

6619ab

6619ab

Form 604
Rev. Dec. 1933
DEPARTMENT OF COMMERCE
U.S. COAST AND GEODETIC SURVEY
R. S. PATTON, DIRECTOR

DESCRIPTIVE REPORT

Topographic | Sheet No. 6619 a & b
~~Hydrographic~~

U. S. COAST & GEODETIC SURVEY
LIBRARY AND ARCHIVES

APR 18 1939

Acc. No.

State Oregon

LOCALITY

Willamette River

Portland, Oregon

1938

CHIEF OF PARTY

W. M. Scaife

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY

REG. NO.

TOPOGRAPHIC TITLE SHEET

The Topographic Sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the Office.

Field Letter

REGISTER NO. 6619 a & b

State OREGON

General locality Willamette River
~~Portland, Oregon~~

Locality Portland
~~Swan Island to Sellwood Bridge~~

Scale 1-10000 insert
~~1-5000~~ Date of survey June-July 1938, 19

Vessel Party No. 9, Columbia River

Chief of Party W. M. Scaife

Surveyed by Clifton J. Wagner

Inked by Clifton J. Wagner

Heights in feet above -- to ground to tops of trees

~~Contour--Approximate--contour--Form--line--interval--~~ ----- feet

Instructions dated February 26, 19 35

Remarks:

DESCRIPTIVE REPORT

to accompany Topographic Sheets

T-6619a & T-6619b

1938

Scale 1-5000 with 1-10000 insert

Instructions dated: February 26, 1935. Party No. 9 Columbia River
W. M. Scaife, Chief of Party.

GENERAL DESCRIPTION:

These two sheets, with insert on T-6619b, comprise a survey of the Willamette River, in Portland, Oregon, a distance of about $6\frac{1}{2}$ statute miles along the axis of the river.

In the area between the Oceanic Terminals and the Ross Island Bridge, both banks of the river are lined with docks and wharves almost the entire distance, the main exception being the sea wall or harbor wall that extends from the Steel Bridge to the Hawthorne bridge on the west side of the river, and this wall is used as a mooring for large vessels.

Seven bridges cross the river in the area covered by these sheets, and they will be listed under "BRIDGES", with clearances, etc.

CONTROL:

The control is from the triangulation of 1935 and 1938.

SURVEY METHODS:

Standard survey methods were used exclusively--three point fixes were used extensively, each such fix being checked by a pointing on a fourth control station. Traverses were run on the insert to T-6619b and will be noted in the part of the report dealing with that sheet. Plane table triangulation was used wherever possible.

Due to the high river stage during the time of field work, many details were not noted and were sketched from the Hydro launch. The high water line shown on the sheet is the water line when the river level is 5 feet above the adopted low water plane (1929).

SHEET T-6619a

COMPARISON WITH PREVIOUS SURVEYS:

The area covered by these sheets has been developed extensively and no comparison with previous surveys is made.

Comparison with the published chart No. 6155 follows:
West side of Willamette River-

Just southeast of the Oceanic Terminals the shore line has been built out about 75 meters.

The old dock charted east of triangulation station ORE 1938 is now gone, stub piling fill the area where the dock is charted. The deep slip charted just southeast of the above is no longer in existence, the area being full of ruins, and the small dock just SE of the slip is in ruins.

The comparison is fair from the small dock to Terminal No. 1. The proposed development of Terminal No. 1 apparently is charted, while this survey shows the detail as it existed at the time of survey-- from Terminal No. 1 to the Broadway bridge the chart and sheet compare well, except for small variations in the detail. Near topographic station Ruin a short section of dock is now in ruins.

The area to NW of west end of Steel bridge has changed; the area being now full of stub piling, but no dock.

East side of Willamette River-

The chart and this survey compare very well with the following exceptions: There has been an extension at the north end of the Union Pacific dock. There is one dock not charted, the Santa Cruz Portland Cement Co. dock, doubtless completed since survey from which chart was compiled. The area just NW of the end (E) of the Broadway Bridge--the charted features are in ruins.

The channel piers of the Broadway Bridge are wider than the bridge, as shown in Topo sheet.

CLOSING ERRORS OF TRAVERSES RUN AND HOW ADJUSTED:

No traverses were run in area covered by this sheet.

GEOGRAPHIC NAMES:

Geographic names are correct as they appear in the published chart.

Pencilled names are for reference only and not recommended for charting unless all dock names are charted. An industrial map of the City of Portland, from which names of docks may be obtained if desired, is transmitted with the sheets. It is expected that air photographs of the Portland waterfront will be made in 1939 by the District Engineer, Portland, Oregon. In this event, a set of the photographs will be obtained, from which additional detail may be obtained.

LIST OF PLANE TABLE POSITIONS:

See attached sheet.

STATISTICS:

Statute miles of shoreline - - - - -6.3

Statute miles of railroads - - - - -0.5

SHEET T-6619b

COMPARISON WITH PREVIOUS SURVEYS:

This survey and chart 6155 agree very well with the exceptions noted:

West side of Willamette River-

The west side of the Burnside Bridge extends too far east in the chart and there is pile and timber cribbing on each side of channel piers that extend beyond the sides of the bridge, as shown on Topo sheet.

The center pier of the Morrison Bridge is shown on chart larger than it is.

The clearance of the Hawthorne Bridge is charted greater than as is noted in the Report of Commission of Public Docks, but the charted clearance agrees with the channel piers of the bridge and this latter appears to be correct as the sides of the vertical members of the structure are over these piers.

Just about SW of topographic station Tar, a basin has been dredged for a mooring place for the old USS Oregon, which is now moored here. From here to the Ross Island Bridge there are small differences in the shoreline as charted and as shown on this survey. Some of the docks are now in ruins.

East side of Willamette River-

Just southeast of the east end of the Steel Bridge the shoreline has changed approximately 20 meters.

North of topographic station Min, there has been a change in the dock detail.

The area south of and adjacent to the east end of the Morrison Bridge has been changed. Only a few piles remain of the charted dock.

The small dock just north of the east end of the Ross Island Bridge is gone, a few piles remain and a few float houses are moored here.

TRAVERSES RUN AND HOW ADJUSTED:

No traverses were run on this sheet.

GEOGRAPHIC NAMES:

The geographic names are correct as charted.

LIST OF PLANE TABLE POSITIONS:

See attached sheet.

STATISTICS:

Statute miles of shoreline - - - - - 4.5

T-6619b (insert)

COMPARISON WITH PREVIOUS SURVEYS:

West side of Willamette River-

The dock in lat. $45^{\circ}29.3'$ and long. $122^{\circ}40.3'$ no longer exists. Between topographic station Pill and topographic station Bell the shoreline as shown on this survey is a bulkhead, while the chart shows the wall or dock that is inshore of the highwater line.

Just south of topographic station ^{Bid} Bell there is charted a small dock that no longer exists.

Just south of topographic station ^{Boq} Bell there is charted a small dock that is smaller than shown on chart and is charted about 30 meters SE of the true position.

The rock in lat. $45^{\circ}28'.3$ and long. $122^{\circ}40'$ is smaller than charted and the elevation is charted as 17 feet, whereas, this rock is only about 12 feet above the adopted low water plane.

In the area around the above rock there is indicated in pencil on the Topo sheet, the limits of the rock ledge surrounding this rock. The chart shows the ledge along the beach, but it is recommended that the ledge symbols be charted as shown on the Topo sheet in pencil. This feature is not inked as it was taken from the Hydrographic sheet, but it is believed to be sufficiently accurate for charting, and if recommendations are accepted, the feature may be inked on the sheet. ^{inked in office.}

The rock ledge charted in lat. $45^{\circ}29'.3$, long. $122^{\circ}40'.3$ appeared to be an area of boulders, but no rock ledge was noted. It is recommended that this feature be removed, and the word "BOULDERS" substituted. ^{inked in office}

East side of Willamette River-

The shoreline of this survey and as charted agrees from the north end to the vicinity of topographic station Hank, while south of topographic station Hank to the edge of this survey the shoreline shows some accretion and is generally offshore from shoreline as charted. The small dock charted in lat. $45^{\circ}29'.5$, long. $122^{\circ}39'.4$ no longer exists.

The small dock, charted in lat. $45^{\circ}28'.3$ and long. $122^{\circ}39'.8$, no longer exists. A few piles remain near where its outer end is charted.

The old railroad trestle in lat. $45^{\circ}28'.2$ and long. $122^{\circ}39'.8$ is now in a state of disrepair, though it is still standing.

Ross Island shows accretions to its shores at north end and NE side, and accretions to its south end.

Hardtack Island shows accretions to its N end, and in vicinity of charted structures in NW end, and there has been a large hole dredged into its west side. There have been accretions at its south end.

The small island to southeast of Hardtack Island shows practically no change.

The small island SW of Ross Island shows considerable accretions and is much larger than charted.

TRAVERSES RUN AND HOW ADJUSTED:

A traverse was run from triangulation station ROSS 1938 to DAM 1938 (on east side of Ross Island) distance, 1.3 statute miles,

closure of 6 meters, adjusted by straight line adjustment. A traverse was run from triangulation station FULTON to topographic station Moor (located on above traverse), distance, 1.5 statute miles, closure of 6 meters, adjusted by straight line adjustment.

GEOGRAPHIC NAMES:

The geographic names are correct as charted.

LIST OF PLANE TABLE POSITIONS:

See attached sheet.

STATISTICS:

Statute miles of shoreline- - - - -13.3

GENERAL:

The shoreline in the area to south of topographic station Tar, sheet T-6619b, was not located as dredging operations for old USS Oregon were in progress at time of the survey. The shoreline is sketched on the sheet from the Department of Public Works print which shows the top of bank line in pencil. This was reduced and applied to sheet from common point topographic station Tar and direction of harbor wall, which is parallel to the Morrison Bridge. Topographic station Tar is shown on this print. This part will be left in pencil and attempt made to get a print of the location of the proposed ~~re-dropped~~ bank, as this is doubtless the best line for charting, as the development will probably be finished in the near future. *rip-rapped*

Bridge Data:

From Report of Commission of Public Docks, Portland, Oregon, year ending November 30, 1936, and width of bridge from County Surveyor's Office.

Broadway Bridge--double Bascule Span; vertical clearance, 90 ft. above low water closed; horizontal clearance 250 ft.; width of bridge, 72 ft. 6 in.

Steel Bridge--double telescopic lift; vertical clearance, 26 ft. above low water closed, 72 ft. above low water, lower deck up, 164 ft. above low water, both decks up; horizontal clearance, 205 ft; width of bridge, 71 ft. 5 in. *Listed as Glison St. in 1935 Eng'g. Bridge Book, p. 548.*

Burnside Bridge--double Bascule Span; vertical clearance, 64.8 ft. above low water closed; horizontal clearance, 209 feet; width of bridge, 82 feet.

Morrison Bridge--swing draw span; vertical clearance, 33 ft. above low water closed; horizontal clearance, 157 ft. each side of center pier; width of bridge, 49 ft. 6 in. (Now under repair and may be changed.)

Hawthorne Bridge--lift span; vertical clearance, 50 ft. above low water closed, 164 ft. above low water span up; horizontal clearance, 200 ft. (This does not agree with this survey* which gives greater horizontal clearance.); width of bridge, 54 feet. * scaled value is 239 ft.

Ross Island Bridge--fixed arch; vertical clearance, 120 ft. above low water for horizontal distance of 100 ft.; horizontal clearance, 490 ft.; width of bridge, 48 feet.

SHEET T-6619b (insert)

Sellwood Bridge--continuous truss; vertical clearance 74.6 ft. above low water; horizontal clearance, 270 ft.; width of bridge, 28 ft. 3in.

The bridge piers that are located on this survey are shown in dotted outline in their respective bridges.

Respectfully submitted,

Clifton J. Wagner
Clifton J. Wagner
Jr. H. & G. Engr.,
C. & G. Survey

Approved and forwarded:

W. M. Scaife
W. M. SCAIFE
Chief of Party
H. & G. Engr.

MAGNETICS

Declinatoire with alidade H-193 was used for magnetic meridians on these sheets.

The declinatoire was checked by comparison with Compass Declinometer No. 21, at triangulation station HAZEL 1938, on Jan. 5, 1939 and found to have the following corrections:

H-193 +40'. Index error of Compass Declinometer + 12', making a total correction of + 52' to Easterly declination.

Magnetic meridians shown on sheet are uncorrected.

SHEET T- 6619a

| <u>Triangulation Stn.</u> | <u>Date</u> | <u>Scaled Obs.</u> | <u>Corrected Obs.</u> | <u>Remarks-</u> |
|---------------------------|---------------|-------------------------------|-------------------------------|-----------------|
| ORE | July 11, 1938 | 23° 08' 23° 41' | 22° 00' 24° 33' | |
| STAR | July 11, 1938 | 21° 10' ✓ | 22° 02' 21° 52' | |
| KERR | June 15, 1938 | 20° 50' 21° 50' | 22° 42' 21° 40' | |

SHEET T-6619b

| | | | | |
|------|---------------|-----------|-----------|-----------------------------------|
| BURN | June 18, 1938 | 21° 01' ✓ | 21° 53' ✓ | |
| GENE | July 5, 1938 | 17° 05' ✓ | 17° 57' ✓ | Power plant about 100 yards N. |

SHEET T-6619b (Insert)

| | | | | |
|--------|---------------|-------------------------------|-------------------------------|--|
| ROSS | July 21, 1938 | 21° 01' ✓ | 21° 53' ✓ | |
| FULTON | July 26, 1938 | 22° 27' 23° 27' | 23° 19' 24° 19' | |
| DAM | July 28, 1938 | 20° 31' 37' | 21° 23' 29' | |
| SELL | Aug. 2, 1938 | 19° 42' 52' | 20° 38' 44' | |

LIST OF RECOVERABLE PLANE TABLE POSITIONS:

| Name and Description | | Latitude | Longitude |
|---------------------------------|--|--------------|---------------|
| <u>SHEET</u> <u>T-6619a</u> | Flood Floodlight near SE corner Dock at Terminal No. 1. | 45° 32' 424" | 122° 40' 129" |
| | Block RR block signal 145 meters NW of Broadway Bridge | 32 99 | 40 412 |
| | Base Cable crossing sign (concrete base) | 31 1695 | 40 317 |
| | Sig RR block signal 202 meters SE of Broadway Bridge | 31 1626 | 40 272 |
| | Bent North Pacific Dock Light | 32 1611 | 41 1046 |
| <u>T-6619b</u> | BM C&GS 014-1920 See Special Publication No. 177 | 31 1287 | 39 1278 |
| | Ride RR block signal, 305 meters N of Burnside Bridge | 31 1038 | 39 1053 |
| <u>Insert</u> <u>T-6619b</u> | Line Power line tower | 29 1702 | 39 1297 |
| | Toe Power line tower | 29 1574 | 39 987 |
| | Pow Power line tower | 29 1453 | 39 693 |
| | B Burner | 29 1050 | 40 126 |
| | T Tank, yellow, elevated | 29 1014 | 40 142 |
| | Bur Burner | 28 1759 | 40 337 |
| | Reef Iron rod stuck in top of rock | 28 612 | 40 49 |
| | Tower Power line tower | 28 262 | 39 977 |
| | Tow Center of round low tower, brick base | 27 1419 | 40 8 |
| | P Stack with conical lid | 29 334 | 40 497 |
| | Q Tank, gray, wood, elevated | 29 246 | 40 545 |
| | R Tank, elevated | 29 216 | 40 518 |
| | S Stack with lid | 29 153 | 40 615 |
| | T Tank, elevated | 29 137 | 40 610 |
| | V Tank, flat top, elevated | 28 1837 | 40 505 |
| <u>67 USE</u> | USE Triangulation Station, Brass washer screwed to Wharf floor | 31 252 | 39 1253 |

NOTE TO ACCOMPANY TOPOGRAPHIC SHEET No. 6619 a & b and
HYDROGRAPHIC SHEET No. 6335

The following signals appear on the US Engineer survey sheet B-15-1/59 "B" July 2, 1938, and on the above sheets of this party. They are listed on this note instead of on the sheets as the US Engineers will probably use a copy of this party's sheets for future surveys, and use the names as given thereon.

| C & G Survey Name | U S Engineer Name |
|--|----------------------|
| Portland, Oceanic Terminals tank 1935 | Elrod Tank |
| Portland, Union Pacific R.R.Co., elevated blk tank | Olympic Tank |
| Portland, PRL & P white concrete stack 1935 | PGE Stack |
| Eastern & Western Lumber Co tank 1938 | Mill Tank |
| Portland, Union Pacific Railroad Co., stack 1935 | O W R & N Stack |
| Portland, Crown Mills, black tank 1935 | Crown Tank |
| Portland, Albers Bros. Milling Co., tank 1935 | Albers Tank |
| Portland, Union Depot Clock Tower 1935 | same as C & S Survey |
| Portland, Union Pacific R. R. Co., tank | U P Tank |
| Portland, Stettler Co., tank 1935 | Stettler Tank |
| Hirsch-Weiss Co., tank | same |
| Base (topographic) | Cable Cross |
| Sig " | Semaphore |

The following USE signals ~~xxxxxx~~ were not recovered:

- Upper Corner Lun. Dock
- SP & S Dock
- Burner

Yellow Tank - There is no tank in the vicinity shown on USE sheet.
Dock

Lukenbach Tank, not located, only one direction obtained in the trian.
while it was believed that several directions were taken.

The signal shown as D/S West Lift probably refers to the Steel Bridge,
and if so is out of position.

The signal shown as Willamette Iron and Steel Stack is plotted in the
position of the Quaker California Eastern States Lines tank 1938, and
the Willamette Iron and Steel Cor is now in lat. 45° 32.7', long. 122°
41.7'.

U. S. COAST & GEODETIC SURVEY
LIBRARY AND ARCHIVES

APR 18 1939


Acc. No.

APPROVAL BY CHIEF OF PARTY

Topographic sheets T-6619a and T-6619b, (with insert) have been inspected and approved by me.

The field work was done under my occasional supervision.

No additional work is considered necessary.


W. M. SCAIFE
H. & G. Engr.,
Chief of Party.

| | Remarks | Decisions |
|----|------------------|----------------|
| 1 | | 455226 U S G B |
| 2 | | 456227 U S G B |
| 3 | <i>off sheet</i> | 455226 |
| 4 | | |
| 5 | | |
| 6 | | 455226 |
| 7 | | " |
| 8 | | " |
| 9 | | " |
| 10 | | see above |
| 11 | | see above |
| 12 | | 454226 |
| 13 | | 454226 U S G B |
| 14 | | 454226 U S G B |
| 15 | | 454226 |
| 16 | | |
| 17 | | |
| 18 | | |
| 19 | | |
| 20 | | |
| 21 | | |
| 22 | | |
| 23 | | |
| 24 | | |
| 25 | | |
| 26 | | |
| 27 | | |

GEOGRAPHIC NAMES

Survey No. **T 6619ab**

| Name on Survey | On Chart No. | | On previous survey No. | | On U. S. quadrangle Maps | | From local information | | On local Maps | | P. O. Guide or Map | | Rand McNally Atlas | | U. S. Light List | |
|-------------------------|--------------|---|------------------------|---|--------------------------|---|------------------------|---|---------------|--|--------------------|--|--------------------|--|------------------|----|
| | A | B | C | D | E | F | G | H | K | | | | | | | |
| <u>Portland, Oregon</u> | | | | | | | | | | | | | | | | 1 |
| <u>Willamette River</u> | | | | | | | | | | | | | | | | 2 |
| <u>Broadway Bridge</u> | | | | | | | | | | | | | | | | 3 |
| | | | | | | | | | | | | | | | | 4 |
| | | | | | | | | | | | | | | | | 5 |
| <u>Steel Bridge</u> | | | | | | | | | | | | | | | | 6 |
| <u>Burnside Bridge</u> | | | | | | | | | | | | | | | | 7 |
| <u>Morrison Bridge</u> | | | | | | | | | | | | | | | | 8 |
| <u>Hawthorne Bridge</u> | | | | | | | | | | | | | | | | 9 |
| <u>Portland, Oregon</u> | | | | | | | | | | | | | | | | 10 |
| <u>Willamette River</u> | | | | | | | | | | | | | | | | 11 |
| <u>Ross I. Bridge</u> | | | | | | | | | | | | | | | | 12 |
| <u>Ross Island</u> | | | | | | | | | | | | | | | | 13 |
| <u>Hardtack Island</u> | | | | | | | | | | | | | | | | 14 |
| <u>Sellwood Bridge</u> | | | | | | | | | | | | | | | | 15 |
| | | | | | | | | | | | | | | | | 16 |
| | | | | | | | | | | | | | | | | 17 |
| | | | | | | | | | | | | | | | | 18 |
| | | | | | | | | | | | | | | | | 19 |
| | | | | | | | | | | | | | | | | 20 |
| | | | | | | | | | | | | | | | | 21 |
| | | | | | | | | | | | | | | | | 22 |
| | | | | | | | | | | | | | | | | 23 |
| | | | | | | | | | | | | | | | | 24 |
| | | | | | | | | | | | | | | | | 25 |
| | | | | | | | | | | | | | | | | 26 |
| | | | | | | | | | | | | | | | | 27 |

INDEXED
 BY L. H. G. ON 7/13/39

MEMORANDUM

IMMEDIATE ATTENTION

SURVEY
 DESCRIPTIVE REPORT } ~~SECRET~~
~~SECRET~~ } No. T 6619eAb

{ received
 registered June 30, 1939
 verified
 reviewed
 approved

This is forwarded in order that your attention may be directed to the matters as indicated below. Please initial in column 3 as an acknowledgement that your attention has been thus directed. The complete original records are available if desired. If you cannot give this your immediate attention, please initial, note, and forward to the next section marked, calling for the records at your convenience.

| ROUTE | | Initial | Attention called to |
|-------|--|---------|---------------------|
| 20 | | | |
| 22 | | | |
| 24 | | | |
| 25 | | | |
| 26 | | | |
| 30 | | | |
| 40 | | | |
| 62 | | | |
| 63 | | | |
| 82 | | | |
| 83 | | | |
| 88 | | | |
| 90 | | | |
| | | | |
| | | | |

RETURN TO

| | |
|----|----------|
| 82 | Lt. Reed |
|----|----------|

✓ JBR

Section of Field Records

REVIEW OF TOPOGRAPHIC SURVEY NO. 6619a and b (1938) FIELD NO.

Portland, Willamette River, Oregon.
Surveyed in June-July, 1938, Scale 1:5,000 and 10,000.
Instructions dated Feb. 26, 1935.

Plane Table Survey.

Aluminum Mounted.

Chief of Party - W. M. Scaife
Surveyed by - Clifton J. Wagner
Inked by - Clifton J. Wagner

1. Junction with Contemporary Surveys.

- a. The junction on the north (T-6619a) with T-6618b (1938) is satisfactory. A small difference exists in the position of the street on the north but will cause no particular charting difficulties.
- b. No surveys have been made by this Bureau to the southward of the present survey limits (Insert, T-6619b).

2. Comparison with Prior Surveys.

T-1546 (1884), Scale 1:10,000.

This survey covers the present survey in the area northward of Ross Island. Extensive differences due mainly to commercial improvements are noted and a detailed comparison will serve no useful cartographic purpose. Within the area covered, the present survey should supersede this survey.

3. Comparison with Chart 6155 (New Print dated April 28, 1939)

a. Topography.

Topography shown on the chart originates principally with various Engineers' surveys. The comparison noted in the Descriptive Report, pages 2 to 4 is very detailed and need not be repeated here. The charted power line, however, which is shown on Bp. 32610 of 1932 in Lat. $45^{\circ}28'$; Long. $122^{\circ}40'$ should be retained on the chart. The present survey shows only one tower on the east bank and the transmission line is still in existence from information shown on H-6335 (1938). Except as just noted, the present survey should supersede these Engineers' surveys.

b. Aids to Navigation.

Aids to navigation have been considered in the review of H-6335 (1938).

c. Magnetic Meridian.

The magnetic observations agree closely with the charted value except the observation at triangulation station GENE (T-6619b) which differs by 4°07'. A power plant, however, is noted about 100 yards north of this station.

4. Condition of Survey.

a. The descriptive report is particularly comprehensive and fully covers all items of importance. The scope of the items considered is commendable.

b. The field drafting is very good.

5. Compliance with Instructions for the Project.

Satisfactory.

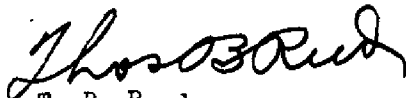
6. Additional Field Work Recommended.

None.

7. Reviewed by Harold W. Murray, October 25, 1939.

8. Inspected by H. R. Edmonston.

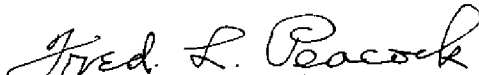
Examined and Approved:



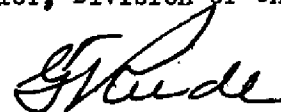
T. B. Reed,
Chief, Section of Field Records.



Chief, Division of Charts.



Chief, Section of Field Work.



Chief, Division of H. & T.