped "V 6 1930," and set in the top of a concrete post which projects about 2 inches above the ground. (4.578 meters or 15.020 feet.)

**B. M. (Unidentified).**—At **Waretown**, Ocean County, at the Central Railroad of New Jersey station, on the sill of one of the doors on the east side of the station. A chiseled cross. (4.689 meters or 15.384 feet.)

**W 6.**—About 1 mile north of **Barnegat**, Ocean County, between the Central Railroad of New Jersey and the Tuckerton Railroad, 46 feet south of a road crossing, 30.1 feet east of the east rail of the Tuckerton Railroad, and 39.6 feet west of the west rail of the Central Railroad of New Jersey. A standard disk, stamped "W 6 1930," and set in the top of a concrete post which projects about 6 inches above the ground. (9.776 meters or 32.073 feet.)

**Y 6.**—At **Barnegat**, Ocean County, at the north edge of the town, east of the tracks of the Central Railroad of New Jersey, on the west side of the circular concrete wall of a turntable. A standard disk, stamped "Y 6 1930," and set horizontally in the top of a wall. (12.798 meters or 41.988 feet.)

**X 6.**—At **Barnegat**, Ocean County, on the west face of and near the southwest corner of the First National Bank on South Bay Street. A standard disk, stamped "X 6 1930," and set vertically about 2½ feet above the sidewalk. (13.136 meters or 43.097 feet.)

**Z 6.**—About 1.7 miles north of **Manahawkin**, Ocean County, about 110 feet north of the crossing of a secondary road, and 15.1 feet east of the east rail of the Tuckerton Railroad. A standard disk, stamped "Z 6 1930," and set in the top of a concrete post which projects about 3 inches above the ground. (10.794 meters or 35.413 feet.)

**A 7.**—At **Manahawkin**, Ocean County, on the Tuckerton Railroad, just south of the main highway crossing at Manahawkin, on the northeast corner of the concrete base of a signal tower. A standard disk, stamped "A 7 1930," and set horizontally. (8.600 meters or 28.215 feet.)

**B 7.**—At **Manahawkin**, Ocean County, about 100 feet west of the four corners on Route No. S 40, on the north end of the east abutment of the first high-

way bridge west of the town. A standard disk, stamped "B 7 1930," and set horizontally. (7.656 meters or 25.118 feet.)

**V 7.**—At **Staffordville**, Ocean County, on the Tuckerton Railroad, 60½ feet south of the highway crossing, and 17.0 feet west of the west rail. A standard disk, stamped "V 7 1930," and set in the top of a concrete post. (8.586 meters or 28.169 feet.)

**W 7.**—At **West Creek**, Ocean County, on the Tuckerton Railroad, about 30 feet southwest of the station, about 31½ feet south of the center of the highway, and 14.0 feet west of the west rail. A standard disk, stamped "W 7 1930," and set in the top of a concrete post which projects about 3 inches above the ground. (7.166 meters or 23.510 feet.)

**X 7.**—At **Tuckerton**, Ocean County, 91½ feet southeast of the railroad station, 69 feet east of a road which parallels the tracks on the west, 30 feet south of a dirt road running east and west, and 16.8 feet east of the most easterly rail. A standard disk, stamped "X 7 1930," and set in the top of a concrete post which projects about 6 inches above the ground. (4.800 meters or 15.748 feet.)

**Y 7.**—At **Tuckerton**, Ocean County, on the southwest corner of the Tuckerton High School, and 2 feet above the ground. A standard disk, stamped "Y 7 1930," and set vertically in the brick wall. (6.941 meters or 22.772 feet.)

**Z 7.**—At **Tuckerton**, Ocean County, in the north face of the Tuckerton Bank, 2 feet east of the northwest corner, and about 8 inches above the ground. A standard disk, stamped "Z 7 1930," and set vertically in the stone wall. (6.458 meters or 21.188 feet.)

**A 8.**—About 2.2 miles west of **Tuckerton**, Ocean County, 95 feet northwest of pole No. S38, 80 feet north by east from pole No. S37, and 36 feet north of the center of the highway. A standard disk, stamped "A 8 1930," and set in the top of a concrete post which projects about 6 inches above the ground. (17.963 meters or 58.934 feet.)

**B 8.**—About 1.7 miles east of **New Gretna**, Burlington County, on the abutment at the northeast corner of the highway bridge over Jobs Creek. A standard disk, stamped "B 8 1930." (2.509 meters or 8.232 feet.)

**C 8.**—At **New Gretna**, Burlington County, at the north edge of the town, 36 feet northwest of the center of highways Nos. 4 and 9, 58 feet southwest of a culvert, 69 feet north of A. C. E. System pole No. 5901, and 100 feet west of a curve in the highway. A standard disk, stamped "C 8 1930," and set in the top of a concrete post which projects about 6 inches above the ground. (1.678 meters or 5.505 feet.)

**D 8.**—At **New Gretna**, Burlington County, near the center of the town, about 137 feet southwest of the St. Paul's Methodist Episcopal Church, about 100 feet west of the residence of E. Cramer, 99 feet northwest of pole No. 649, and 28½ feet west of the center of highways Nos. 4 and 9. A standard disk, stamped "D 8 1930," and set in the top of a concrete post which projects about 4 inches above the ground. (5.178 meters or 16.988 feet.)

**E 8.**—At **New Gretna**, Burlington County, at the south edge of the town, in the southwest corner of a cultivated field at the edge of a wood, 794 feet south of a road intersection and pole No. 841, and 26 feet east of the center line of highways Nos. 4 and 9. A standard disk, stamped "E 8 1930," and set in the top of a concrete post which is flush with the ground. (4.472 meters or 14.672 feet.)

**F 8.**—In Atlantic County, about 3.6 miles south of **New Gretna**, Burlington County, 17.3 feet west of the D. A. R. Monument, and 34 feet north of pole No. 494. A standard disk, stamped "F 8 1930," and set in a concrete post which projects about 6 inches above the ground. (2.540 meters or 8.333 feet.)

**G 8.**—About 2.3 miles north of the post office at **Oceanville**, Atlantic County, 34.6 feet east of the center line of highways Nos. 4 and 9, 243 feet north of a road intersection, 460 feet south of another road intersection, 26 feet west of the center of a dirt road which parallels the highway, 9.0 feet south of a spike in a pine tree, and 7.9 feet east of a spike in an oak tree. A standard disk, stamped "G 8 1930," and set in the top of a concrete post which projects about 2 inches above the ground. (4.254 meters or 13.957 feet.)

**H 8.**—At **Oceanville**, Atlantic County, at the northeast corner of School No. 1. A standard disk, stamped "H 8 1930," and set vertically in the brick wall. (13.348 meters or 43.793 feet.)

**J 8.**—At **Absecon**, Atlantic County, at the southeast corner of the First National Bank of Absecon. A standard disk, stamped "J 8 1930," and set vertically in the brick wall. (6.062 meters or 19.888 feet.)

**L 8.**—At **Absecon**, Atlantic County, on the southeast corner of the Absecon school. A standard disk, stamped "L 8 1930," and set vertically in the brick wall. (8.177 meters or 26.827 feet.)

**K 8.**—At **Absecon**, Atlantic County, on the southeast face of the city hall, about 12 feet southwest of the northeast corner of the building, and 2½ feet above the ground. A standard disk, stamped "K 8 1930," and cemented vertically in the brick wall. (7.769 meters or 25.489 feet.)

**B 4.**—See page 15.

**BM 54 (?)**—At **Absecon**, Atlantic County, on the northeast abutment of Pennsylvania Railroad bridge No. 52/12 which is the first bridge southeast of the station. A bolt cemented in rock with the inscription "B. M. 54" chiseled in the rock. (2.362 meters or 7.749 feet.)

**M 8.**—At **Pleasantville**, Atlantic County, on Leeds Avenue at Pleasantville School No. 3, on the south face of the building, 4 feet east of the main entrance, and 2 feet above the ground. A standard disk, stamped "M 8 1930," and cemented vertically in the brick wall. (8.814 meters or 28.917 feet.)

**N 8.**—At **Pleasantville**, Atlantic County, 3.0 feet west of the northeast corner of the Pleasantville School on Washington Avenue. A standard disk, stamped "N 8 1930," and set vertically in the brick wall. (10.784 meters or 35.381 feet.)

**G 4.**—See page 16.

**P 8.**—At **Pleasantville**, Atlantic County, on Franklin Avenue, at the main entrance to the Senior High School, and at the northwest corner of the steps. A standard disk, stamped "P 8 1930," and cemented vertically in the brick wall. (3.664 meters or 12.021 feet.)

#### LINE 8, MANAHAWKIN TO BEACH HAVEN AND BARNEGAT CITY, N. J.

This line follows the Pennsylvania Railroad from Manahawkin to Beach Haven. From Shipbottom a spur line follows the highway to Barnegat City. The field work was done during the summer of 1930 by W. R. Porter, junior hydrographic and geodetic engineer.

**A 7.**—See page 22.

**C 7.**—About 3 miles east of **Manahawkin**, Ocean County, at the first highway bridge east of the railroad crossing, about 100 feet east of the crossing, on the abutment at the southwest corner of the bridge. A standard disk, stamped "C 7 1930," and set horizontally. (1.472 meters or 4.829 feet.)

**D 7.**—About 2 miles west of **Shipbottom**, Ocean County, on Bonnet Island, about 100 yards west of the drawbridge, south of the tracks, and on the northeast corner of the concrete base of semaphore. A standard disk, stamped "D 7 1930," and set horizontally. (1.580 meters or 5.184 feet.)

**H 7.**—At **Shipbottom-Beach Arlington**, Ocean County, at the standpipe, on the east side of the concrete base. A lag screw and washer, stamped "H 7 1930," and set in the concrete. (2.157 meters or 7.077 feet.)

**G 7.**—At **Shipbottom-Beach Arlington**, Ocean County, west of the railroad station, in the northeast corner of the concrete base of Semaphore No. 10710. A standard disk, stamped "G 7 1930," and set horizontally. (1.311 meters or 4.301 feet.)

**F 7.**—At **Shipbottom-Beach Arlington**, Ocean County, across the road from Conrad Brothers Lumber Co., 49.2 feet west of the edge of the concrete highway, 77.2 feet south of the railroad station, and 19.2 feet east of the east rail. A standard disk, stamped "F 7 1930," and set in the top of a concrete post which is flush with the ground. (1.127 meters or 3.697 feet.)

**NOTE.**—This is an unusual type of mark, having been cast in a 9-inch augur hole about 4 feet deep, the bottom of which was enlarged by taking out wet sand which caved into the hole near the bottom. A dry mix of cement and sand was used to fill the hole up to where water had been encountered in digging and a wet mix of cement and sand to complete the mark. It is requested that anyone recovering and making use of this mark also tie in to H 7 or G 7 near by as a check on the stability of F 7, which is somewhat in the nature of an experimental mark. This office will greatly appreciate reports on any ties made between F 7 and other near-by marks.

#### Spur line to Barnegat City.

**E 7.**—About 0.5 mile north of **Shipbottom-Beach Arlington**, Ocean County, on the northeast corner of the junction of the Beach and Manahawkin roads, between the curb and the sidewalk, 23.7 feet north of the edge of the curb of a blind street, 7.2 feet west of the west edge of the sidewalk and 3.2 feet

east of the east curb of the Beach road. A standard disk, stamped "E 7 1930," and set in the top of a concrete post which is flush with the ground. (1.668 meters or 5.472 feet.)

NOTE.—This is also a mark of the experimental type similar to F 7, described on page 24, and should not be used to control important leveling without tying in additional marks. This office will greatly appreciate reports on any such ties as may be made.

**P 7.**—At Surf City, Ocean County, at the Surf City water tank, on the northwest corner of the northwest concrete footing. A standard disk, stamped "P 7 1930." (2.047 meters or 6.716 feet.)

**Q 7.**—At Highpoint, Ocean County, on the southwest corner of the concrete tank and 20 feet east of the Highpoint water tank. A standard disk, stamped "Q 7 1930," and set vertically in the concrete wall. (1.296 meters or 4.252 feet.)

**R 7.**—About 1.6 miles south of Barnegat City, Ocean County, 51½ feet west ¼ north of A. C. E. System pole No. 8314, 25½ feet southwest of telephone pole No. 254, and 33½ feet west of the center of the road. A standard disk, stamped "R 7 1930," and set in the top of a concrete post. (1.649 meters or 5.410 feet.)

NOTE.—This mark is of the same type of construction as F 7 and should not be used to control important leveling without checking upon near-by bench marks of the standard type of construction.

**S 7.**—At Barnegat City, Ocean County, at the Coast Guard Station, on the southeast corner of the concrete base of the flagpole. A standard disk, stamped "S 7 1930." (2.137 meters or 7.011 feet.)

**T 7.**—At Barnegat City, Ocean County, west of the west end of the street, about 100 yards west of the post office, about 100 yards south of the Sunset Hotel, 49 feet west of the center of the street, 35½ feet south of pole No. 322, 33.5 feet south of a concrete monument numbered "BM2," and 35 feet south of the south edge of the hotel property. A standard disk, stamped "T 7 1930," and set in a concrete post which extends about 8 inches above the ground. (1.493 meters or 4.898 feet.)

NOTE.—This mark is of the same type of construction as F 7 and should not be used to control important leveling without checking upon near-by bench marks of the standard type of construction.

**BM 2 (?).**—At Barnegat City, Ocean County, about 100 yards west of the post office and 33½ feet north of Bench Mark T 7, described above. A cross cut in the top of a concrete post which projects about 12 inches above the ground. (1.992 meters or 6.535 feet.)

**U 7.**—At Barnegat City, Ocean County, at the lighthouse, on the southwest corner of the concrete base of the battery box. A standard disk, stamped "U 7 1930." (3.556 meters or 11.667 feet.)

End of spur line.

**T. B. M. 76.**—At Brant Beach, Ocean County, at the Brant Beach water tower, in the east face of the southeast concrete footing. A lag screw cemented in a horizontal drill hole in the nearly vertical face of the concrete footing. (1.930 meters or 6.332 feet.)

**J 7.**—At Peahala, Ocean County, 61.1 feet south of the railroad station, 18.6 feet east of the east rail of the Pennsylvania Railroad, and 38.8 feet west of the west edge of the highway. A standard disk, stamped "J 7 1930," and set in the top of a concrete post which is flush with the ground. (1.262 meters or 4.140 feet.)

NOTE.—This is an experimental type of mark similar to F 7, described on page 24, and anyone using this mark to control important leveling should tie to some other near-by mark. This office will greatly appreciate a report on any such ties that may be made.

**K 7.**—At Beach Haven Terrace, Ocean County, at the Long Beach standpipe, on the east side of the concrete base. A standard disk, stamped "K 7 1930," and set horizontally. (1.995 meters or 6.545 feet.)

**L 7.**—At Beach Haven, Ocean County, in the north part of the town, on the southwest corner of a brick school building. A standard disk, stamped "L 7 1930," and set vertically in the wall. (2.536 meters or 8.320 feet.)

**M 7.**—At Beach Haven, Ocean County, near the center of the town, on the northwest corner of the northwest footing for the Beach Haven water tank. A standard disk, stamped "M 7 1930," and set horizontally. (2.009 meters or 6.591 feet.)

**N 7.**—At **Beach Haven**, Ocean County, on the northeast corner of the Beach Haven National Bank and Trust Co. building. A standard disk, stamped "N 7 1930," and set vertically in the brick wall. (1.842 meters or 6.043 feet.)

**Tidal 3.**—1.7 miles south of **Beach Haven**, Ocean County, at the Bonds Coast Guard Station, on the southeast corner of a square concrete cesspool, about 7 feet from the south side of the Coast Guard Station, and 1.8 feet above the ground. Originally Tidal 3 was an unmarked point 2 inches from both edges of the concrete, but in 1930 a standard disk, stamped "NX 7 1930," was cemented in the concrete, flush with the surface. (2.286 meters or 7.500 feet.)

**Tidal 2.**—About 1.7 miles south of **Beach Haven**, Ocean County, at the Bonds Coast Guard Station, on top of the southwest corner of a square concrete water basin at the artesian well about 23 feet south of the Coast Guard Station. No mark was made on the concrete but the level rod was held on the corner about 2 inches from both edges. (2.235 meters or 7.333 feet.)

#### LINE 9, SEA ISLE JUNCTION TO CAMDEN, N. J.

This line follows highways from Sea Isle Junction, N. J., through Dennisville, Delmont, Port Elizabeth, Millville, Bridgeton, Quinton, and Salem, to Penns Grove, thence along the West Jersey and Seashore Railroad to Camden, N. J. The field work was done during the summer of 1930 by W. R. Porter, junior hydrographic and geodetic engineer.

**Q 4.**—See page 17.

**16.90 (P. R. R.).**—See page 17.

**Q 8.**—At **South Seaville**, Cape May County, in the concrete base of the first semaphore south of the railroad station, and about 10 feet north of the highway. A standard disk, stamped "Q 8 1930." (6.771 meters or 22.215 feet.)

**R 8.**—About  $\frac{1}{2}$  mile east of **South Dennis**, Cape May County, on the east side of highway No. 4, 80 feet north of the crossing of a dirt road, 105 feet northeast of the corner of a yellow house located at the intersection of the highway and road, 26 feet east of the center line of the highway,  $38\frac{1}{2}$  feet south of telephone pole No. 30, and  $53\frac{1}{2}$  feet east of telephone pole No. 2974. A standard disk, stamped "R 8 1930," and set in the top of a concrete post. (5.281 meters or 17.326 feet.)

**S 8.**—At **Dennisville**, Cape May County, on highway No. 49, at the crossing of the first branch of Dennis Creek to the west of Dennisville, on the northeast abutment of the highway bridge. A standard disk, stamped "S 8 1930." (3.359 meters or 11.020 feet.)

**T 8.**—About 3.2 miles west of **Dennisville**, Cape May County, on highway No. 49, on property belonging to Charles Christian of Cape May, 35.0 feet north of the center line of the highway,  $86\frac{1}{4}$  feet northwest of pole No. 2767,  $62\frac{1}{4}$  feet southeast of pole No. 2766, opposite concrete road block No. 1094, and 23 feet northeast of the third cedar tree of a line of four cedar trees paralleling the road. A standard disk, stamped "T 8 1930," and set in the top of a concrete post which projects about 2 inches above the ground. (4.608 meters or 15.118 feet.)

**U 8.**—About 1.2 miles west of **Eldora**, Cape May County, at the highway bridge crossing West Creek, on the south curb at a point 10 feet west of the east end of the bridge. A standard disk, stamped "U 8 1930." (3.485 meters or 11.434 feet.)

**UX 8.**—At **Delmont**, Cumberland County, on property belonging to Howard Thorson, 101 feet southwest of the Thorson house,  $28\frac{1}{4}$  feet north of the center line of highway No. 49, and  $23\frac{1}{4}$  feet northeast of pole No. BT 32576. A standard disk, stamped "UX 8 1930," and set in the top of a concrete post which projects about 2 inches above ground. (3.262 meters or 10.702 feet.)

**V 8.**—About 1.5 miles north of **Delmont**, Cumberland County, at the New Jersey State Prison Farm, on the southeast concrete footing of the 150-foot water tank. A standard disk, stamped "V 8 1930." (4.505 meters or 14.780 feet.)

**X 8.**—About 0.5 mile southeast of **Dorchester**, Cumberland County, 57.8 feet southeast of the center line of highway No. 49, opposite the dirt road leading to Dorchester, 29 feet northeast of the center line of a dirt road leading southeast, and  $32\frac{1}{2}$  feet southeast of a concrete road sign. A standard disk, stamped

"X 8 1930," and set in the top of a concrete post which projects about 4 inches above the ground. (6.231 meters or 20.443 feet.)

**W 8.**—About 0.7 mile south of **Port Elizabeth**, Cumberland County, on the northeast abutment of the highway bridge over Muskee Creek. A standard disk, stamped "W 8 1930." (2.268 meters or 7.441 feet.)

**WX 8.**—At **Port Elizabeth**, Cumberland County, 24½ feet east of highway No. 49, opposite the north edge of property belonging to J. Howard Heiseler, 70½ feet south of pole No. 725, and 59 feet north of pole No. 726. A standard disk, stamped "WX 8 1930," and set in the top of a concrete post which projects about 4 inches above the ground. (3.154 meters or 10.348 feet.)

**Y 8.**—About 2 miles north of the cemetery at **Port Elizabeth**, Cumberland County, on highway No. 49, at the bridge over Menantico Creek, on the west curb, and 10 feet north of the south end of the bridge. A standard disk, stamped "Y 8 1930." (3.013 meters or 9.885 feet.)

**Z 8.**—At **Millville**, Cumberland County, east of a Shell gasoline station at the southeast edge of the town, 27.7 feet east of the center line of highway No. 49, 60½ feet north of pole No. 1039, 65¾ feet southeast of pole No. 1038, 53¼ feet east of pole No. 56306, and 8.3 feet southeast of a hydrant. A standard disk, stamped "Z 8 1930," and set in the top of a concrete post which projects about 4 inches above the ground. (6.906 meters or 22.657 feet.)

**C 9.**—At **Millville**, Cumberland County, on the northeast corner of the city hall. A standard disk, stamped "C 9 1930," and set in concrete. (9.206 meters or 30.203 feet.)

**A 9.**—At **Millville**, Cumberland County, on the southeast corner of the Millville National Bank building. A standard disk, stamped "A 9 1930," and set in concrete. (8.990 meters or 29.495 feet.)

**B 9.**—At **Millville**, Cumberland County, on the southeast corner of the post-office building. A standard disk, stamped "B 9 1930," and set in concrete. (11.140 meters or 36.548 feet.)

**D 9.**—About 3 miles west of **Millville**, Cumberland County, at the New Jersey Forest Fire Lookout Tower, on the east concrete footing of the tower. A standard disk, stamped "D 9 1930." (30.348 meters or 99.567 feet.)

**E 9.**—About 5 miles west of **Millville**, Cumberland County, 22 feet north of the center line of highway No. 49, between an apple orchard and a thick wood, 15 feet northwest of pole No. 2335, and 49 feet east of pole No. 235. A standard disk, stamped "E 9 1930," and set in the top of a concrete post which projects about 2 inches above the ground. (30.152 meters or 98.924 feet.)

**F 9.**—At **Gouldtown**, Cumberland County, 200 feet southeast of a house owned by William Wright, 21.7 feet north of the center line of highway No. 49, 72 feet east of pole No. 67/120, 59 feet west of pole No. 67/119, and 30 feet north of pole No. 3985. A standard disk, stamped "F 9 1930," and set in the top of a concrete post which projects about 2 inches above the ground. (27.007 meters or 88.605 feet.)

**G 9.**—At **Bridgeton**, Cumberland County, at the corner of East Commerce and Bank Streets, on the southwest corner of the post office. A standard disk, stamped "G 9 1930," and set in concrete. (11.617 meters or 38.113 feet.)

**38.44 (N. J. G. S.)**—At **Bridgeton**, Cumberland County, at the corner of East Commerce and Bank Streets, at the main entrance to the post office, on the southwest corner of the stone base to the most westerly column of the porch. A chiseled cross. (11.831 meters or 38.816 feet.)

**32.73 (N. J. G. S.)**—At **Bridgeton**, Cumberland County, at the corner of East Commerce and Bank Streets, at the Central Methodist Episcopal Church, at the entrance under the tower, on the outer corner of the northerly end of the doorsill. A chiseled cross. (10.087 meters or 33.094 feet.)

**H 9.**—At **Bridgeton**, Cumberland County, on the northwest corner of the Cumberland County Courthouse. A standard disk, stamped "H 9 1930," and set vertically. (14.410 meters or 47.277 feet.)

**J 9.**—At **Bridgeton**, Cumberland County, on the southeast corner of the Bridgeton High School. A standard disk, stamped "J 9 1930," and set vertically in the brick wall. (24.541 meters or 80.515 feet.)

**K 9.**—About 1.5 miles southeast of **Shiloh**, Cumberland County, in the northeast end of the bridge over Barretts Run. A standard disk, stamped "K 9 1930," and set vertically in the concrete wall. (17.797 meters or 58.389 feet.)

**L 9.**—At **Shiloh**, Cumberland County, in the northeast face of the Shiloh Public School, 10 feet southeast of the north corner of the building, and 3 feet above the ground. A standard disk, stamped "L 9 1930," and set vertically in the brick wall. (35.832 meters or 117.559 feet.)

**T. B. M. 183.**—At **Marlboro**, Salem County, at the highway bridge over Sarah Run, on the northeast side of the highway, on the southeast corner of the east abutment. A chiseled cross. (18.503 meters or 60.705 feet.)

**M 9.**—At **Marlboro**, Salem County, at the east corner of the Marlboro Church, in the southeast face of the building, and 3.5 feet above the ground. A standard disk, stamped "M 9 1930," and set vertically in sandstone. (21.096 meters or 69.212 feet.)

**N 9.**—About 1.8 miles northwest of **Marlboro**, Salem County, about 150 yards northwest of Pikes Corners, directly east of a lone house called "Chestnut Cottage," 25.6 feet northeast of the center line of highway No. 49, 90 feet northwest of pole No. 398, and 24 feet east of pole No. 399. A standard disk, stamped "N 9 1930," and set in the top of a concrete post. (21.582 meters or 70.807 feet.)

**NX 9.**—About 2 miles southeast of **Quinton**, Salem County, 38 feet north by east of the center of highway No. 49, 72 feet southeast of pole No. 490, 24½ feet northwest of pole No. 489, and 51.4 feet west by north of the end of the railing along the highway. A standard disk, stamped "NX 9 1930," and set in the top of a concrete post. (36.302 meters or 119.101 feet.)

**P 9.**—At **Quinton**, Salem County, in the northwest corner of the Quinton Grammar School. A standard disk, stamped "P 9 1930," and set vertically in the brick wall. (6.380 meters or 20.932 feet.)

**18.97 (N. J. G. S.).**—At **Quinton**, Salem County, about 100 yards easterly from the Quinton Glass Co.'s store, on the northerly side of Main Street, at the granite monument set by the Daughters of the American Revolution, at the bottom of the inscription, on the east end of the carved fold. An arrow cut in the granite. (5.968 meters or 19.590 feet.)

**Q 9.**—At **Quinton**, Salem County, at the highway bridge over Alloway Creek, in the south end of the northeast curb. A standard disk, stamped "Q 9 1930," and set in concrete. (2.774 meters or 9.101 feet.)

**Chiseled square (?).**—At **Quinton**, Salem County, on the northwest pier of the highway bridge over Alloway Creek. A large chiseled square. (1.197 meters or 3.927 feet.)

**R 9.**—At **Salem**, Salem County, at the northeast corner of the building of the Salem National Bank and Trust Co., 0.5 foot west of the east face of the building, and 3.5 feet above the sidewalk. A standard disk, stamped "R 9 1930," and set vertically in granite. (5.822 meters or 19.101 feet.)

**16.82 (N. J. G. S.).**—At **Salem**, Salem County, at the Broadway entrance to the Salem County Courthouse, near the outer edge of, and 9 inches from, the northwest end of the granite doorsill. A chiseled cross. (5.267 meters or 17.280 feet.)

**S 9.**—At **Salem**, Salem County, in the northeast corner of the main wing of the Salem High School, and about 2 feet above the ground. A standard disk, stamped "S 9 1930," and set vertically in the brick wall. (5.289 meters or 17.352 feet.)

**T 9.**—At **Salem**, Salem County, at county bridge No. 700, on the southwest end of the bridge, on the west concrete rail, 10 feet northeast of the brass inscription plate, and 1.5 feet above the sidewalk. A standard disk, stamped "T 9 1930," and set vertically in concrete. (4.048 meters or 13.281 feet.)

**V 9.**—About 2.5 miles southeast of **Pennsville**, Salem County, on property belonging to J. F. Sinnickson, east of the highway and about 100 yards north of the farmhouse rented by H. Sparks, 108 feet west of the northwest corner of a barn, 36.8 feet east of the center line of the Salem-Penns Grove highway, and 16 feet southeast of pole No. SD 521. A standard disk, stamped "V 9 1930," and set in the top of a concrete post which projects about 3 inches above the ground. (4.620 meters or 15.157 feet.)

**W 9.**—At **Pennsville**, Salem County, in the southwest corner of the brick grade-school building, and 2.5 feet above the ground. A standard disk, stamped "W 9 1930," and set vertically in the brick wall. (5.679 meters or 18.632 feet.)

**X 9.**—At **Pennsville**, Salem County, in the southeast face of the town hall, midway between the entrance to the fire department and the outside entrance. A standard disk, stamped "X 9 1930," and set in the brick wall. (4.390 meters or 14.403 feet.)

**Y 9.**—At **Deepwater**, Salem County, on the east concrete footing of the water tank. A standard disk, stamped "Y 9 1930." (2.729 meters or 8.953 feet.)

**Z 9.**—At **Carneys Point**, Salem County, in the west face of the John J. Pershing School, 20 feet north of the main entrance, and 3 feet above the

ground. A standard disk, stamped "Z 9 1930," and set vertically in the brick wall. (5.721 meters or 18.770 feet.)

**5.60 (N. J. G. S.).**—At **Penns Grove**, Salem County, in the railroad yards, 200 yards southeast of the station, at the water tank, on top of the south foundation bolt in the most southerly concrete footing supporting the steel frame of the tank. A cross cut in the top of the bolt. (1.944 meters or 6.378 feet.)

**C 10.**—At **Penns Grove**, Salem County, at the Pittman Street crossing of the railroad, on the northeast corner of the bell-signal tower, about 100 feet west of a large cylindrical gas tank, 32 feet north of the center of Pittman Street, and 10.2 feet west of the west rail. A standard disk, stamped "C 10 1930," and set in concrete. (3.659 meters or 12.005 feet.)

**A 10.**—At **Penns Grove**, Salem County, on the northwest corner of Borough Hall, 3.0 feet east of the west face, and 2.5 feet above the sidewalk. A standard disk, stamped "A 10 1930," and set vertically in the brick wall. (3.886 meters or 12.749 feet.)

**B 10.**—At **Penns Grove**, Salem County, in the building of the Peoples Bank of Penns Grove, 5.0 feet southwest of the main entrance, and 2.0 feet above the sidewalk. A standard disk, stamped "B 10 1930," and set in the brick wall. (4.624 meters or 15.171 feet.)

**D 10.**—At **Oldman**, Salem County, 161.6 feet southwest of the center of the highway, 102 feet northeast of pole No. P 2531, 40 feet southwest of pole No. P 2530, and 29.4 feet northwest of the northwest rail of the main line of the railroad. A standard disk, stamped "D 10 1930," and set in the top of a concrete post which projects about 2 inches above the ground. (4.448 meters or 14.593 feet.)

**E 10.**—At **Jumbo**, Salem County, 90 feet south of bridge No. 23.80, in the northeast corner of the concrete base of the bridge signal, 49 feet south of the bridge tender's house, and 6.6 feet west of the west rail. A standard disk, stamped "E 10 1930." (2.253 meters or 7.392 feet.)

**F 10.**—About 0.5 mile southwest of **Bridgeport**, Gloucester County, at culvert No. 21.20, and 18.1 feet north of the north rail. A standard disk, stamped "F 10 1930," and set in concrete. (0.832 meters or 2.730 feet.)

**G 10.**—At **Bridgeport**, Gloucester County, 118.6 feet west of the railroad station, 35.2 feet south of a packing house, and 6.7 feet north of the north rail, on the southwest corner of the concrete base of a semaphore. A standard disk, stamped "G 10 1930." (2.929 meters or 9.610 feet.)

**10.40 (N. J. G. S.).**—At **Bridgeport**, Gloucester County, at the southwest corner of the railroad station. A copper bolt, set in a concrete block. (3.359 meters or 11.020 feet.)

**H 10.**—About 1.8 miles east of **Bridgeport**, Gloucester County, at the railroad bridge over Little Timber Creek, on the southwest corner of the west railing, and 18.4 feet northwest of the northwest rail. A standard disk, stamped "H 10 1930," and set in the concrete railing. (2.588 meters or 8.491 feet.)

**J 10.**—About 0.5 mile west of **Gibbstown**, Gloucester County, at the overhead crossing of a highway, on the southeast face of the second central column, 7.5 feet northwest of the northwest rail, and about 3 feet above the ground. A standard disk, stamped "J 10 1930," and set vertically. (1.958 meters or 6.424 feet.)

**K 10.**—At **Greens**, Gloucester County, about 50 feet south of the railroad, on the northwest concrete footing of the Gibbstown water tank. A standard disk, stamped "K 10 1930," and set in the concrete footing. (4.253 meters or 13.953 feet.)

**L 10.**—At **Paulsboro**, Gloucester County, at the west edge of the town, at the water tank in the railroad yards, 7.7 feet south of the south rail, at the northwest corner of the tank. A standard disk, stamped "L 10 1930," and set in the concrete footing. (3.626 meters or 11.896 feet.)

**M 10.**—At **Paulsboro**, Gloucester County, about 1,000 feet southeast of the railroad station, on the northeast corner of the concrete base of signal tower No. 9921, and 6.4 feet southwest of the southwest rail. A standard disk, stamped "M 10 1930." (2.922 meters or 9.587 feet.)

**N 10.**—At **Thorofare**, Gloucester County, between the main line and a spur track, 88.5 feet southeast of the station, 70½ feet northwest of pole No. 11/10, 18.5 feet northeast of the northeast rail of the main-line track, and 11.5 feet southwest of the southwest rail of the spur track. A standard disk, stamped "N 10 1930," and set in the top of a concrete post. (6.467 meters or 21.217 feet.)

**P 10.**—At **Woodbury**, Gloucester County, 45.4 feet west of the center of Carpenter Street, 6.8 feet south of the south rail, and 15 feet east of the yard limit, on the northeast corner of a banjo signal. A standard disk, stamped "P 10 1930," and set in concrete. (10.528 meters or 34.541 feet.)

**37.59 (N. J. G. S.)**—At **Woodbury**, Gloucester County, at the front entrance to G. G. Green's brick laboratory which faces the railroad just south of the station of the West Jersey & Seashore Railroad Co. A chiseled cross on the south end of the stone doorsill. (11.601 meters or 38.061 feet.)

**Q 10.**—At **Woodbury**, Gloucester County, about 100 yards northeast of the station, on the southwest end of a long retaining wall, 8.3 feet northwest of the northwest rail, and 2.6 feet above the ground. A standard disk, stamped "Q 10 1930." (11.750 meters or 38.550 feet.)

**R 10.**—At **Woodbury**, Gloucester County, at the north edge of the town, about 0.3 mile north of the station, and about 75 yards north of bridge signal No. 81 C, on the southwest abutment of bridge No. 8.10, 8.0 feet west of the west rail. A standard disk, stamped "R 10 1930." (8.818 meters or 28.930 feet.)

**Copper bolt (?)**—At **Woodbury**, Gloucester County, at the north edge of the town, on the southwest abutment of railroad bridge No. 8.10. A copper bolt, set in the concrete. (8.834 meters or 28.983 feet.)

**S 10.**—At **Westville**, Gloucester County, in the southwest edge of the town, about 200 feet northwest of Highway No. 45, and about 100 feet southeast of Highway No. 44, on the southeast corner of the Westville Grammar School. A standard disk, stamped "S 10 1930," and set vertically in the brick wall. (4.300 meters or 14.108 feet.)

**T 10.**—In **Camden** County, about 0.5 mile north of **Westville**, Gloucester County, at the Brooklawn undergrade bridge, on the southwest concrete abutment. A standard disk, stamped "T 10 1930." (7.414 meters or 24.324 feet.)

**T. B. M. 235.**—About 0.5 mile south of **Gloucester**, Camden County, on the northeast corner of the concrete base of the signal tower, opposite the Timber control tower, and 6.0 feet west of the west rail. A chiseled square. (3.672 meters or 12.047 feet.)

**U 10.**—At **Gloucester**, Camden County, at the corner of Jay and Cumberland Streets, at the east corner of the Gloucester High School, in the northeast face of the building, and about 3 feet above the ground. A standard disk, stamped "U 10 1930," and set vertically in the brick wall. (5.905 meters or 19.373 feet.)

**V 10.**—At **Gloucester**, Camden County, in the northeast corner of the railroad ticket office. A standard disk, stamped "V 10 1930," and set vertically in the brick building. (6.053 meters or 19.859 feet.)

**17.46 (N. J. G. S.)**—At **Gloucester**, Camden County, at the most northerly entrance on the east side of the railroad station, in the south end of the door-sill. A copper bolt. (5.435 meters or 17.831 feet.)

**W 10.**—At **Gloucester**, Camden County, at the north edge of the town, at bridge signal No. 34 C, 7.6 feet east of the east rail, on the southwest corner of the south concrete base of the signal. A standard disk, stamped "W 10 1930," and set in concrete. (2.369 meters or 7.772 feet.)

**X 10.**—At **Camden**, Camden County, at the first railroad bridge southeast of the Reading Terminal, on the southwest inner rail of the bridge, 39.3 feet southeast of the northwest end of the bridge, and 11.0 feet southwest of the southwest rail. A standard disk, stamped "X 10 1930," and set horizontally. (7.096 meters or 23.281 feet.)

**Y 10.**—At **Camden**, Camden County, about 1,300 feet southeast of the Reading Terminal, on the south corner of the concrete base of the southwest water plug. A standard disk, stamped "Y 10 1930." (6.237 meters or 20.463 feet.)

S 3.—See page 14.

### RAIL ELEVATIONS

The elevations in the following list were determined during the course of the leveling and refer to the top of the rail opposite the railroad station. These elevations are approximate only, since the track does not accurately maintain a constant elevation for any great length of time.

*Approximate rail elevations, in feet*

## LINE 7, HIGHLANDS TO ABSECON, N. J.

Station	Elevation	Station	Elevation
Monmouth Beach .....	8.3	Seaside Heights .....	6.0
Ocean Grove .....	20.3	Oceangate .....	7.0
Lake Como .....	19.6	Beachwood † .....	25.8
Manasquan .....	13.3	Waretown .....	14.3
Point Pleasant .....	12.3	Barnegat .....	41.2
Bayhead .....	4.9	Manahawkin .....	29.1
Mantoloking .....	5.1	Tuckerton .....	16.6

## LINE 9, SEA ISLE JUNCTION TO CAMDEN, N. J.

Paulsboro .....	13.2	Westville .....	10.7
Woodbury .....	36.4	Gloucester .....	16.9
North Woodbury .....	44.8		

† Top of rail at crossing of P. R. R. and C. R. R. of N. J.



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